COMMON CORE ESSENTIAL ELEMENTS
AND ALTERNATE ACHIEVEMENT DESCRIPTORS FOR

Mathematics

Wisconsin Department of Public Instruction

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Wisconsin Department of Public Instruction
Tony Evers, PhD, State Superintendent

Madison, Wisconsin

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SECTION I

Wisconsin's Approach to Academic Standards

Foreword

In June 2010, Wisconsin adopted the Common Core State Standards in English Language Arts and Mathematics. These K-12 academic standards are aligned with college and work expectations, include rigorous content and application, and are internationally benchmarked. Additionally, the Common Core State Standards emphasize literacy in all of the disciplines. For all students to be career and college ready, including students with significant cognitive disabilities, educators should include both the content and the reading and writing skills that students need to demonstrate learning in the other disciplinary areas.

All students, including students with significant cognitive disabilities, deserve and have a right to a quality educational experience. This right includes, to the maximum extent possible, the opportunity to be involved in and meet the same challenging expectations that have been established for all students. Wisconsin educators collaborated with educators from 12 other states to create alternate achievement standards aligned to the Common Core State Standards. These alternate achievement standards are called the *Wisconsin Common Core Essential Elements (CCEEs) in English Language Arts and Mathematics*. The CCEEs satisfy the requirement of the U.S. Department of Education that Wisconsin have alternate achievement standards for its students with significant cognitive disabilities that are clearly linked to grade-level academic content standards, promote access to the general curriculum and reflect professional judgment of the highest expectation possible.

This document is a guide for parents, educators, school personnel, and other community members to support their work in teaching students with significant cognitive disabilities the academic skills necessary to succeed in life after graduation.

Tony Evers, PhD
State Superintendent

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Purpose of the Document

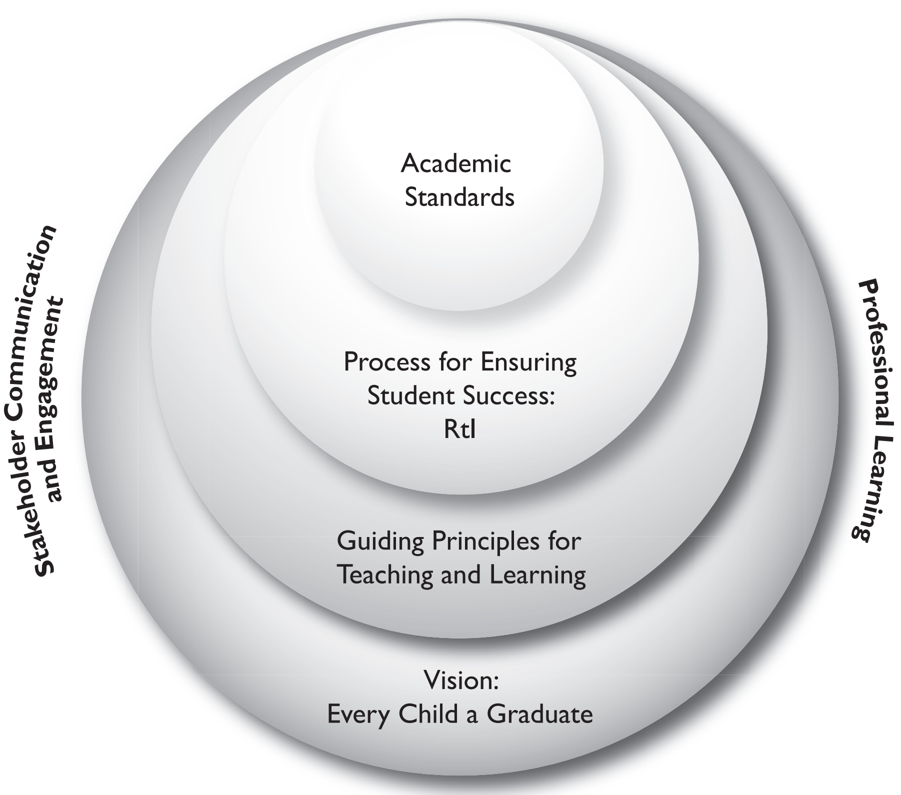
Sections I, 2 and 4 of this document were developed by Wisconsin educators to provide the vision and principles that support Wisconsin's Approach to Academic Standards. These principles, although initially developed for the CCSS, can be applied to the CCEEs and instructional practices of educators of students with significant cognitive disabilities.

To assist Wisconsin education stakeholders in understanding and implementing the **Common Core State Standards (CCSS)**, Wisconsin Department of Public Instruction (DPI) has developed guidance to be used along with the CCSS. These materials are intended to provide further direction and should not be viewed as administrative rule. This publication provides a vision for student success, guiding principles for teaching and learning, and locates the standards within a multi-level system of support where high quality instruction, balanced assessment, and collaboration function together for student learning. Information on the design and content of the CCSS is included, as is a guide to assist with facilitating local conversations about these internationally-benchmarked standards and how they impact instruction.

Aligning for Student Success

To build and sustain schools that support every student in achieving success, educators must work together with families, community members, and business partners to connect the most promising practices in the most meaningful contexts. Major statewide initiatives focus on high school graduation, Response to Intervention (RtI), and the *Common Core State Standards for English Language Arts, Disciplinary Literacy, and Mathematics*. While these are often viewed as separate efforts or initiatives, each of them is connected to a larger vision of every child graduating college and career ready. The graphic below illustrates how these initiatives function together for a common purpose. Here, the vision and set of guiding principles form the foundation for building a supportive process for teaching and learning rigorous and relevant content. The following sections articulate this integrated approach to increasing student success in Wisconsin schools and communities.

Relationship Between Vision, Principles, Process, Content



A Vision: Every Child a Graduate

In Wisconsin, we are committed to ensuring every child is a graduate who has successfully completed a rigorous, meaningful, 21st century education that will prepare him or her for careers, college and citizenship. Though our public education system continues to earn nation-leading graduation rates, a fact we can be proud of, one in ten students drop out of school, achievement gaps are too large, and overall achievement could be even higher. This vision for every child a graduate guides our beliefs and approaches to education in Wisconsin.

Guided By Principles

All educational initiatives are guided and impacted by important and often unstated attitudes or principles for teaching and learning. *The Guiding Principles for Teaching and Learning* emerge from research and provide the touchstone for practices that truly affect the vision of every child a graduate prepared for college and career. When made transparent, these principles inform what happens in the classroom, the implementation and evaluation of programs, and most important, remind us of our own beliefs and expectations for students.

Ensuring a Process for Student Success

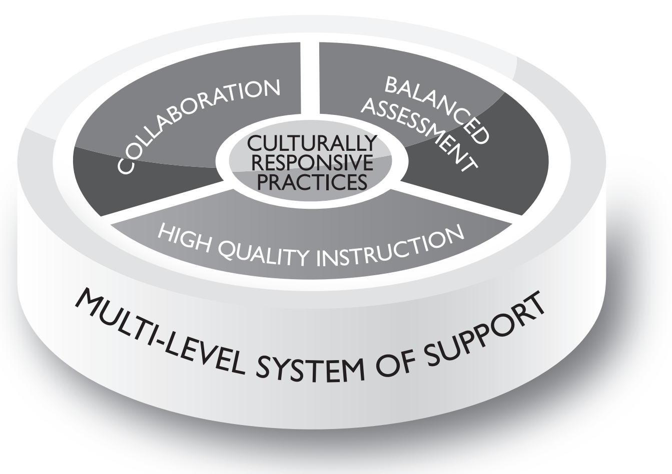
To ensure that every child in Wisconsin graduates prepared for college and career, schools need to provide high quality instruction, balanced assessment and collaboration reflective of culturally responsive practices. The Wisconsin Response to Intervention (RtI) framework helps to organize the components of a system designed to support student learning. Below, the three essential elements of high quality instruction, balanced assessment and collaboration interact within a multi-level system of support to ensure each student receives what he or she needs to access higher levels of academic and behavioral success.

At the school or district level, programs, initiatives and practices related to high quality instruction, balanced assessment and collaboration can be more powerful when organized or braided to function systemically to support all students. The focus must be on a comprehensive approach to student learning.

Connecting to Content: The Common Core State Standards

Within this vision for increased student success, rigorous, internationally-benchmarked academic standards provide the content for high quality curriculum and instruction, and for a balanced assessment system aligned to those standards. With the adoption of the CCSS, Wisconsin has the tools to build world-class curriculum, instruction and assessments for greater student learning. The CCSS articulate what we teach so that educators can focus on how instruction can best meet the needs of each student. When implemented within a multi-level system of support, the CCSS can help to ensure that every child will graduate prepared for college, work and a meaningful life.

Wisconsin's Vision for RtI



"Educators must work together with families, community members, and business partners to connect the most promising practices in the most meaningful contexts."

Guiding Principles for Teaching and Learning

These guiding principles are the underpinnings of effective teaching and learning for every Wisconsin teacher and every Wisconsin student. They are larger than any one initiative, process or set of standards. Rather, they are the lens we look through as we identify teaching and learning standards, design assessments and determine what good instruction looks like. These principles recognize that every student has the right to learn and are built upon three essential elements: high quality instruction, balanced assessment, and collaboration. They are meant to align with academic excellence, rigorous instruction, and college and career readiness for every Wisconsin student. For additional research, resources and probing questions to support professional learning on the six principles, please see the Wisconsin Research and Resources section of this document.

Every student has the right to learn.

It is our collective responsibility as an education community to make certain each child receives a high-quality, challenging education designed to maximize potential, an education that reflects and stretches his or her abilities and interests. This belief in the right of every child to learn forms the basis of equitable teaching and learning. The five principles that follow cannot exist without this commitment guiding our work.

Instruction must be rigorous and relevant.

To understand the world in which we live, there are certain things we all must learn. Each school subject is made up of a core of essential knowledge that is deep, rich, and vital. Every student, regardless of age or ability, must be taught this essential knowledge. What students learn is fundamentally connected to how they learn, and successful instruction blends the content of a discipline with processes of an engaging learning environment that changes to meet the dynamic needs of all students.

Purposeful assessment drives instruction and affects learning.

Assessment is an integral part of teaching and learning. Purposeful assessment practices help teachers and students understand where they have been, where they are, and where they might go next. No one assessment can provide sufficient information to plan teaching and learning. Using different types of assessments as part of instruction results in useful information about student understanding and progress. Educators should use this information to guide their own practice and in partnership with students and their families to reflect on learning and set future goals.

Learning is a collaborative responsibility.

Teaching and learning are both collaborative processes. Collaboration benefits teaching and learning when it occurs on several levels: when students, teachers, family members, and the community collectively prioritize education and engage in activities that support local schools, educators, and students; when educators collaborate with their colleagues to support innovative classroom practices and set high expectations for themselves and their students; and when students are given opportunities to work together toward academic goals in ways that enhance learning.

Students bring strengths and experiences to learning.

Every student learns. Although no two students come to school with the same culture, learning strengths, background knowledge, or experiences, and no two students learn in exactly the same way, every student's unique personal history enriches classrooms, schools, and the community. This diversity is our greatest education asset.

Responsive environments engage learners.

Meaningful learning happens in environments where creativity, awareness, inquiry, and critical thinking are part of instruction. Responsive learning environments adapt to the individual needs of each student and encourage learning by promoting collaboration rather than isolation of learners. Learning environments, whether classrooms, schools, or other systems, should be structured to promote engaged teaching and learning.

Reaching Every Student; Reaching Every Discipline

Reaching Every Student

The CCSS set high, clear and consistent expectations for all students. In order to ensure that all students can meet and exceed those expectations, Wisconsin educators provide flexible and fluid support based on student need. Each student brings a complex system of strengths and experiences to learning. One student may have gifts and talents in mathematics and need additional support to reach grade-level standards in reading. A student may be learning English as a second language while remaining identified for gifted services in science. The following statements provide guidance for how to ensure that the CCSS provide the foundation for learning for every student in Wisconsin, regardless of their unique learning needs.

Application of Common Core State Standards for English Language Learners

The National Governors Association Center for Best Practices and the Council of Chief State School Officers strongly believe that all students should be held to the same high expectations outlined in the Common Core State Standards. This includes students who are English language learners (ELLs). However, these students may require additional time, appropriate instructional support, and aligned assessments as they acquire both English language proficiency and content area knowledge.

ELLs are a heterogeneous group with differences in ethnic background, first language, socioeconomic status, quality of prior schooling, and levels of English language proficiency. Effectively educating these students requires pre-assessing each student instructionally, adjusting instruction accordingly, and closely monitoring student progress. For example, ELLs who are literate in a first language that shares cognates with English can apply first-language vocabulary knowledge when reading in English; likewise ELLs with high levels of schooling can often bring to bear conceptual knowledge developed in their first language when reading in English. However, ELLs with limited or interrupted schooling will need to acquire background knowledge prerequisite to educational tasks at hand. Additionally, the development of native-like proficiency in English takes many years and may not be achieved by all ELLs especially if they start schooling in the US in the later grades. Teachers should recognize that it is possible to achieve the standards for reading and literature, writing and research, language development and speaking and listening without manifesting native-like control of conventions and vocabulary.

English Language Arts

The Common Core State Standards for English Language Arts (ELA) articulate rigorous grade-level expectations in the areas of reading, writing, speaking, listening to prepare all students to be college and career ready, including English language learners. Second-language learners also will benefit from instruction about how to negotiate situations outside of those settings so they are able to participate on equal footing with native speakers in all aspects of social, economic, and civic endeavors.

ELLs bring with them many resources that enhance their education and can serve as resources for schools and society. Many ELLs have first language and literacy knowledge and skills that boost their acquisition of language and literacy in a second language; additionally, they bring an array of talents and cultural practices and perspectives that enrich our schools and society. Teachers must build on this enormous reservoir of talent and provide those students who need it with additional time and appropriate instructional support. This includes language proficiency standards that teachers can use in conjunction with the ELA standards to assist ELLs in becoming proficient and literate in English. To help ELLs meet high academic standards in language arts it is essential that they have access to:

- Teachers and personnel at the school and district levels who are well prepared and qualified to support ELLs while taking advantage of the many strengths and skills they bring to the classroom;
- Literacy-rich school environments where students are immersed in a variety of language experiences;
- Instruction that develops foundational skills in English and enables ELLs to participate fully in grade-level coursework;

- Coursework that prepares ELLs for postsecondary education or the workplace, yet is made comprehensible for students learning content in a second language (through specific pedagogical techniques and additional resources);

- Opportunities for classroom discourse and interaction that are well-designed to enable ELLs to develop communicative strengths in language arts;

- Ongoing assessment and feedback to guide learning; and

- Speakers of English who know the language well enough to provide ELLs with models and support.

Application to Students with Disabilities

The Common Core State Standards articulate rigorous grade-level expectations in the areas of mathematics and English language arts. These standards identify the knowledge and skills students need in order to be successful in college and careers.

Students with disabilities, students eligible under the Individuals with Disabilities Education Act (IDEA), must be challenged to excel within the general curriculum and be prepared for success in their post-school lives, including college and/or careers. These common standards provide an historic opportunity to improve access to rigorous academic content standards for students with disabilities. The continued development of understanding about research-based instructional practices and a focus on their effective implementation will help improve access to mathematics and English language arts (ELA) standards for all students, including those with disabilities. Students with disabilities are a heterogeneous group with one common characteristic: the presence of disabling conditions that significantly hinder their abilities to benefit from general education (IDEA 34 CFR §300.39, 2004). Therefore, how these high standards are taught and assessed is of the utmost importance in reaching this diverse group of students.

In order for students with disabilities to meet high academic standards and to fully demonstrate their conceptual and procedural knowledge and skills in mathematics, reading, writing, speaking and listening (English language arts), their instruction must incorporate supports and accommodations, including:

- Supports and related services designed to meet the unique needs of these students and to enable their access to the general education curriculum (IDEA 34 CFR §300.34, 2004).

- An Individualized Education Program (IEP)[1] which includes annual goals aligned with and chosen to facilitate their attainment of grade-level academic standards.

- Teachers and specialized instructional support personnel who are prepared and qualified to deliver high-quality, evidence-based, individualized instruction and support services.

Promoting a culture of high expectations for all students is a fundamental goal of the Common Core State Standards. In order to participate with success in the general curriculum, students with disabilities, as appropriate, may be provided additional supports and services, such as:

- Instructional supports for learning, based on the principles of Universal Design for Learning (UDL),[2] which foster student engagement by presenting information in multiple ways and allowing for diverse avenues of action and expression.

- Instructional accommodations (Thompson, Morse, Sharpe & Hall, 2005), changes in materials or procedures, which do not change the standards but allow students to learn within the framework of the Common Core.

- Assistive technology devices and services to ensure access to the general education curriculum and the Common Core State Standards.

Some students with the most significant cognitive disabilities will require substantial supports and accommodations to have meaningful access to certain standards in both instruction and assessment, based on their communication and academic needs. These supports and accommodations should ensure that students receive access to multiple means of learning and opportunities to demonstrate knowledge, but retain the rigor and high expectations of the Common Core State Standards.

Implications for the Common Core State Standards for Students with Gifts and Talents

The CCSS provide a roadmap for what students need to learn by benchmarking expectations across grade levels. They include rigorous content and application of knowledge through higher-order skills. As such, they can serve as a foundation for a robust core curriculum, however, students with gifts and talents may need additional challenges or curricular options. In order to recognize what adaptations need to be made or what interventions need to be employed, we must understand who these students are.

According to the National Association for Gifted Children (2011), "Giftedness, intelligence, and talent are fluid concepts and may look different in different contexts and cultures" (para. 1). This means that there are students that demonstrate high performance or have the potential to do so in academics, creativity, leadership, and/or the visual and performing arts. Despite this diversity there are common characteristics that are important to note.

Students with gifts and talents:

- Learn at a fast pace.
- Are stimulated by depth and complexity of content.
- Make connections.

These traits have implications for how the Common Core State Standards are used. They reveal that as curriculum is designed and instruction, is planned there must be:

- Differentiation based on student readiness, interest, and learning style:
  - Pre-assessing in order to know where a student stands in relation to the content that will be taught (readiness), then teach those standards that the student has not mastered and enrich, compact, and/or accelerate when standards have been mastered. This might mean using standards that are beyond the grade level of the student.
  - Knowledge of our students so we are familiar with their strengths, background knowledge, experiences, interests, and learning styles.
  - Flexible grouping to provide opportunities for students to interact with peers that have similar abilities, similar interests, and similar learning styles (homogenous grouping), as well as different abilities, different interests, and different learning styles (heterogeneous grouping).
- Differentiation of content, process, and product.
  - Use of a variety of materials (differentiating content) to provide challenge. Students may be studying the same concept using different text and resources.
  - Variety of tasks (differentiating process). For example in a science lesson about the relationship between temperature and rate of melting, some students may use computer-enhanced thermometers to record and graph temperature so they can concentrate on detecting patterns while other students may graph temperature at one-minute intervals, then examine the graph for patterns.
  - Variety of ways to demonstrate their learning (differentiating product). These choices can provide opportunities for students with varying abilities, interests, and learning styles to show what they have discovered.
- Adjustment to the level, depth, and pace of curriculum.
  - Compact the curriculum to intensify the pace.
  - Vary questioning and use creative and critical thinking strategies to provide depth.
  - Use standards beyond the grade level of the students. Since the CCSS provide a K-12 learning progression, this is easily done.
  - Accelerate subject areas or whole grades when appropriate.
- Match the intensity of the intervention with the student's needs. This means that we must be prepared to adapt the core curriculum and plan for a continuum of services to meet the needs of all students, including those with gifts and talents.

References

Individuals with Disabilities Education Act (IDEA), 34 CFR §300.34 (a). (2004).

Individuals with Disabilities Education Act (IDEA), 34 CFR §300.39 (b)(3). (2004).

National Association for Gifted Children (2010). Redefining Giftedness for a New Century Shifting the Paradigm. Retrieved from http://www.nagc.org/index.aspx?id=6404.

National Association for Gifted Children (2011). What is giftedness? Retrieved from http://nagc.org/index.aspx?id=574.

Sousa, D.A. (200). How the gifted brain learns. Thousand Oaks, CA: Corwin Press.

Thompson, Sandra J., Amanda B. Morse, Michael Sharpe, and Sharon Hall. "Accommodations Manual: How to Select, Administer and Evaluate Use of Accommodations and Assessment for Students with Disabilities," 2nd Edition. Council for Chief State School Officers, 2005 http://www.ccsso.org/content/pdfs/AccommodationsManual.pdf . (Accessed January, 29, 2010).

Reaching Every Discipline
Wisconsin's Approach to Disciplinary Literacy

Background

In Wisconsin, we hold the vision that every child must graduate ready for post-secondary education and the workforce. To achieve this vision, students must develop the skills to think, read, communicate, and perform in many academic contexts. If students must develop these specific skills, every educator must then consider how students learn to read, write, think, speak and listen in their discipline.

The kinds of reading, writing, thinking, speaking and listening required in a marketing course are quite different when compared with the same processes applied in an agriculture, art or history course. For example, a student may have successfully learned the vocabulary and content needed to score an A on a freshman biology test, but finds he still struggles to understand relevant articles from *Popular Science Magazine*, or use his science vocabulary to post respected responses on an environmental blog he reads at home. This student knows biology content, but lacks the disciplinary literacy to think, read, write, and speak with others in this field. Without this ability, his content knowledge is limited only to the classroom, and cannot extend to the real world around him.

In Wisconsin, disciplinary literacy is defined as the confluence of content knowledge, experiences, and skills merged with the ability to read, write, listen, speak, think critically and perform in a way that is meaningful within the context of a given field.

Teaching for disciplinary literacy ensures that students develop the skills to use the deep content knowledge they learn in school in ways that are relevant to each of them, and to the world around them.

In 2009, *The State Superintendent's Adolescent Literacy Plan* offered recommendations for how to begin professional conversations about disciplinary literacy in Wisconsin. The plan recommended Wisconsin write standards for literacy that were specific to each discipline, and emphasized the need to accompany these literacy standards with discipline-specific professional learning.

Wisconsin's Approach to Disciplinary Literacy

In 2010, the Council of Chief State School Officers (CCSSO) responded to this need for standards by publishing Common Core State Standards for Literacy in History/Social Studies, Science and Technical Subjects in grades 6-12. These standards were adopted by State Superintendent Tony Evers in June 2010. Wisconsin applauds this bold move to begin a national conversation on disciplinary literacy, and recognizes the need to broaden this effort to include all disciplines, and every educator in every grade level.

The ability to read, write, think, speak, and listen, in different ways and for different purposes begins early and becomes increasingly important as students pursue specialized fields of study in high school and beyond. These abilities are as important in mathematics, engineering and art courses as they are in science, social studies and English.

To further solidify Wisconsin's expanded approach to disciplinary literacy, a statewide leadership team comprised of K-16 educators from diverse subject areas was convened. A set of foundations, was established and directs Wisconsin's approach to disciplinary literacy.

This document begins the conversation about literacy in all subjects. It will come to life when presented to teachers and they are able to showcase their subjects' connection to literacy in all subjects which will bring the literacy standards to life for their community of learners.

Wisconsin Foundations for Disciplinary Literacy

To guide understanding and professional learning, a set of foundational statements, developed in concert with *Wisconsin's Guiding Principles for Teaching and Learning*, directs Wisconsin's approach to disciplinary literacy.

- Academic learning begins in early childhood and develops across all disciplines.
- Content knowledge is strengthened when educators integrate discipline-specific literacy into teaching and learning.
- The literacy skills of reading, writing, listening, speaking and critical thinking improve when content-rich learning experiences motivate and engage students.
- Students demonstrate their content knowledge through reading, writing, listening, and speaking as part of a content literate community.

Wisconsin's Common Core Standards for Literacy in All Subjects

With the Wisconsin Foundations for Disciplinary Literacy, Wisconsin expands the Common Core State Standards for Literacy in History/Social Studies, Science and Technical Subjects, to include every educator in every discipline and at every level. The Common Core Standards for English Language Arts include the Literacy Standards in History/Social Studies, Science and Technical Subjects as well as other relevant standards materials, resources, and research that support discipline-specific conversations across all content areas and grade levels.

The Common Core State Standards for Literacy in all Subjects is included as part of every set of Wisconsin standards as each discipline is reviewed in accordance with the process for Wisconsin standards revision http://www.dpi.wi.gov/standards. This document includes relevant resources and research that may be helpful in advancing school and district conversations, and can also be downloaded at www.dpi.wi.gov/standards or purchased as a stand-alone document through www.dpi.wi.gov/publications.

SECTION 2

Wisconsin's Approach to Mathematics

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Wisconsin Foundations for Mathematics

Wisconsin's Guiding Principles for Teaching and Learning provide important guidance for the mathematics classroom. Within the discipline of mathematics, each of the six principles has specific implications for equity, pedagogy, instruction, and assessment. Mathematics educators should consider how the six guiding principles influence their teaching.

The following foundations provide direction for the teaching and learning of mathematics in Wisconsin.

Every student must have access to and engage in meaningful, challenging, and rigorous mathematics.

Equity in mathematics education requires recognition that the standards must be kept consistent while being flexible in instructional approach and methods of assessment to accommodate the strengths and weaknesses of all students. In order to optimize student learning, the high bar that is set for all should not be moved for some students; instead, the delivery system must be varied to allow access for all. Schools and classrooms need to be organized to convey the message that all students can learn mathematics and should be expected to achieve. Effective mathematics classroom practice involves assessing students' prior knowledge, designing tasks that allow flexibility of approach, and orchestrating classroom discussions that allow every student to successfully access and learn important mathematics.

Mathematics should be experienced as coherent, connected, intrinsically interesting, and relevant.

The PK-12 curriculum should integrate and sequence important mathematical ideas so that students can make sense of mathematics and develop a thorough understanding of concepts. The curriculum should build from grade to grade and topic to topic so that students have experiences that are coherent. The connections of mathematical ideas in a well-designed curriculum allow students to see mathematics as important in its own right, as well as a useful subject that has relevant applications to the real world and to other disciplines.

Problem solving, understanding, reasoning, and sense-making are at the heart of mathematics teaching and learning and are central to mathematical proficiency.

Using problem solving as a vehicle for teaching mathematics not only develops knowledge and skills, but also helps students understand and make sense of mathematics. By infusing reasoning and sense-making in daily mathematics instruction, students are able to see how new concepts connect with existing knowledge and they are able to solidify their understanding. Students who are mathematically proficient see that mathematics makes sense and show a willingness to persevere. They possess both understanding of mathematical concepts and fluency with procedural skills.

Effective mathematics classroom practices include the use of collaboration, discourse, and reflection to engage students in the study of important mathematics.

Collaboration and classroom discourse can significantly deepen student understanding of mathematical concepts. In addition to teacher-student dialogue, peer collaboration and individual reflection must also be emphasized. Representing, thinking, discussing, agreeing, and disagreeing are central to what students learn about mathematics. Posing questions and tasks that elicit, engage, and challenge students' thinking, as well as asking students to clarify their thinking and justify solutions and solution paths should be evident in all mathematics classrooms.

When today's students become adults, they will face new demands for mathematical proficiency that school mathematics should attempt to anticipate. Moreover, mathematics is a realm no longer restricted to a select few. All young Americans must learn to think mathematically, and they must think mathematically to learn.

(Adding It Up, National Research Council, 2001).

Standards for Mathematical Practice

The Standards for Mathematical Practice are central to the teaching and learning of mathematics. These practices describe the behaviors and habits of mind that are exhibited by students who are mathematically proficient. Mathematical understanding is the intersection of these practices and mathematics content. It is critical that the *Standards for Mathematical Practice* are embedded in daily mathematics instruction.

The graphic below shows the central focus on the *Standards for Mathematical Practice* within the familiar content areas of mathematics. Some of the behaviors and dispositions exhibited by students who are mathematically proficient are elaborated in the Characteristics of Mathematically Proficient Students.

Standards for Mathematical Content

The *Standards for Mathematical Content* describe the sequence of important mathematics content that students learn. They are a combination of procedures and understandings. These content standards are organized around domains and clusters which are specified by grade level, kindergarten through grade 8, and by conceptual category at high school. The domains at all levels are based on research-based learning progressions detailing what is known about students' mathematical knowledge, skill, and understanding. The progressions build from grade to grade and topic to topic, providing K-12 focus and coherence. Other important cross-grade themes that should be noted and investigated are concepts such as the role of units and unitizing, the properties of operations across arithmetic and algebra, operations and the problems they solve, transformational geometry, reasoning and sense-making, and modeling of and with mathematics.

The **narratives at each K-8 grade level** specify 2-4 key areas that are identified as the primary focus of instruction. These are referred to as **critical areas**. At the high school level, the narratives describe the **focus** for each conceptual category, as well as the connections to other categories and domains.

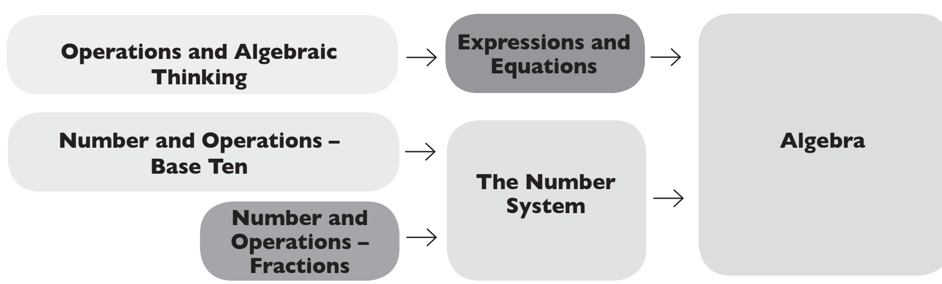
Learning mathematics with understanding is a focus of the CCSSM. Many of the *Standards for Mathematical Content* begin with the verb "understand" and are crucial for mathematical proficiency. It is generally agreed that students understand a concept in mathematics if they can use mathematical reasoning with a variety of representations and connections to explain the concept to someone else or apply the concept to another situation. This is how 'understand' should be interpreted when implementing the CCSSM.

> *One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student's mathematical maturity, why a particular mathematical statement is true or where a mathematical rule comes from... Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness (CCSSM p. 4).*

While the *Standards for Mathematical Practice* should be addressed with all of the *Standards for Mathematical Content*, the content standards that begin with the verb "understand" are a natural intersection between the two.

K-12 Coherence and Convergence

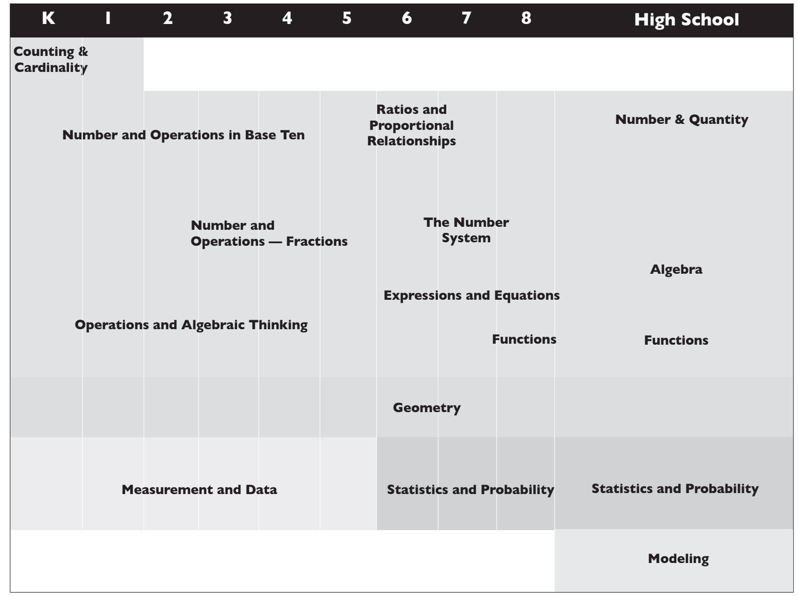
The *Standards for Mathematical Content* are built upon **coherence**, one of the design principles of the CCSSM. The intentional progression and sequencing of topics lays the foundation for the mathematics that is developed from kindergarten through high school. The diagram below depicts how domains at the elementary and middle school levels converge toward algebra at the high school. It is important that educators are knowledgeable about these progressions so that students learn mathematics with understanding and so that new content can build on prior learning



Focus and Organization of the Standards for Mathematical Content

The mathematics content of the CCSSM builds across grades and provides important underpinnings for the mathematics to be learned at subsequent levels. The coherence of the CCSSM lies in those connections, both within and across grade levels and topics. The graphic below illustrates the second design principle of the CCSSM – **focus**.

At the early elementary grades, the focus is largely on the areas of number and operations in base ten and algebraic thinking. This expands to a focus on fractions later in elementary school. The K-5 mathematics content provides the groundwork for the study of ratios, proportional reasoning, the number system, expressions and equations, and functions at the middle school level. By providing a focused mathematics experience in elementary and middle school, a strong foundation is developed for the content to be learned at the high school level.



Mathematical Proficiency

Mathematical proficiency is necessary for every student; therefore, understanding concepts and being fluent with procedural skills are both important. This means that educators must intentionally engage students at all levels so they are readily able to understand important concepts, use skills effectively, and apply mathematics to make sense of their changing world.

Adding it Up (National Research Council, 2001), a major research report that informed the development of the Common Core State Standards for Mathematics, emphasizes the five strands of mathematical proficiency: conceptual understanding, procedural fluency, adaptive reasoning, strategic competence, and productive disposition. These strands are not sequential, but intertwined and form the basis for the *Standards for Mathematical Content* and the *Standards for Mathematical Practice*. Together, these two sets of mathematics standards define what students should understand and be able to do in their study of K-12 mathematics.

Standards for Mathematical Practice	Characteristics of Mathematically Proficient Students*
Make sense of problems and persevere in solving them.	**Mathematically proficient students can:** Explain the meaning of a problem and restate it in their words. Analyze given information to develop possible strategies for solving the problem. Identify and execute appropriate strategies to solve the problem. Evaluate progress toward the solution and make revisions if necessary. Explain the connections among various representations of a problem or concept. Check for accuracy and reasonableness of work, strategy and solution. Understand and connect strategies used by others to solve problems.
Reason abstractly and quantitatively.	**Mathematically proficient students can:** Translate given information to create a mathematical representation for a concept. Manipulate the mathematical representation by showing the process considering the meaning of the quantities involved. Recognize the relationships between numbers/quantities within the process to evaluate a problem. Review the process for reasonableness within the original context.
Construct viable arguments and critique the reasoning of others.	**Mathematically proficient students can:** Use observations and prior knowledge (stated assumptions, definitions, and previous established results) to make conjectures and construct arguments. Compare and contrast logical arguments and identify which one makes the most sense. Justify (orally and in written form) the approach used, including how it fits in the context from which the data arose. Listen, understand, analyze, and respond to the arguments of others. Identify and explain both correct and flawed logic. Recognize and use counterexamples to refine assumptions or definitions and dispute or disprove an argument.

Standards for Mathematical Practice	Characteristics of Mathematically Proficient Students*
Model with mathematics.	**Mathematically proficient students can:** Use a variety of methods to model, represent, and solve real-world problems. Simplify a complicated problem by making assumptions and approximations. Interpret results in the context of the problem and revise the model if necessary. Choose a model that is both appropriate and efficient to arrive at one or more desired solutions.
Use appropriate tools strategically.	**Mathematically proficient students can:** Identify mathematical tools and recognize their strengths and weaknesses. Select and use appropriate tools to best model/solve problems. Use estimation to predict reasonable solutions and/or detect errors. Identify and successfully use external mathematical resources to pose or solve problems. Use a variety of technologies, including digital content, to explore, confirm, and deepen conceptual understanding.
Attend to precision.	**Mathematically proficient students can:** Understand symbols and use them consistently within the context of a problem. Calculate answers efficiently and accurately and label them appropriately. Formulate precise explanations (orally and in written form) using both mathematical representations and words. Communicate using clear mathematical definitions, vocabulary, and symbols.
Look for and make use of structure.	**Mathematically proficient students can:** Look for, identify, and accept patterns or structure within relationships. Use patterns or structure to make sense of mathematics and connect prior knowledge to similar situations and extend to novel situations. Analyze a complex problem by breaking it down into smaller parts. Reflect on the problem as a whole and shift perspective as needed.
Look for and express regularity in repeated reasoning.	**Mathematically proficient students can** Recognize similarities and patterns in repeated trials with a process. Generalize the process to create a shortcut which may lead to developing rules or creating a formula. Evaluate the reasonableness of results throughout the mathematical process while attending to the details.

** collaborative project with Cedarburg, Franklin, Fox Point-Bayside, Grafton, Greendale, Kettle Moraine, Menomonee Falls, Oconomowoc, Pewaukee, Waukesha, & Whitefish Bay School Districts and CESA 1.*

Design Features of the Common Core State Standards for Mathematics

The design of the CCSSM has several specific features. Additional resources to support the CCSSM are available online at: http://dpi.wi.gov/standards/stds.html

- The *Standards for Mathematical Practice* must be addressed at all levels and intertwined with the *Standards for Mathematical Content*.
- K-8 grade level content standards illustrate a **coherent and rigorous curriculum** to be completed in each of these grades.
- The high school *Standards for Mathematical Content* are not by grade or course, rather they are grouped in **conceptual categories** and can be clustered in multiple ways to design courses and programs of study.
- The CCSSM are designed to provide **focus**, by identifying two to four critical areas at each K-8 grade level. These are found in the short narrative section of grades K-8, immediately before each grade level's content standards. They present the areas that should be the primary focus for instruction in that grade. Critical areas for each of the high school conceptual categories are described in the narratives.
- The CCSSM were designed to provide **coherence**, through connections and progressions both within and across grade levels. The authors of the CCSSM have developed *Progressions* documents that provide in-depth discussion of the domain progressions across grades, highlight connections across domains, elaborate on the learning expectations for students, and provide instructional suggestions.
- The CCSSM were designed to be **rigorous**, which is provided by a focus on College and Career Readiness and by emphasizing the *Standards for Mathematical Practice* across K-12. The high school CCSSM also specify additional mathematics (+ standards) that students pursuing mathematics-intensive STEM careers should accomplish.

How to use Appendix A of the Common Core State Standards for Mathematics

The *CCSSM Standards for Mathematical Content* are organized by grade level in grades K-8. A similar organization was not possible for the high school content standards, since schools and curricula do not all introduce high school content in the same order. The high school content standards are therefore organized by conceptual categories, leaving open the question of how the required content is to be distributed among high school courses. There are two commonly-used approaches: traditional/non-integrated U.S. curriculum in which content is typically divided into courses named Algebra I, Geometry, and Algebra II; and the integrated approach, more commonly used in other countries, in which the strands of mathematics are interwoven in courses which might simply be named Mathematics I, Mathematics II, and Mathematics III. The CCSSM should be fully acquired through either course sequences.

CCSSM Appendix A, *Designing High School Mathematics Courses Based on the Common Core State Standards*, provides four suggested pathways as to how this distribution might be accomplished (http://corestandards.org/assets/CCSSI_Mathematics_Appendix_A.pdf). In considering this appendix, it is important to keep in mind comments from the CCSSM authors:

> *The* ***pathways and courses are models, not mandates****. They illustrate possible approaches to organizing the content of the CCSS into coherent and rigorous courses that lead to college and career readiness. States and districts are not expected to adopt these courses as is; rather, they are encouraged to use these pathways and courses as a starting point for developing their own (CCSSM, Appendix A, p.2).*

SECTION 3

Common Core Essential Elements for Mathematics

Common Core Essential Elements and Alternate Achievement Descriptors for Mathematics

From the State Members of the

Dynamic Learning Maps
Alternate Assessment Consortium
and
Edvantia, Inc.

March 7, 2012

DYNAMIC LEARNING MAPS

EDVANTIA®
Partners in education. Focused on results.

Common Core Essential Elements and Alternate Achievement Descriptors for Mathematics

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INTRODUCTION

The Common Core Essential Elements (EEs) are linked to the Common Core State Standards (CCSS) for Mathematics. A group of general educators, special educators, and content specialists from member states in the Dynamic Learning Maps (DLM) Consortium gathered to determine the essence of the CCSS.

This document provides a high-level view of the relationship between the CCSS and the links to performance for students with significant cognitive disabilities. It is intended to provide a beginning structure for the design of a summative alternate assessment. The document is not intended as a stand-alone guide to instruction, nor is it intended to contain all the steps in a complete learning progression or detailed curriculum. The DLM and associated professional development will provide greater detail than described in this document.

Beginning with the Mathematics CCSS, stakeholders defined links to illuminate the precursors for the essential content and skills contained in the grade level CCSS clusters and indicators. These EEs are not intended as a redefinition of the standards. Rather, they are intended to describe challenging expectations for students with significant cognitive disabilities in relation to the CCSS. The EEs clarify the bridge between grade level achievement expectations for students with significant cognitive disabilities who participate in alternate assessments and the CCSS.

Neither are the EEs intended to prescribe the beginning or end of instruction on the content and skills they represent; rather, they indicate the grade level at which initial mastery would be the target to be assessed. Students should begin instruction in content and skills at the earliest point possible and continue instruction until mastery is attained.

The stakeholder group, consisting of state education agency (SEA) representatives and SEA-selected content teachers of students with significant cognitive disabilities, developed instructional achievement level descriptors (IALDs) for each of the EEs. IALDs were defined for four performance levels: I, II, III, and IV. Level III IALDs are aligned with the EEs. The target content and skills for each level of achievement, from Level I to Level IV, were then defined. For each target skill, the stakeholder group developed examples to illustrate how students might demonstrate achievement of the performance level. The IALDs are intended to provide an achievement ladder for students working toward achievement (Level III) of the EEs and onward (Level IV) and toward greater participation in the grade level CCSS to which the EEs are linked. The provided examples are intended to assist teachers to envision how the broad range of students with significant cognitive disabilities might perform the same content, despite the different challenges their disabilities might present. The examples are not exhaustive and do not represent the full range of possibilities in which the highly diverse population of students with significant cognitive disabilities might access the EEs or demonstrate the achievement of those elements. However, the examples do provide some of the ways that performance might be elicited and demonstrated across the spectrum of students with significant cognitive disabilities.

Finally, the stakeholder group developed alternate assessment achievement descriptors for each grade level -- from third grade through high school -- where summative assessments might be required. The alternate assessment achievement descriptors will provide a bridge between the EEs and a summative alternate assessment aligned to them. The descriptors are intended to provide one element to guide development of the test blueprint, development of items and tasks that measure the full range of achievement, and the setting of cut scores during standard setting for the assessment. The focus of an alternate assessment in a standards-based system is based on the achievement that aligns with EEs linked to grade level content.

Together, the system of standards and descriptors is designed to allow students with significant cognitive disabilities to progress toward the achievement of state standards linked to grade level expectations. The relationship of standards and assessment to teaching and learning are depicted for use by teachers, assessment designers, and users of alternate assessment results.

NCLB GUIDANCE

The stakeholder group's work was guided by the U. S. Department of Education's Peer Review Guidance (*Standards and Assessments Peer Review Guidance: Information and Examples for Meeting Requirements of the No Child Left Behind Act of 2001 [NCLB]),* which requires that alternate academic achievement standards align with the alternate assessment. They must

- include knowledge and skills that link to grade level expectations,
- promote access to the general curriculum, and
- reflect professional judgment of the highest learning standards possible for the group of students with the most significant cognitive disabilities.

Although the grade-level content may be reduced in complexity or adjusted to reflect prerequisite skills, the link to grade-level standards must be clear. The Peer Review Guidance notes that the concept of alternate achievement standards related to grade level may be ambiguous. According to the Guidance, the descriptors

- should be defined in a way that supports individual growth because of their linkage to different content across grades;
- are not likely to show the same clearly defined advances in cognitive complexity as the general education standards when examined across grade levels;
- should rely on the judgment of experienced special educators and administrators, higher education representatives, and parents of students with disabilities as they define alternate achievement standards; and

- should provide an appropriate challenge for students with the most significant cognitive disabilities as they move through their schooling.

The Guidance requires links to grade-level standards. The EEs were developed by DLM consortium states to differentiate knowledge and skills by grade level. This differentiation is intended to clarify the link between the grade-level EEs and the grade-level CCSS and to show a forward progression across grades. The progression of content and skills across years of instruction reflect the changing priorities for instruction and learning as students move from grade to grade. The differences from grade level to grade level are often subtle and progression is sometimes more horizontal than vertical. For example, the grade-to-grade level differences may consist of added skills that are not of obvious increasing rigor compared to the differences found in the CCSS across grade levels. To the degree possible, skills escalate in complexity or rigor at Levels III and IV across the grades, with clear links to the shifting emphasis at each grade level in the CCSS.

ACCESS TO INSTRUCTION AND ASSESSMENT

The EEs and Achievement Descriptors developed by the DLM consortium states are intended to create the maximum possible access to the CCSS for students with significant cognitive disabilities. The way in which information is presented for instruction and assessment and the manner in which students demonstrate achievement is in no way intended to be limited by statements of EEs or Achievement Descriptors. To that end, modes of communication, both for presentation or response, are not stated in either the EEs or Achievement Descriptors unless a specific mode is an expectation. Where no limitation has been stated, no limitation should be inferred. Students' opportunities to learn and to demonstrate learning should be maximized by providing whatever communication, assistive technologies, augmentative and alternative communication (AAC) devices, or other access tools that are necessary and routinely used by the student during instruction.

Students with significant cognitive disabilities include a broad range of students with diverse disabilities and communication needs. For some students with significant cognitive disabilities, graphic organizers similar to those used by students without disabilities provide useful access to content and are adequate to maximize opportunities to learn and demonstrate achievement. Other students require a range of assistive technologies to access content and demonstrate achievement. For some students, AAC devices and accommodations for hearing and visual impairments will be needed. As with other physical disabilities, students with visual impairments may perform some expectations using modified items, presentations, or response formats. A few items may not lend themselves to such modifications. Decisions about the appropriate modifications for visual impairments are accounted for in the design of the assessments.

The access challenge for some is compounded by the presence of multiple disabilities. All of these needs, as well as the impact of levels of alertness due to medication and other physical disabilities which may affect opportunities to respond appropriately, need to be considered.

Most presentation and response access conditions do not constitute accommodations as they are understood for students who take the general assessment. Methods of presentation that do not violate the intended construct by aiding or directing the students' response allow the student to perceive what knowledge or skill is expected. Aids to responding that do not constitute a violation of the intended construct allow the student to demonstrate the expected knowledge and skills. Examples of acceptable access technologies include the following:

- communication devices that compensate for a students' physical inability to produce independent speech.
- devices that compensate for a students' physical inability to manipulate objects or materials, point to responses, turn pages in a book, or use a pencil or keyboard to answer questions or produce writing.
- tools that maximize a students' ability to acquire knowledge and skills and to demonstrate the products of their learning.

ACCESSING THE GENERAL CURRICULUM

Technology is also of particular importance to students with significant cognitive disabilities to access the general curriculum and achieve the EEs. Although educators have traditionally viewed technology as hardware and software, assistive technology tenets provide a broader view of the applications of low, medium, and high levels of technology use. Assistive technology tools can be vital to a student in acquiring and demonstrating learning unimpeded by the barriers that the disability presents.

Model Symbol Use Throughout Instruction

Many students with significant cognitive disabilities have difficulty with or cannot use speech to communicate and/or are supported by the use of communication symbols (e.g., communication boards, speech generating devices, voice output communication devices) and supports to augment their speech and other means of communication. Students who require symbols and other AAC supports require frequent modeling in the use of those symbols to interact and respond during instruction. Students who use symbols and other communication supports need as much modeling as children who use speech to communicate. Modeling in this way is not viewed as a means of prompting, guidance, or support, just as having a teacher talk serves those purposes for a student who communicates using speech.

When modeling the use of symbols and other communication supports, teachers use the symbols and supports themselves, hand them to students without communication impairments to use, and involve the students who need to use them every day. Each of these steps can play an important role in validating the use of symbols and communication supports and demonstrating multiple levels of expertise in their use.

Use Partner-Assisted Scanning Across the Day

Making a choice from the items on a list, symbols, tactuals, or a communication board can be difficult for some students because they lack the ability to point, cannot see or read the choices, or are positioned too far away (as in group activities). Partner-assisted scanning addresses these issues by asking the communication partner (a teacher, paraprofessional, or peer) to point to each of the options pausing long enough at each for the students with physical and communication impairments to respond “yes” if the item is their desired choice. Depending on the needs of an individual child, the partner can name each option when pointing or simply point.

Throughout the IALDS, examples are provided that require students to select, identify, recognize, and so forth from a number of options. It is suggested that teachers use partner-assisted scanning to support these modes of responding and communicating whenever it appears that the act of directly pointing to a response is too difficult for a particular student.

Use First-Letter Cueing as a Communication Strategy Whenever Possible

Students with communication impairments who are beginning to read, write, and communicate regularly face the challenge of not having access to the words or symbols they want or need to communicate effectively. When attempting to provide them with every possible word they might need, the result is an unmanageable communication system. When guessing what will be most important, it is inevitable that some guesses will be wrong. Until students can spell well enough to communicate their own thoughts, it is important to rely on cueing strategies. First-letter cueing is one such strategy. Students can use an alphabet display to point to the first letter (or try to spell more) of the word they are trying to communicate. Teachers can use this strategy to help students respond efficiently to questions that involve known choices. Teachers can also model the use of first-letter cueing in their day-to-day interactions with the class. Natural opportunities to incorporate this strategy occur when the teacher is prompting students to recall a specific word (e.g., “I am thinking of a new word we learned yesterday that started with the letter ‘t’”.) or concept (e.g., “Who remembers the big word we learned to describe when we put things together to find out how many we have in all? It begins with the letter ‘a’”.). There are times every school day when the adults in the class can model the use of first-letter cueing.

GUIDANCE AND SUPPORT

The authors of the CCSS use the words, “prompting and support” at the earliest grade levels to indicate when students were not expected to achieve standards completely independently. Generally, “prompting” refers to “the action of saying something to persuade, encourage, or remind someone to do or say something” (McKean, 2005). However, in special education, prompting is often used to mean a system of structured cues to elicit desired behaviors that otherwise would not occur. In order to communicate clearly that teacher assistance is permitted during instruction of the EEs, and is not limited to structured prompting procedures, the decision was made by the stakeholder group to use the more general term *guidance* throughout the EEs and alternate achievement descriptors.

Guidance and support during instruction should be interpreted as teacher encouragement, general assistance, and informative feedback to support the student in learning. Some examples of the kinds of teacher behaviors that would be considered guidance and support include

- getting the student started (e.g., "Tell me what to do first"),
- providing a hint in the right direction without revealing the answer (e.g., Student wants to write dog but is unsure how, the teacher might say, "See if you can write the first letter in the word, /d/og."),
- narrowing the field of choices as a student provides an inaccurate response,
- using structured technologies such as task specific word banks, or
- providing the structured cues such as those found in prompting procedures (e.g., least-to-most prompts, simultaneous prompting, and graduated guidance).

Guidance and support as described above apply to instruction per the examples provided in the IALDS. The IALDs are intended to provide an idea of how students might perform the EEs at the threshold to various achievement levels as they work toward independent mastery.

Alternate assessments measure the degree to which students with significant cognitive disabilities have mastered the EEs. During any assessment, accommodation(s) allowed on the assessment must have been used and practiced during instruction; however, some accommodations that are permissible during instruction would compromise the integrity of the assessments, thereby yielding invalid and unreliable results and cannot be used for assessment purposes. Some guidance and support strategies may not be allowed for assessment purposes when variance in teacher assistance, cues, and prompts could compromise judgments about mastery of the EEs and comparability of administration.

RELATIONSHIP TO THE DYNAMIC LEARNING MAPS ASSESSMENT

The EEs and Achievement Descriptors developed by the DLM consortium states and their stakeholder representatives serve two functions. Instructionally, they provide teachers with information about the level of knowledge and skills expected of their students. Second, they provide elaboration that teachers can use to help guide instruction toward achievement expectations. IALDs were developed for each of the EEs. Each IALD is further clarified by a range of examples. Teachers may find these examples useful for envisioning how their students might perform as they progress toward the expected achievement, as long as they keep in mind that they are examples only and cannot represent the full range of ways in which students might demonstrate their achievement.

Assessment Achievement Level Descriptors (AALDs) will emerge as drafts from the IALDS. The AALDs are content and grade specific, but summarize across the EEs the key performance differences across levels of achievement and across grade levels. While draft AALDs will be used in the initial stages of standard setting to help guide that process, final AALDs will emerge from the standard setting process. Standard setting will take into account the overall degree of accuracy with which a student would need to perform in order to achieve at a particular level. Just as on a general education assessment, no individual student will be expected to perform proficiently on every EE in order to be considered Level III.

For purposes of the DLM assessments under development, the achievement descriptors provide a useful link between the EEs and the DLM assessments. The descriptors, along with DLM developed from the CCSS, provide guidance to the development of the alternate assessment so that a full range of performance is measured and the setting of score ranges within each level rests on a defined frame of reference. The grade level EEs and alternate achievement standards

- standardize meaning for the content and skill expectations,
- create consistency in expected performance,
- emphasize skill similarities for all students participating in the alternate assessments,
- accommodate diverse disabilities, and
- ground alternate assessments in a consistent set of expectations.

Achievement descriptors are used to categorize and explain student performance both in the course of instruction and on the alternate assessment.

SYSTEM ALIGNMENT

The EEs and alternate achievement descriptors are intended to contribute to a fully aligned system of standards, curriculum, teaching, learning, technology, and assessment that optimize equity of opportunity for all students in each classroom, school, and local education agency to access and learn the standards. To the degree possible, the grade level EEs are vertically aligned and linked to the grade level CCSS.

The linkages provided by the EEs to the CCSS are intended to increase access to the general curriculum for all students with disabilities. Examples provided for IALDs at each level of achievement are designed for special education and general education classroom teachers to use in working with special education students who have significant cognitive disabilities. The examples are designed to help teachers evaluate students' progress toward achievement of the EEs as well as illuminate the kinds of performances that indicate various levels of achievement.

Just as the EEs and IALDS are designed to guide teaching practices toward achievement in academic content areas, the standards reframe the expectations for foundational skills in pre-academic and academic areas. Precursor/prerequisite and the unique enabling skills related to mathematics content is specified in the context of their roles as a foundation for students with significant cognitive disabilities to achieve skills related to academic content.

Levels of Performance

Within this document, each grade level EE is cross-referenced to one or several CCSS.

Four performance levels have been proposed for the DLM's alternate academic achievement standards: I, II, III, and IV. Mastery is considered to be demonstrated at Level III and Level IV and is identified as meeting the Level III level on an alternate assessment as specified in the NCLB. A general description of each of these levels is included below:

Level I - A student at this level attempts to perform tasks with support.

Level II - A student at this level demonstrates some content knowledge and skills from the EEs linked to grade level standards.

Level III - A student at this level demonstrates content knowledge and skills at a level aligned with the complexity of the EEs.

Level IV - A student at this level demonstrates content knowledge and skills at a higher level of complexity than those described for Level III. Typically, this complexity includes the routine use of symbol systems as applied to mathematics.

For each performance level, specific descriptions of content and skills are bulleted and examples of each level of performance are provided. The EEs, IALDS, and examples are intended as a resource for developing individualized education plan (IEP) goals, benchmarks, and curricular materials in reading, language arts, and mathematics. Students may need goals and benchmarks in areas other than academic content domains (e.g., self-care/living skills, mobility). As always, IEPs address the individual needs of each student to make progress toward the standards.

DOCUMENT ORGANIZATION

Common Core Grade-Level Clusters are the Cluster titles and Grade-Level Indicators as they appear in the CCSS for Mathematics (Common Core State Standards Initiative, 2010).

Common Core Essential Elements (EEs) describe links to the CCSS for access by students with significant cognitive disabilities.

Instructional Achievement Level Descriptors (IALDs) describe performance at four achievement levels based on the EEs and are accompanied by examples at each achievement level.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Represent and solve problems involving addition and subtraction. **1.OA.1**. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	**EE1.OA.1.a.** Use language to describe putting together and taking apart, aspects of addition and subtraction.	**Level IV AA Students will:** **EE1.OA.1.a.** Use words like take away, subtract, give, add, more, and same quantity, when putting together and taking apart. Ex. When gathering and distributing classroom supplies, appropriately use words like “more” and “take away” (handing out paper, pencils, or other tools used in a lesson). Ex. When picking teams for P.E., use the language of “I need one more student” or “I need to take away one more from my team.” Ex. Request “one more” or “take away” one or more when the teacher has set up an activity where there is an uneven number of supplies. Ex. During an activity, use “add,” “more,” “less,” etc. to indicate when a different amount is needed. **Level III AA Students will:** **EE1.OA.1.a.** Use language to describe putting together and taking apart, aspects of addition and subtraction. Ex. After the teacher shows six blocks and removes two, label the action as “take away” or informal language with the same meaning. Ex. Appropriately use “more” and “give” to express desire for more snacks or blocks. Ex. Use one-to-one correspondence to line up two sets of objects and ask which group has more/less. Ex. During practice of adding __ more to a numeral, show correct flashcard when asked, “I have two; who has two more (4)?” **Level II AA Students will:** **EE1.OA.1.a.** Put together or take away. Ex. Take away one crayon from the box**.** Ex. Put together red blocks and green blocks when asked. Ex. Give coins to purchase an item or take change at end of purchase. Ex. Give the teacher two blocks and then two more blocks. **Level I AA Students will:** **EE1.OA.1.a.** Follow directions to put together or take away an object with a verbal prompt. Ex. In a classroom routine and when presented with a component needed for the routine, give component(s) when asked to put together for the activity. Ex. Take a paper or object from peer when passed out. Ex. Offer paper or object to peer to put together with group’s work when collected at the end of the lesson.

Directions for Interpreting Essential Elements

Essential Elements (EEs). The EEs are statements that provide links for students with significant cognitive disabilities to the essential content and skills defined in the grade-level clusters of the CCSS. The EEs provide a bridge for students with significant cognitive disabilities to the CCSS. The EEs are not intended as a reinterpretation of the CCSS; rather, they were developed to create a bridge between the CCSS and challenging achievement expectations for students with significant cognitive disabilities. The order in which the EEs are listed is a direct reflection of the order in which the CCSS are listed. The order is not intended to convey a sequence for instruction; rather, it illustrates progress across years. In the tables, the left column contains the CCSS grade-level clusters and indicators, the middle column contains the EE linked to them, and the right column contains the IALDs for each EE and examples for each IALD (as demonstrated by the example provided on the previous page). Each EE and IALD completes the phrase "Students will . . . ."

CCSS marked with an (+) are advanced standards and are not included in this document as it was determined by the stakeholder group that students of this population would not be accessing the curriculum at this advanced level and writing Essential Elements to this level would be unnecessary. Also, if it appears that a standard has been omitted in the high school grades, it is an advanced standard.

NOTE: N/A is used instead of a descriptor under Level IV, if it was determined by the stakeholder group that the content of the CCSS could not be addressed.

Bullets under instructional achievement levels denote descriptions of achievement at that level for the content related to the essential element.

Examples clarify certain components of EEs. The provided examples are illustrative, not exhaustive. They are intended to provide a range of ways in which a student may demonstrate progress toward the essential element and beyond.

COMMON CORE ESSENTIAL ELEMENTS AND ACHIEVEMENT DESCRIPTORS FOR KINDERGARTEN

Kindergarten Mathematics Standards: Counting and Cardinality

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Know number names and the count sequence. **K.CC.1.** Count to 100 by ones and by tens.	**EEK.CC.1.** Starting with one, count to 10 by ones.	**Level IV AA Students will:** **EEK.CC.1.** Starting with any number greater than one, count to 10 by ones. Ex. Count numbers to 10 starting with one and any number great than one and less than 10. Ex. Count sequentially to 10 starting with one, independent of objects, pictures, or things as a student would recite the alphabet. Ex. Count with or without one-to-one correspondence numbers beyond 10. Ex. Count groups of 10. Ex. Count backwards from 10. **Level III AA Students will:** **EEK.CC.1.** Starting with one, count to 10 by ones. Ex. Count number to 10 verbally. Ex. Count without one-to-one correspondence to 10 starting with one by rote. Ex. Sequentially sing numbers to 10 starting with one. **Level II AA Students will:** **EEK.CC.1.** Starting with one, count by ones to five. Ex. Count own fingers to five verbally. Ex. Sequentially, count sequence to five either independent of objects, pictures, or things as a student would recite the alphabet or by pointing. Ex. Count without one-to-one correspondence to five. Ex. Sequentially sing numbers to five. Ex. Sing along to counting song.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level I AA Students will: **EEK.CC.1.** Count with teacher from one to two. Ex. Count with the teacher to two.
K.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at one).	**EEK.CC.2.** N/A	
K.CC.3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).	**EEK.CC.3.** N/A	
Count to tell the number of objects. **K.CC.4.** Understand the relationship between numbers and quantities; connect counting to cardinality. When counting objects, say the number names in the standard order, pairing each object with one and only one number name	**EEK.CC.4.** Demonstrate one-to-one correspondence pairing each object with one and only one number and each name with only one object.	**Level IV AA Students will:** **EEK.CC.4.** Demonstrates one-to-one correspondence with more than one. Ex. When counting objects, say the number names in standard order and pair each object with one and only one number name. Ex. Pass pencils out to classmates and count the pencils as each classmate gets a pencil. Ex. Uses one-to-one correspondence when counting up to 10 common objects in the classroom (crayons, blocks, buttons). Ex. Count out 10 pennies to exchange for a dime. Ex. Sing a counting song and raise the correct number of fingers with each number. Ex. Count dots on dice and move forward corresponding number of spaces on game board. Ex. Round robin count to 10.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
and each number name with one and only one object. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. Understand that each successive number name refers to a quantity that is one larger.		**Level III AA Students will:** **EEK.CC.4.** Demonstrate one-to-one correspondence pairing each object with one and only one number and each name with only one object. Ex. Uses one-to-one correspondence when counting up to five common objects in classroom (crayons, blocks, buttons). Ex. Create sets of objects to five. Ex. Place corresponding number of beans in an egg carton with each section labeled 1-5. Ex. Move beads on an abacus as another student counts one to five. Ex. Given an egg carton, place five stickers in each section. **Level II AA Students will:** **EEK.CC.4.** Demonstrate one object's correspondence with one object. Ex. Uses one-to-one correspondence when counting up to three common objects in classroom (crayons, blocks, buttons). Ex. Given bowls, place three balls in each. Ex. Match objects by pairing each object with one and only one other number. Ex. Given "one" letter in each student's mailbox to go home. **Level I AA Students will:** **EEK.CC.4.** With guidance and support, count one object. Ex. Place "one" letter in each student's mailbox to go home. Ex. Put one object in each section of an egg carton. Ex. Indicate "one" object when asked, "Where is one <name of familiar object>?" Ex. Give one pencil to each classmate.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
K.CC.5. Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.	**EEK.CC.5.** Count out up to three objects from a larger set, pairing each object with one and only one number name to tell how many.	**Level IV AA Students will:** **EEK.CC.5.** Counts five objects out of a group of more than five objects. Counts a given set of five objects, pairing each object with one and only one number name and when asked, "how many", says five without recounting. Ex. Given a box of crayons, select five crayons as requested by teacher. Ex. Given a set of five objects, count out three objects. Ex. From an array of five objects, count each object in the group only one time and tell how many was in the group without recounting the objects. Ex. Count five children out of all the children only one time and tell how many without recounting. **Level III AA Students will:** **EEK.CC.5.** Count out up to three objects from a larger set, pairing each object with one and only one number name to tell how many. Ex. Given an array of objects, count out three of the objects, counting each object only once and tell how many. Ex. Given a box of crayons, select three crayons as requested by teacher. Ex. Count out three counting bears from a group of five. Ex. Pass out three pages to each student from a stack of paper, counting one, two, three each time, and tell how many they gave to the students. **Level II AA Students will:** **EEK.CC.5.** Counts either one or two objects out of a group of five objects. Ex. Given a box of crayons, select either one or two crayons as requested by teacher. Ex. Count out two counting bears from a group of five.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level I AA Students will: **EEK.CC.5.** Identify one object out of a group of objects. Ex. Identify between a set with one or two apples when asked, “show me one apple” and make a choice. Ex. Go to the prize box and pick one object.
Compare numbers. **K.CC.6.** Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.	**EEK.CC.6.** Identify whether the number of objects in one group is more or less than (when the quantities are clearly different) or equal to the number of objects in another group.	**Level IV AA Students will:** **EEK.CC.6.** Identify whether the number of objects in one group is more or less than or equal to the number of objects in another group. Ex. Identify which group has more from two groups created by the teacher (e.g., The teacher creates two groups of manipulative objects whose total quantity is within three. Given two groups of blocks, for example, one group has seven blocks and the other has four, the student is able to identify which group has more blocks. The teacher asks which group has more and the student identifies it. Ex. Given two groups of blocks, one group has eight blocks and other has five, identify which group has less blocks. Ex. Given five papers to pass out to a group of eight students, indicate that there are MORE students than papers by counting the people and then counting the papers. **Level III AA Students will:** **EEK.CC.6.** Identify whether the number of objects in one group is more or less (when the quantities are clearly different) or equal to the number of objects in another group. Ex. Given a choice of two boxes of blocks, one box with nine blocks and one box with four blocks, identify which box has more blocks. Ex. Given a choice of two boxes of blocks, one box with eight blocks and one box with four blocks, identify which box has fewer blocks.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EEK.CC.6.** Given two groups of dramatically different quantities of objects, identify which group has more. Ex. When two groups of objects are counted out to the student, identify which has more objects than another group (e.g., using matching and counting strategies). Ex. Given two bowls of snacks with a large difference in quantity, identify which has more. Ex. Given a choice of two boxes of blocks with a difference in quantity of at least twice the other, identify which has more. **Level I AA Students will:** **EEK.CC.6.** Explore groups that have more and less. Ex. Using sand/water/ball tables with drastically different quantities of materials, explore the quantity while the teacher is talking about the language of more. Ex. Place silly bands/bangles/bells with drastically different quantities on the arms or legs of the students and explore the quantity of more while the teacher uses the language of more. Ex. Given two groups of buttons with very different amounts, identify the group that has "more" by pointing to picture symbols of more/less, big/small.
KK.CC.7. Compare two numbers between 1 and 10 presented as written numerals.	**EEK.CC.7.** N/A	

Kindergarten Mathematics Standards: Operations and Algebraic Thinking

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from. **K.OA.1.** Represent addition and subtraction with objects, fingers, mental images, drawings[1], sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.	**EEK.OA.1.** Represent addition as "putting together" or subtraction as "taking from" in everyday activities.	**Level IV AA Students will:** **EEK.OA.1.** Represent addition as "putting together" and subtraction as "taking from" with quantities to 10. Ex. Combine two sets of objects, pictures, or things to make one set of 10 through the use of assistive technology or AAC device. Ex. Take away one set of objects from 10 and determine how many remain. Ex. Using a simple story context and objects, the student puts together and takes from as appropriate by directly modeling the problem with objects, actions, or symbols. Ex. Follow directions to gather enough materials for everyone and then passes them out to each student. Ex. Put a counting bear with a group to add or take away a counting bear to subtract. **Level III AA Students will:** **EEK.OA.1.** Represent addition as "putting together" or subtraction as "taking from" in everyday activities. Ex. Identify the total number of crayons when one student has three crayons and another student has two, and they put their crayons together to share. Describe the action as put together. Ex. Add to a group of crayons when told to add to group. Ex. Take away from a group of crayons when told to take away from the

[1] Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		group. Ex. Given five stickers, give another student one of the five stickers, and describes the action as take away. Ex. Join linking cubes to show action/process of putting together or addition. Ex. Break apart linking cubes/snap blocks/bristle blocks/pop-beads to show action/process of taking from or subtraction. **Level II AA Students will:** **EEK.OA.1.** Follow directions to “put together” by adding one or “take from” by taking one. Ex. Given a bowl of counting bears, add a counting bear to the bowl. The teacher calls the action “putting together” or addition. Ex. Take one when the teacher is passing out supplies and directs the students to take one. The teacher calls the action “taking away” or subtraction. Ex. Place popsicle sticks into a circle and use language to describe addition or “putting together”. Ex. Using cubes, create towers by adding or taking away one cube at a time. Ex. Remove popsicle sticks from a circle and use language to describe subtraction or “taking from”. **Level I AA Students will:** **EEK.OA.1.** “Put together” or “take from” with teacher. Ex. The teacher and student together add a block to a stack while teacher says, “put together.” Ex. The teacher and student together take a block from a stack while the teacher says, “take away.”

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
K.OA.2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.	**EEK.OA.2.** N/A	
K.OA.3. Decompose numbers less than or equal to 10 into pairs in more than one way by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).	**EEK.OA.3.** N/A	
K.OA.4. For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.	**EEK.OA.4.** N/A	
K.OA.5. Fluently add and subtract within 5.	**EEK.OA.5.** N/A	

Kindergarten Mathematics Standards: Number and Operations in Base Ten

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Work with numbers 11-19 to gain foundations for place value. **K.NBT.1.** Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	**EEK.NBT.1.** N/A (See EEK.NBT.1.4 and EEK.NBT.1.6)	

Kindergarten Mathematics Standards: Measurement and Data

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Describe and compare measurable attributes. **K.MD.1.** Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. **K.MD.2.** Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.* **Classify objects and count the number of objects in each category.** **K.MD.3.** Classify objects into given categories;	**EEK.MD.1-3.** Classify objects according to attributes (big/small, heavy/light).	**Level IV AA Students will:** **EEK.MD.1-3.** Order objects according to attributes (big/smaller/smallest, heavy/lighter/lightest). Ex. Given two backpacks of different weight, describe or demonstrate which one is heavier. Ex. Given two cubes of different sizes, describe or demonstrate which cube is bigger and which cube is smaller. Ex. Compare heights of two classmates to a standard such as a meter stick. Ex. Compare sports balls (baseball, basketball, tennis ball, etc.) using various lengths of yarn. Ex. Given blocks of varying sizes, identify which are heavier/lighter and smaller/bigger. **Level III AA Students will:** **EEK.MD.1-3.** Classify objects according to attributes (big/small, heavy/light). Ex. Given a big book and a small book, describe or demonstrate which one is bigger and which one is smaller. Ex. Given the shoe of a student and the teacher, identify which one is bigger and which one is smaller. Ex. Sort heavy and light objects according to weight. Ex. Given the hand of a student in the class and the hand of the teacher, identify which one is bigger and which one is smaller. Ex. Given two objects of varying weight, describe or demonstrate which is heavy/light or large/small. **Level II AA Students will:** **EEK.MD.1-3.** Using a model or a template, sort objects by one attribute

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
count the numbers of objects in each category and sort the categories by count.[2]		(big/small or heavy/light). Ex. Sort counting bears by size using a model or template. Ex. Given two objects, where one is at least twice the size of the other, identify which one is bigger and which one is smaller with descriptive prompts from the teacher. Ex. Identify bigger ball when shown a beach ball and a tennis ball, and listening to the teacher use voice inflections and kinesthetic motions to exaggerate bigger and smaller. Ex. Identify the bigger ball when shown a golf ball and beach ball and listening to the teacher using voice inflections and motions to exaggerate. Ex. Sort objects in the classroom into groups of heavy and light (e.g., bowling ball, beach ball, and a rock). Ex. Given two pictures of real-life objects, select the bigger one. **Level I AA Students will:** **EEK.MD.1-3.** Match objects by attribute big and small. Ex. Touch a large object (such as a pumpkin) as teacher describes it as big when compared to a smaller pumpkin toy. Ex. Indicate small pumpkin as teacher describes it as small when compared with a large pumpkin. Ex. Indicate if they want the big ball or the small ball.

[2] Limit category counts to be less than or equal to 10.

Kindergarten Mathematics Standards: Geometry

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). **K.G.1.** Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*.	**EEK.G.1.** Identify words of proximity to describe the relative position.	**Level IV AA Students will:** **EEK.G.1.** Use words referring to frames of reference or demonstrate relative position. Ex. Given manipulatives, follow directions to place them in proper position (put the dog behind the boy). Ex. When looking at birds outside the window, tell where the bird is (e.g., in the tree, or on the wire). Ex. Given a picture, indicate the object that is in the named position (point to the person standing in front of the window). Ex. Looking at a picture in a book, use the correct word to describe the position of items in the pictures. Ex. Play "Simon Says" using positional words. Ex. "Is the ball next to you, in front of you, or behind you?" Ex. Given a set of building blocks, stack them to demonstrate beside and between. **Level III AA Students will:** **EEK.G.1.** Identify words of proximity to describe the relative position. Ex. Given manipulatives, follow direction to place them in proper position (one block "on top" of another). Ex. Given a picture, indicate the object that is in the named position (point to the person standing between the trees). Ex. Indicate where another teacher is relative to their position when walking side-by-side (e.g., "Am I walking next to you or beside you? Beside me?"). Ex. Indicate the relative position of a desk (e.g., beside). Ex. Given manipulatives, follow direction to place them in proper position (put the dog under the table).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EEK.G.1.** Respond to spatial words that describe relative position of an object using position terms (e.g., on, in, off). Ex. Given a picture, indicate the object that is in the named position (e.g., point to the person standing on the ladder). Ex. Play hide-and-seek with an object and tell the teacher where to hide it (on or in something). Another person comes in the room to find the object. The students tell them where the object is located (on or in something). Ex. After listening to a story, such as *Hop on Pop,* indicate answers to positional questions (e.g., "Is the ball in the box or outside of the box?"). Ex. Follow teacher directions when cleaning up from an activity by putting items away, such as put your crayons "in" your pencil box. Ex. Indicate choice when the teacher asks the student a series of questions, such as "do you want your hat 'on' your head or 'in' your backpack?" while preparing to go home. **Level I AA Students will:** **EEK.G.1.** Repeat positional words during an activity or lesson in which the teacher demonstrates the relative position of an object. Ex. Repeat or indicate the positional word the teacher uses as (s)he moves the student to physically demonstrate position terms (on, in). Ex. Repeat "in" as the teacher puts on a student's shoes and describes the action as putting the students' feet in the shoe.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
K.G.2. Correctly name shapes regardless of their orientations or overall size. **K.G.3.** Identify shapes as two-dimensional (lying in a plane, “flat”; or three-dimensional, “solid”).	**EEK.G.2-3.** Match two-dimensional shapes (circle, square, triangle).	**Level IV AA Students will:** **EEK.G.2-3.** Match two-dimensional shapes that vary in size (circle, square, triangle). Ex. Given an assortment of shapes that vary in size, match the shapes according to shape and size. Ex. Using computer software, select a triangle and match it to a target triangle that is a different size. Ex. Given a circle, go on a “Circle Hunt” to find other examples of circles around the school. **Level III AA Students will:** **EEK.G.2-3.** Match two-dimensional shapes (circle, square, triangle). Ex. Given a collection of pairs of identically sized shapes, match the shapes. Ex. Match shapes in an interactive whiteboard activity. Ex. Given four poker chips and four blocks, match the objects based on shape. **Level II AA Students will:** **EEK.G.2-3.** Match a shape to its duplicate. Ex. Given one shape and shown two shapes, select the matching shape from the two choices to one of hers/his. Ex. Match a colored construction paper circle to an outline on paper. Ex. Complete a shape-sorting box. **Level I AA Students will:** **EEK.G.2-3.** Repeat a model to match shapes. Ex. Match shaped objects with teacher model. Repeat after observing a teacher-directed matching activity routine involving shapes.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Match shaped objects with teacher prompts. Repeat after observing the teacher match the correct shaped object to the same object. Ex. Repeat after observing the teacher use pictures cut from magazines that show circles and squares. Teacher holds up a picture and asks what shape it is, then places it on a large circle or square mat.

COMMON CORE ESSENTIAL ELEMENTS AND ACHIEVEMENT DESCRIPTORS FOR FIRST-GRADE

First Grade Mathematics Standards: Operations and Algebraic Thinking

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Represent and solve problems involving addition and subtraction. **1.OA.1.** Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	**EE1.OA.1.a.** Use language to describe putting together and taking apart, aspects of addition and subtraction.	**Level IV AA Students will:** **EE1.OA.1.a.** Use words like take away, subtract, give, add, more, and same quantity, when putting together and taking apart. Ex. When gathering and distributing classroom supplies, appropriately use words like "more" and "take away" (handing out paper, pencils, or other tools used in a lesson). Ex. When picking teams for P.E., use the language of "I need one more student" or "I need to take away one more from my team." Ex. Request "one more" or "take away" one or more when the teacher has set up an activity where there is an uneven number of supplies. Ex. During an activity, use "add," "more," "less," etc. to indicate when a different amount is needed. **Level III AA Students will:** **EE1.OA.1.a.** Use language to describe putting together and taking apart, aspects of addition and subtraction. Ex. After the teacher shows six blocks and removes two, label the action as "take away" or informal language with the same meaning. Ex. Appropriately use "more" and "give" to express desire for more snacks or blocks. Ex. Use one-to-one correspondence to line up two sets of objects and ask which group has more/less. Ex. During practice of adding __ more to a numeral, show correct flashcard when asked, "I have two; who has two more (four)?"

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EE1.OA.1.a.** Put together or take away. Ex. Take away one crayon from the box**.** Ex. Put together red blocks and green blocks when asked. Ex. Give coins to purchase an item or take change at end of purchase. Ex. Give the teacher two blocks and then two more blocks. **Level I AA Students will:** **EE1.OA.1.a.** Follow directions to put together or take away an object with a verbal prompt. Ex. In a classroom routine and when presented with a component needed for the routine, give component(s) when asked to put together for the activity. Ex. Take a paper or object from peer when passed out. Ex. Offer paper or object to peer to put together with group's work when collected at the end of the lesson.
	EE1.OA.1.b. Recognize two groups that have the same or equal quantity.	**Level IV AA Students will:** **EE1.OA.1.b.** Create two groups that have the same or equal quantity. Ex. Fill two book bags with five books each. Ex. Put an equal number of chairs at two tables. Ex. Count out and pass books/material in groups of two items to each student at beginning of lesson. **Level III AA Students will:** **EE1.OA.1.b**. Recognize two groups that have the same or equal quantity. Ex. When presented with two groups of items, indicate if they have the same quantity. "Are they equal?" Ex. During an art activity, recognize that everyone has an equal amount of

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		supplies (everyone has two googly eyes, one sheet of paper, and one glue stick.) Ex. While playing a game with dice, recognize when the same quantity is rolled on each die. Ex. Given three groups of objects arranged on the table, two with the same number of objects, one with a different number of objects, identify which two sets of objects are the same/equal. **Level II AA Students will:** **EE1.OA.1.b.** Add one more to a group to make it the same or equal to the other. Ex. At the request of the teacher, add one more object to make the groups equal after the teacher makes two groups of objects, one group having two objects and one group only one object. Ex. Add one more chair at the request of the teacher when there are two students and one chair. Ex. Use 10 frames to add beans to a quantity to make one more in order to match the teacher model. Ex. Add one more student to a group to play a game or complete a cooperative group with teacher prompts. **Level I AA Students will:** **EE1.OA.1.b.** Replicate a group of objects. Ex. Given two blocks and shown a model of two blocks together, duplicate the model. Ex. Given the outline of two circles, place two disks on the circles to duplicate the model.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
1.OA.2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	**EE1.OA.2.** Use "putting together" to solve problems with two sets.	**Level IV AA Students will:** **EE1.OA.2.** Use "putting together" to solve problems using three sets. Ex. Given a simple story that presents a problem involving three sets, put the sets together to make one (e.g., John went to a party and brought one gift, Karen went to the party and brought two gifts, Tom went to the party and brought one gift; how many gifts did they have altogether?). Ex. Put together objects to solve a problem (e.g., Sarah put two apples in the basket, Javier put three apples in the basket, Sasha put one apple in the basket; how many apples are in the basket?). Ex. Draw objects next to a vertical addition problem to solve. Ex. Utilize a pictorial math program on the computer to solve for three quantity addition problems. **Level III AA Students will:** **EE1.OA.2.** Use "putting together" to solve problems with two sets. Ex. Take attendance for a group of five or fewer students. Determine number of boys and number of girls. Put together number of boys and girls to determine how many classmates total. Ex. Using name cards, determine for a group of five or fewer students the number of children who want to buy lunch from the cafeteria, and the number of children who brought a sack lunch. Put together the number of students eating lunch. Ex. Line up for special class on numbers on classroom floor and tell how many students are in line. Ex. Use counting sticks to solve a problem. **Level II AA Students will:** **EEI.OA.2.** Use "putting together" to solve a problem with one set and adding one more.

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		Ex. Given a set of counting bears (fewer than five), put together one more to make the next number. Ex. When cleaning up the activity center, "put together" the toys, to make the next number (e.g., "I have two blocks. Can you put them together with one more to make three?"). Ex. Use dry erase board to solve a problem by adding one more. **Level I AA Students will:** **EE1.OA.2.** Put in an item from a group, using technology or objects. Ex. Drop one more bean bag into a bucket with a verbal prompt. Ex. Drop one ping-pong ball into a Pringles can with hole cut into lid. Ex. Follow directions to add one counting block to a group.
Understand and apply properties of operations and the relationship between addition and subtraction. **1.OA.3.** Apply properties of operations as strategies to add and subtract.[3] *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To*	**EE1.OA.3.** N/A	

[3] Students need not use formal terms for these properties.

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add 2 + 6 + 4, the second two numbers can be added to make a 10, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)		
1.OA.4. Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8. Add and subtract within 20.*	**EE1.OA.4.** N/A (See EENBT.1.4 and EENBT.1.6)	
Add and subtract within 20. **1.OA.5.** Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).	**EE1.OA.5.a.** Use manipulatives or visual representations to indicate the number that results when adding one more.	**Level IV AA Students will:** **EE1.OA.5.a.** Indicate the numeral that results when adding one more to the numbers. Ex. With nine beads on the string, indicate "10" after adding one more. Ex. After taking attendance, indicate how many students are present when adding one more student. Ex. Stand on large floor number line, determine how many, and then add one more to determine sum. Ex. Use table number line to line up counting sticks, then add one more to each. Ex. When teaching time to the hour, teacher says it is 2:00, (and points to clock) what time will it be in one hour? **Level III AA Students will:** **EE1.OA.5.a.** Use manipulatives or visual representations to indicate the

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		number that results when adding one more. Ex. There are four crackers on the table. "If I add one more, how many will I have?" Answer is five. Ex. If three children are sitting at the table with four chairs, indicate "four" when asked, "How many will we have when Linda arrives?" Ex. Using tokens as positive reinforcement, teacher points out that the student has five tokens, then adds one more and asks how many. **Level II AA Students will:** **EE1.OA.5.a.** Indicate the numbers that result when adding one more to the numbers from one to five. Ex. Add one more to a set of four objects. Ex. When presented with four beads on a string, add one more. Ex. While following steps to play a game, add one more card to a set of cards. **Level I AA Students will:** **EE1.OA.5.a.** Do or give one more. Ex. When asked, hand or give the teacher one more block. Ex. When asked, clap one more time. Ex. Use a Big Mac switch to request one more song, turn, or item with teacher prompt. Ex. In adaptive P.E., perform one more exercise, ball throw, etc. upon request. Ex. Look at a block when asked to give one more.

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	EE1.OA.5.b. Apply knowledge of "one less" to subtract one from the numbers.	**Level IV AA Students will:** **EE1.OA.5.b.** Indicate the numeral that is one less. Ex. With 14 beads on the string, indicate "13" after subtracting one. Ex. Shown 10 beads on a string, and asked, "What is one less?" indicate "nine." Ex. After taking attendance, indicate how many students are present after one student goes home. Ex. Given a vertical number sentence, draw objects to match first number and then cross out the corresponding amount of the second number to arrive at difference. Ex. Point to the number left when 10 students are standing in a line and one sits down. Ex. Listen to the teacher read *10 Little Monkeys Jumping on the Bed* and tell how many are left at each page. **Level III AA Students will:** **EE1.OA.5.b.** Apply knowledge of "one less" to subtract one from the numbers. Ex. Identify the number remaining when one object is taken away from a group of six objects arranged on the table. Ex. Given five tasks to complete, tell how many tasks are left to complete before lunch as the teacher checks each off the list. Ex. Tell how many chairs are left each time when playing musical chairs as the teacher takes away one chair each time. Ex. Using a computer with touch screen and math software to click and drag objects one at a time away from total, determine how many are left each time an object is dragged away from the total set.

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		Level II AA Students will: **EE1.OA.5.b.** Indicate how many are left when one is taken away from two to four objects. Ex. With four counting cubes, take away one to leave three counting cubes. Ex. When presented with four beads on a string, take away one and indicate how many are left. Ex. Given four quarters, spend one at the school store and then tell the teacher how many quarters are left in bank. Ex. Using materials presented at a table, each student takes one as the group counts backwards. **Level I AA Students will:** **EE1.OA.5.b.** Remove or take one away. Ex. Erase one mark from a group of two on a dry erase board. Ex. Take away one counting bear from a group of three. Ex. Take one block from a group of two.
1.OA.6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship	**EE1.OA.6**. N/A	

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between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).		
Work with addition and subtraction equations. **1.OA.7.** Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.	**EE1.OA.7.** N/A (See EE1.OA.1.b)	
1.OA.8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the*	**EE1.OA.8.** N/A	

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unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = _ – 3, 6 + 6 = _.		

First Grade Mathematics Standards: Number and Operations in Base Ten

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Extend the counting sequence. **1.NBT.1.** Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.	**EE1.NBT.1.a.** Count by ones.	**Level IV AA Students will:** **EE1.NBT.1.a.** Count from 1 - 30 with meaning; cardinality. Ex. Participate in a classroom chant to count numbers 1 – 30. Ex. Recite the count sequence 1 – 30. Ex. Sing numbers to 30. **Level III AA Students will:** **EE1NBT.1.a.** Count by ones. Ex. Participate in a classroom chant to count numbers 1 – 20. Ex. Recite the count sequence 1 – 20. Ex. Sing numbers to 20. **Level II AA Students will:** **EE1.NBT.1.a.** Count to 10. Ex. Participate in a classroom chant 1 -10. Ex. Recite numbers 1-10. Ex. Sing numbers 1-10. **Level I AA Students will:** **EE1.NBT.1.a.** Count to two. Ex. Sing numbers up to two with teacher. Ex. Count along using a voice output communicative device that will count in order (1-2) upon each activation. Ex. Activate a pre-programmed sequenced communication device repeatedly to recite the numbers one and two.

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	EE1.NBT.1.b. Count as many as 10 objects and represent the quantity with the corresponding numeral.	**Level IV AA Students will:** **EE1.NBT.1.b.** Count up to 20 objects and represent the quantity with a numeral. Ex. Count a number of dots on a card and write or select the corresponding numeral. Ex. Count the number of names on the attendance chart and write the corresponding number up to 20. Ex. Count up number of pennies/tokens in bank at end of day and record on balance sheet. Ex. Using two 10 frames, count out disks in a bag and record result to classroom graph. **Level III AA Students will:** **EE1.NBT.1.b.** Count as many as 10 objects and represent the quantity with the corresponding numeral. Ex. Teacher will show the student numeral nine and ask them to give them that many blocks. Ex. When shown the number five, count five crayons. Ex. Match a numeral card to a group of objects. Ex. Write or draw the numeral that corresponds with the number of counting sticks. **Level II AA Students will:** **EE1.NBT.1.b.** Count as many as five objects and/or represent the quantity with the appropriate numeral. Ex. Tap objects while counting. Ex. During teacher-led counting/clapping routine, clap once for each number the teacher recites.

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		Level I AA Students will: **EE1.NBT.1.b.** Count up to two objects. Ex. Use tapping, switching, blinking, clapping, chanting to count two objects. Ex. Hand items to peer one at a time, while peer counts. Ex. Use eye gaze with large number line to look at each number as teacher counts.
Understand place value. **1.NBT.2.** Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: ▪ 10 can be thought of as a bundle of ten ones — called a "ten." ▪ The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. ▪ The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six,	**EE1.NBT.2.** Create sets of 10.	**Level IV AA Students will:** **EE1.NBT.2.** Create multiple sets of ten with an odd number of objects (remainders). Ex. Given a bowl of 27 counting bears and baggies, put 10 at a time in each baggie and leave the leftovers in the bowl. Ex. Given a box of 32 paperclips and envelopes, put 10 at a time in each envelope. Ex. Use a 10 compartment egg carton to count out 10 pennies to exchange for a dime. Put remainders back in bank. **Level III AA Students will:** **EE1.NBT.2.** Create sets of 10. Ex. Given 20 crayons, divide them into two sets of 10. Ex. Given 30 playing cards, pass out 10 cards to three players. Ex. During calendar, students count out 10 straws to represent 10 days in school and bundles them and moves the bundle to the tens place pocket. Ex. Five students work cooperatively to count out 10 pennies each, combine and roll for the bank. **Level II AA Students will:** **EE1.NBT.2**. Create one set of 10 to match another set of 10.

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seven, eight, or nine tens (and 0 ones).		Ex. Create one set of 10 using a jig, model, or template to match another set of 10. Ex. Given a set of 10 objects arranged in a row, make another row of 10 objects. Ex. Given a hula hoop, group a set of 10 beanbags in it. Ex. Count out enough toy rings for each of 10 fingers and put them on and check for accuracy. Ex. Make a "bean stick" by counting out 10 beans and gluing them on a popsicle stick to match a model. Ex. Access a switch that says "stop" or "that's it" when watching or listening to another individual arrange sets or groups of 10. **Level I AA Students will:** **EE1.NBT.2.** Identify a set of five. Ex. Select a set of five objects from a choice of two or more sets. Ex. Choose from a set of markers and a set of crayons. (Exposure to vocabulary: set) Ex. Choose from two sets of pictures the one that matches the model set of five.
1.NBT.3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.	**EE1.NBT.3.** Compare two groups of 10 or fewer items when the quantity of items in each group is similar.	**Level IV AA Students will:** **EE1.NBT.3.** Choose the larger/smaller set of items that are <10, >10 when the sets differ by three or fewer. Ex. Given two stacks of books, identify which set has <10, >10. Ex. Given two pencil boxes, identify which pencil box contains <10, >10 pencils. Ex. Given two stacks of cups, identify which set has <10, >10. Ex. Given two class lines of students, identify which set has <10, >10.

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		Level III AA Students will: **EE1.NBT.3.** Compare two groups of 10 or fewer items when the quantity of items in each group is similar. Ex. Given two pencil boxes, one with five and one with 10 pencils, identify which pencil box contains the smaller set of items. Ex. Given one set of cubes with 1-4 cubes, and a second set of cubes with 6-10, identify the set with less than five. **Level II AA Students will:** **EE1.NBT.3.** Choose the matching set of items. Ex. Given three pencil boxes, identify which two pencil boxes contain the same number of items. Ex. Given three bracelets, match a second set of three bracelets from two choices. Ex. Given one set of counting cubes with 1-4 cubes, and a second set of counting cubes with 6-9 cubes, identify the larger set. **Level I AA Students will:** **EE1.NBT.3.** Match sets of one, two, or three objects .showing the same number of objects. Ex. Given three sets of objects of one or two objects, match the two showing the same number.
Use place value understanding and properties of operations to add and subtract.	**EE1.NBT.4.** Compose numbers less than or equal to five in more than one way.	**Level IV AA Students will:** **EE1.NBT.4.** Compose numbers less than or equal to 10 in more than one way. Ex. Given a bowl of pennies, and make sets of 10 with different numbers of pennies. Ex. Given lanyards or string and two colors of beads, create bracelets with

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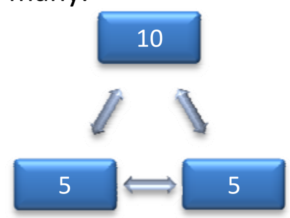
1.NBT.4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.		varying combinations of 10 colored beads. (One bracelet with 10 blue beads, one bracelet with five blue beads, five red beads, etc.). Ex. Using a triangle graphic organizer, place random amounts of manipulatives in two base angles and move/combine them at the top and count how many.  **Level III AA Students will:** **EE1.NBT.4.** Compose numbers less than or equal to five in more than one way. Ex. Given a set of red counting cubes and a set of green counting cubes, create a set of only red, a set of only green, and a set of mixed red and green totaling five in each case. Ex. Given a five-piece inset puzzle and two trays, take out and sort the puzzle pieces into the trays in more than one way. Ex. Place colored macaroni pieces on each number on a number line up to five in any combination, then string. Ex. Shake two sizes of markers or painted beans in a cup and spill. Ask students to count each color and then count all together. Ex. Draw circles and squares to make five in any combination. Ex. Use a muffin pan with five wells to place one colored block in each well, then count to find total.

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		Level II AA Students will: **EE1.NBT.4.** Identify (subitize) sets of one to three objects. Ex. Given a set of two stickers and a set of three stickers on a page, find the set of three stickers when asked for three. Ex. Given a domino with one dot and a domino with three dots, locate the domino with one dot when asked for one. Ex. Given sets of one to three objects, indicate the set with three objects when asked for three. If the student counts, teacher asks again for three and reinforce, "This is three." Ex. Teacher holds up 1-3 fingers and asks how many. If student counts, teacher asks again for final number and reinforce, "This is three." **Level I AA Students will:** **EE1.NBT.4.** Repeat the number of objects in sets of 1-3 objects. Ex. Watch as the teacher uses one scarf, saying, "I have one scarf. How many?" Ex. Attend to a finger-play of "Three Little Monkeys" told with finger-puppets and repeats how many monkeys. Ex. Repeat when teacher says how many eyes, nose, ears, mouth, etc. he/she has. Ex. Point to or indicate items of clothing as teacher counts how many (e.g., "I have two shoes. How many shoes?" "I have one hat. How many hats?" "I have two mittens. How many mittens?" "I have one coat. How many coats?").
1.NBT.5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to	**EE1.NBT.5.** N/A (See EE1.OA.5.a and EE1.OA.5.b)	

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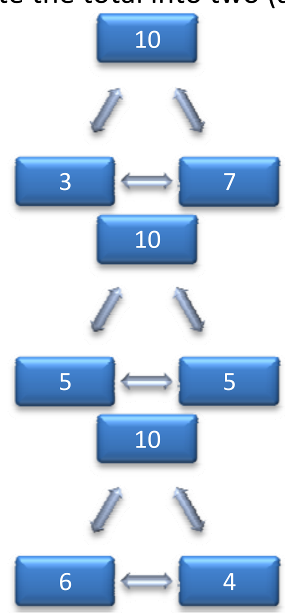
count; explain the reasoning used.		
1.NBT.6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	**EE1.NBT.6.** Decompose numbers less than or equal to five in more than one way.	**Level IV AA Students will:** **EE1.NBT.6.** Decompose numbers less than or equal to 10 in more than one way. Ex. Given 10 or fewer bean bags and two baskets, toss bean bags into baskets creating different sets each time using a dry erase board. Ex. Given 10 or fewer counting blocks, arrange them into two different group combinations. Ex. Given a triangle graphic organizer with up to 10 manipulatives in the tip, separate the total into two (any size) groups in the base angles. 

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		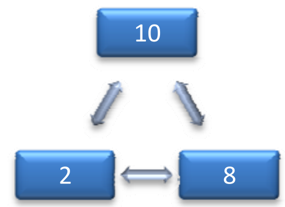 Ex. Ask students how many ways they can create 10 cents. **Level III AA Students will:** **EE1.NBT.6.** Decompose numbers less than or equal to five in more than one way. Ex. Given five books, divide them into two groups in more than one way. Ex. Given five matchbox cars and two cardboard “garages,” “park” the cars in the garages in varying ways. (First time, student may put two cars in one garage and three cars in the other garage, and teacher asks, “Can you do it a different way this time?” and student continues to distribute the cars in varying ways.) Ex. Given five counting blocks, divide them into two groups in more than one way. Ex. Use teacher-made dice to roll combinations totaling up to five. Ex. Play a finger game where two students put up random number of fingers on one hand each to create five. If they do, the students’ team earns a point. Ex. Use a dry erase board to decompose numbers less than five in more than one way. **Level II AA Students will:** **EE1.NBT.6.** Decompose numbers less than or equal to five in one way. Ex. Given a handful of blocks (up to five), separate into two piles in any order. Count and label each pile with teacher assistance.

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		Ex. Sort up to five items into two groups. Ex. Given a group of five tokens composed of two different colors, count out total, sort with teacher by color and count each group. **Level I AA Students will:** **EE1.NBT.6.** Identify two sets of the same object (less than five) as they are being decomposed. Ex. Asked to find the same item as shown somewhere else in the room, bring two of the same items together to make a bigger set. Ex. Repeat as the teacher decomposes two objects into two groups (e.g., Teacher has two balls, rolls one to the students. Teacher says, “You have one ball, I have one ball. How many balls do you have?” Student rolls it back at prompt. Teacher says, "Now, I have two balls. “ How many balls do I have?” Repeat with various combinations.). Ex. Repeat as the teacher decomposes two counting bears on the table in a pile (e.g., Teacher says, “Here are two bears. How many bears are there? Take one. Now there is one bear on the table. How many bears are on the table now?”). Ex. Repeat as the teacher decomposes two books (e.g., Teacher counts aloud the number of books as they are handed to each student. Teacher says, “There are two books. How many books are there? Here is one for you. How many books do you have? Here is one for you. How many books do you have?”).

First Grade Mathematics Standards: Measurement and Data

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Measure lengths indirectly and by iterating length units. **1.MD.1.** Order three objects by length; compare the lengths of two objects indirectly by using a third object. **1.MD.2.** Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*	**EE1.MD.1-2.** Use appropriate vocabulary to describe the length of an object using the language of longer/shorter, taller/shorter.	**Level IV AA Students will:** **EE1.MD.1-2.** Measure and compare two similar objects aligned at the same starting point, and describe which is longer/shorter, taller/shorter. Ex. Indicate who is taller and who is shorter when two students stand side-by-side. Ex. Measure the height of their desks and the height of the teacher's desk with interlocking cubes and then lay them down horizontally side-by-side on a table to compare. Ex. Use footprints to measure off length of classroom versus hall and state which is longer/ shorter. Ex. Use a string to measure two objects and tell which is longer. **Level III AA Students will:** **EE1.MD.1-2.** Use appropriate vocabulary to describe the length of an object using the language of longer/shorter, taller/shorter. Ex. Given two pieces of string placed side-by-side, use "longer" and "shorter" to describe their relative lengths (e.g., "Look at these two objects and tell me about their length."). Ex. Given two pencils laid side-by-side, use "longer/shorter" to describe each one. Ex. Given two different kinds of objects, that are similar in all attributes except for length (e.g. pencil to marker), but one is significantly longer than the other, tell which is longer. **Level II AA Students will:** **EE1.MD.1-2.** With guidance and support, select from two everyday objects based on the stated attribute (long/short, tall/short). Ex. Using a model, select the one that is shorter from two options (e.g.,

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		using two sets of pictures the teacher says "Here are two boys. This one is shorter." "Here are two dogs. Show me the shorter one."). Ex. Point to or indicate in a picture showing two story characters standing side-by-side the one that is taller (e.g., "In the story, Bob is taller than Joe. Look at the picture. Which one is taller?"). Ex. Using a model of a bar graph, select the bar that is taller on a second graph (e.g., using two bar graphs, the teacher says "Here is the taller bar on this graph." Show a second bar graph of daily temperatures and say, "Which bar is taller."). Ex. After being shown one boot and one shoe, identify the "tallest." **Level I AA Students will:** **EE1.MD.1-2.** Explore tall/short objects. Ex. Focus on the short and tall objects when the teacher is presenting a story about long and short. Ex. Explore soft blocks (one tall, one short) on their wheelchair tray, while teacher says and demonstrates, "Reach up high to touch the tall block, now touch the short block." Ex. When presented with a model, use clay to make a "long snake and a short snake" and compare them. Ex. First sit and then stand to explore short and tall (e.g., Stand up; Now you are tall. Sit down; Now you are short.)
Tell and write time. **1.MD.3.** Tell and write time in hours and half-hours using analog and digital clocks.	**EE1.MD.3.a.** Demonstrate an understanding of the terms "tomorrow, yesterday, and today."	**Level IV AA Students will:** **EE1.MD.3.a.** Use the words "today, tomorrow, and yesterday" to refer to personal activities and events. Ex. Using lunch menu, answer questions such as, "What did you have for lunch yesterday?", "What did you eat today?", and "What will you have tomorrow?"

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		Ex. Use classroom calendar to find today's activities, after being shown yesterday's. Ex. Complete a graphic organizer by placing index card with day of the week written on it and place it in the correct column under "Yesterday," "Today," or "Tomorrow". Ex. Find "Today" in monthly planner when given date by teacher and points to it. Move finger backward and forward to find "Yesterday" and "Tomorrow." **Level III AA Students will:** **EE1.MD.3.a.** Demonstrate understanding of the terms "tomorrow, yesterday, and today." Ex. Indicate yesterday, today, or tomorrow when teacher asks about a favorite activity and when it happened or will happen. Ex. Given a classroom calendar, find a picture of an activity that fits with "What happens tomorrow?" Ex. Given a calendar, find "Today" and place a sticker on it. Ex. Find "Tomorrow's" lunch choice on cafeteria monthly menu. **Level II AA Students will:** **EE1.MD.3.a.** Indicate understanding of the term "today." Ex. When shown two picture cards or math cue cards of daily activities, select the event that happens today. Ex. During calendar activity, answer the question, "Show me today on the calendar. What is the weather like today?" Ex. Indicate "Today" by pointing to the correct day of the week, drawing a line from it to the correct day of the week, or circling the day from a field of three options.

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		Level I AA Students will: **EE1.MD.3.a.** Identify an activity that will take place "today." Ex. Indicate a preference when asked and shown the play items, "Yesterday you played with the blocks. Do you want to play with the blocks or the balls today?" Ex. Attend to class discussion during calendar and then choose pictured activities for today on cards to place on their visual schedule.
	EE1.MD.3.b. Name a day of the week for tomorrow and yesterday.	**Level IV AA Students will:** **EE1.MD.3.b.** Using a calendar, recall the seven days of the week and identify the appropriate day for tomorrow and yesterday. Ex. If today is Monday, what day is tomorrow? Ex. If yesterday was Friday, what day is today? Ex. Fill in the blanks to complete sentences with index cards with the names of the days on them (i.e., Yesterday was ________, today is ________, and tomorrow will be _______.). **Level III AA Students will:** **EE1.MD.3.b.** Name a day of the week for tomorrow and yesterday. Ex. Use a calendar to determine the day before and the day after today. Ex. Given today, identify what tomorrow is? Ex. If today is Tuesday, what is tomorrow? Ex. If today is Monday, what was yesterday? **Level II AA Students will:** **EE1.MD.3.b.** Name a day of the week. Ex. Names the days of the week, but not in order. Ex. When asked, identify today. Ex. Sing a "Days of the Week" song.

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		Ex. Answer questions by naming the day of the week, “What day do you go to church?” or “What day do we cook?” **Level I AA Students will:** **EE1.MD.3.b.** Identify an activity that is happening today. Ex. Indicate one activity on a picture schedule when asked, “What are we doing today?” Ex. Indicate that today is a school day. Ex. During art class, identify a paint brush as the tool needed for today’s activity when presented with a choice of paintbrush and a sock. Ex. Look at visual schedule and using picture symbol, indicate the music symbol to represent the current activity.
	EE1.MD.3.c. Identify activities that come next, before, and after.	**Level IV AA Students will:** **EE1.MD.3.c.** Correctly sequence the activities given the direction to identify what comes next, before, and after in the day’s or week’s schedule. Ex. Identify what is the first activity of the day, and then identify what comes after that. Ex. Given an activity such as going out to recess, correctly sequence three picture cards from the daily schedule illustrating getting ready to go outside. Ex. Sequence 3-4 events in a story with picture cues. Ex. Repeat a three-step direction and then carry it out (i.e., First, I ___, next, I ___, and last, I ___.) **Level III AA Students will:** **EE1.MD.3.c.** Identify activities that come next, before, and after. Ex. Given a personal schedule, answer questions such as, “What do we

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		need to do next?” Ex. Given digital camera pictures of a child engaged in the day’s activities, answer questions such as, “What did you do before lunch today? What did you do next? What did you do after you after that?” Ex. Use a calendar to identify next, before, and after. Ex. Sequence a set of pictures depicting a shoe tying or jacket zipping routine. Ex. At the end of the day, teacher asks students to sequence the day’s events to include in the parent communicator. Ex. Use a visual schedule or sequence cards to complete an activity that offer first, second, and third steps. **Level II AA Students will:** **EE1.MD.3.c.** Indicate activities that come next. Ex. Given a daily schedule listing the day’s activities, answer the question, “We just finished lunch. What happens next?” Ex. When participating in a transition routine (moving from one activity to a new activity), indicate the next activity. Ex. Tell the next step in a familiar activity (e.g., Teacher communicates classroom routines consistently and then asks students questions to reinforce the learning by asking, “What step comes next to turn in work?”). Ex. Use the classroom schedule to indicate what happens next (e.g., After timer rings to end an activity, the teacher asks students, “What happens next?” and refers to the classroom schedule.). Ex. Given a pattern with two repetitions, identify the “next” object in the pattern sequence.

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		Level I AA Students will: **EE1.MD.3.c.** Recognize the next activity. Ex. Using a picture schedule, identify the next activity by indicating the next picture. Ex. Using a First/Then graphic with self-sticking non-adhesive pictures, remove the First picture when the task is done. Ex. When shown a three-part illustration of an activity with a before-during-after sequence, indicate which of the actions comes next. Ex. Given a picture schedule, choose the next activity picture to indicate what is next. Ex. Pull the self-sticking non-adhesive picture off the schedule at the end of the activity and point to the next activity pictured.
	EE1.MD.3.d. Demonstrate an understanding that telling time is the same every day.	**Level IV AA Students will:** **EE1.MD.3.d.** Demonstrate an understanding of telling time with a clock or watch related to real-life context. Ex. Indicate from a set of tools (e.g., ruler, measuring cup, watch) what you will use to know when it is time for lunch. Ex. Match noon on an analog clock to lunch. Ex. Choose pictures of different style clocks and watches and put into a category, rejecting distracter pictures. Ex. Match a picture of a clock to a clock and tell what a clock is used for. Ex. Match the current time on a clock with the appropriate activity from a picture schedule. Ex. Point to various activities and their corresponding times on clocks that have been posted with corresponding activities on the classroom bulletin board.

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		Level III AA Students will: **EE1.MD.3.d.** Demonstrate an understanding that telling time is the same every day. Ex. Show the schedule for today and tomorrow side-by-side. When teacher indicates we went to lunch at noon today, indicate we will go to lunch at noon tomorrow. Ex. Teacher announces the time to go home every day. Then, the teacher announces the time and asks, "What happens every day at this time?" **Level II AA Students will:** **EE1.MD.3.d.** Demonstrate an understanding of the use of a clock (time). Ex. Indicate the use of a clock when asked what tool is needed to tell time. Ex. Indicate a clock when asked what tool is needed to help you awake from a night's sleep. Ex. Look at the clock, repeat the time after the teacher, and follow the teacher directions when the teacher models, using "Think alouds," by announcing various times throughout the day. Ex. After listening to stories about time, answer questions to demonstrate an understanding of time. Ex. Use objects for transitioning to predict time of day (spoon represents lunch, backpack represents home, book represents reading/language) **Level I AA Students will:** **EE1.MD.3.d.** Recognize representations of different parts of the day; morning, noon, and night. Ex. Point to a picture of a bed when prompted. Ex. Point to a picture of a sunrise when prompted. Ex. Point to a clock when prompted. Ex. Points to food pictures to indicate meal times.

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Represent and interpret data. **1.MD.4.** Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.	**EE1.MD.4.** Given a count of the total number of data points in two categories, determine whether there are more or less in each category.	**Level IV AA Students will:** **EE1.MD.4.** Collect and count data into at least two categories to answer questions about the total number of data points and whether there are more or less in one category than in another. Ex. Collect data from a class vote and categorize it to determine the category with the most votes (e.g., the class takes a vote, counts the vote, and decides which choice won). Ex. Collect data about class choices and categorize the count to determine which is the favorite (e.g., hot lunch choices, milk choices, any activity where you are counting and tallying in two or more choices). Ex. Attend to a bar graph of daily temperatures in winter and determine if there were more days of indoor or outdoor recess. **Level III AA Students will:** **EE1.MD.4.** Given a count of the total number of data points in two categories, determine whether there are more or less in each category. Ex. Given a graphical display of data (lunch count) of the number of data points in each category, determine whether there are more or less in each category (e.g., did more students buy cheese sandwich). Ex. Given a pictograph of the number of boys and girls in class, choose the group with more. Ex. Stand next to one of two books for class to vote on what book to read during story time. After teacher counts each group, determine which book won. **Level II AA Students will:** **EE1.MD.4.** Put objects and choices into categories. Ex. Given a picture of the type of drink (e.g., chocolate milk, plain milk, juice), place their choice on a lunch chart to represent the number who

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		wants each type of drink. The teacher counts the number of each drink choice on the chart. Ex. Tape a paper doll to attendance chart to represent oneself (e.g., Each girl has a paper doll representing “girl” and each boy has one representing “boy.” After students tape their dolls to the attendance chart, the teacher counts the number of boys and the number of girls on the chart.). Ex. Using a dry erase board, enter a tally into the appropriate column provided by the teacher (e.g., preferred activity of story reading versus block counting, etc.). Ex. Drop one marble into a “yes” or “no” can to answer a question. The teacher counts the number of marbles and the correct answer is revealed. Ex. Use a classroom clicker system to respond to questions, one vote/response per person. **Level I AA Students will:** **EE1.MD.4.** Participate in data collection by voting or otherwise choosing. Ex. Indicate pencil or crayon when asked, “Do you like pencils or crayons better?” Ex. Indicate preference (vote) when asked, “Who wants to play outside?”

First Grade Mathematics Standards: Geometry

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Reason with shapes and their attributes. **1.G.1.** Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes. **1.G.2.** Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and	**EE1.G.1.** Identify common two-dimensional shapes: square, circle, triangle, and rectangle.	**Level IV AA Students will:** **EE1.G.1-2.** Identify attributes of common two-dimensional shapes: square, circle, triangle, and rectangle. Ex. Given shapes of different sizes, and orientations, sort by shape attribute. Ex. Given a triangle and asked, “How many sides does a triangle have?” Indicate three. **Level III AA Students will:** **EE1.G.1-2.** Identify common two-dimensional shapes: square, circle, triangle, and rectangle. Ex. Given an array of shapes, identify the shape when asked. Ex. Given a picture, identify common shapes within the picture. Ex. Given a card with a shape on it, answer, and “Is this a square?” **Level II AA Students will:** **EE1.G.1-2.** Match shape to shape Ex. Match a two-dimensional shape to a two-dimensional shape in their environment. Ex. Given a shape puzzle, complete the puzzle. **Level I AA Students will:** **EE1.G.1-2.** Recognize a shape. Ex. Given a circle and asked “Show me circle,” point to the circle.

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compose new shapes from the composite shape.[4]		Ex. Given a card with a shape, point to the shape.
1.G.3. Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as *two of*, or *four of* the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.	**EE1.G.3.** Put together two pieces to make a shape that relates to the whole (i.e., two semicircles to make a circle, two squares to make a rectangle).	**Level IV AA Students will:** **EE1.G.3.** Demonstrate part and whole terminology understanding. Ex. Given an array of half shapes such as tangrams, select two and put them together to make a circle, square, or triangle. Ex. On an interactive whiteboard, move two squares together to form a rectangle and them take them apart again. **Level III AA Students will:** **EE1.G.3.** Put together two pieces to make a shape that relates to the whole (i.e., two semicircles to make a circle, two squares to make a rectangle). Ex. Put together two parts of a circle to create a whole circle. Ex. Put two squares together to form a rectangle. Ex. Given half of an index card with a partial shape or picture, find a peer who has the other half to make a complete shape or picture. **Level II AA Students will:** **EE1.G.3.** Put together two pieces. Ex. Using an inset puzzle as a model, put together a whole circle from half-circle puzzle parts. Ex. Given a template, put together two pieces to form a whole. Ex. Using plastic eggs, practice breaking apart into two equal parts, and put together to make a whole.

[4] Students do not need to learn formal names such as "right rectangular prism."

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		Level I AA Students will: **EE1.G.3.** Given an inset puzzle or technology equivalent, insert a shape. Ex. Using a one-shape puzzle, insert missing piece. Ex. While using shape-based chart, student inserts shape into open slot. Ex. Match a paper cut-out shape to an outline on picture and glue. Ex. Use a touch window to click and drag a shape from shape bank to insert into outline in picture.

COMMON CORE ESSENTIAL ELEMENTS AND ACHIEVEMENT DESCRIPTORS FOR SECOND GRADE

Second Grade Mathematics Standards: Operations and Algebraic Thinking

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Represent and solve problems involving addition and subtraction. **2.OA.1.** Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	**EE2.OA.1.** Add and subtract to solve real world one-step story problems from 0-20 when the result is unknown.	**Level IV AA Students will:** **EE2.OA.1.** Add and subtract to solve real world one-step story problems from 0-20 when any number in the problem is unknown (result, start, change, difference). Ex. During adaptive P.E., there are five students and three balls. Determine how many more balls are needed so every student will have a ball, representing the unknown with a blank (e.g., three balls + __ balls is equal to five balls). Ex. Given a real-world story involving addition or subtraction, represent the problem using numbers and the + or - symbol, and solve the problem, with the unknown as any number. **Level III AA Students will:** **EE2.OA.1.** Add and subtract to solve real world one-step story problems from 0-20 when the result is unknown. Ex. Given concrete objects, represent and solve a story problem with addition or subtraction with the unknown as the result. Ex. Given concrete objects, solve a simple one-step story problem using subtraction. **Level II AA Students will:** **EE2.OA.1.** Given the equation, add to solve real world one-step story problems from 0-10. Ex. Using a dry erase board with pictures in place of numbers, solve a real world addition problem (e.g., add the number of girls and boys to determine the number of pencils needed).

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		Ex. Given a felt board story problem about Johnny Appleseed, point to the number or picture showing the total apples that he planted in one day plus another day. **Level I AA Students will:** **EE2.OA.1.** Identify the object(s) that appear in the real world one-step story problem. Ex. Given a story problem and concrete representations of the objects point to the correct object(s). Ex. Given a felt board story problem about Johnny Appleseed and asked what you are adding, indicate apples.
Add and subtract within 20. **2.OA.2.** Fluently add and subtract within 20 using mental strategies.[5] By end of Grade 2, know from memory all sums of two one-digit numbers.	**EE2.OA.2.** N/A (See EE2.NBT.7)	
Work with equal groups of objects to gain foundations for multiplication.	**EE2.OA.3.** Equally distribute even numbers of objects between two groups.	**Level IV AA Students will:** **EE2.OA.3**. Determine that a quantity of objects is even or odd by separating them into two groups. Ex. Given a X quantity of objects, distribute them into two groups. Indicate

[5] See standard 1.OA.6 for a list of mental strategies.

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2.OA.3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.		that if there are leftovers, the quantity is odd and if the quantity divides evenly, the number is even. Ex. Given two plastic rings and nine cubes distribute the cubes evenly into the rings and determine if there are any leftovers. Indicate if the number of cubes was even or odd. **Level III AA Students will:** **EE2.OA.3.** Equally distribute even numbers of objects between two groups. Ex. Distribute eight objects equally between two boxes and count the total number of objects in each box. Ex. Divide 10 crayons into two equal collection cans. **Level II AA Students will:** **EE2.OA.3.** Separate objects into two groups. Ex. Given an assortment of objects, divide into two groups and indicate how many in each group. Ex. Given counting cubes in two sizes, sort them into two piles. **Level I AA Students will:** **EE2.OA.3.** Make two groups of two. Ex. Given a group of four objects, two each of two unlike objects (e.g., a ball and a box), separate them into two groups of two with like objects in each group. Ex. Given two unlike objects (e.g., a cube and a pyramid), separate them. Then, when shown two objects that match the previously presented objects, place them with the matching object to make a group (two cubes, two pyramids). Ex. Group objects into like sets.

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2.OA.4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.	**EE2.OA.4.** Use addition to find the total number of objects arranged within equal groups up to a total of 10.	**Level IV AA Students will:** **EE2.OA.4.** Use addition to find the total number of objects arranged within equal groups beyond 10. Ex. Using paper plates, put equal amount of objects on each plate (1-6), combine and solve for total number of objects. Ex. Given a pocket chart, arrange 12 red cards into sets of equal groups and tell if there is another way the cards could be put into equal groups. **Level III AA Students will:** **EE2.OA.4.** Use addition to find the total number of objects arranged within equal groups up to a total of 10. Ex. Add two equal groups of counting bears to get a total. Ex. Given four large blocks and four small blocks, match them into like groups and indicate how many objects there are in all. **Level II AA Students will:** **EE2.OA.4.** Recognize that two groups are made up of equal quantities up to a total of less than 10. Ex. Given three sets of objects, find the sets that contain equal amounts in each and state the number. Ex. Given bags of objects, two of which have two objects and one of which have one object, find the bags that contain an equal number of objects. **Level I AA Students will:** **EE2.OA.4.** Differentiate same/different when presented with two objects. Ex. Given two objects (ball and cup), indicate if they are the same or different. Ex. Given a variety of items, match two like items.

Second Grade Mathematics: Number and Operations in Base Ten

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Understand place value. **2.NBT.1.** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: ▪ 100 can be thought of as a bundle of ten tens — called a "hundred." ▪ The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	**EE2.NBT.1.** Represent numbers through 30 with sets of tens and ones with objects in columns or arrays.	**Level IV AA Students will:** **EE2.NBT.1**. Put numbers through 30 into sets of tens and ones with numbers. Ex. Given a picture of 24 objects, indicate/circle two groups of 10 and four ones. Tell how many tens there are and how many ones there are. Ex. Given a place value chart and the prompt, "Show me '20,'" indicate that the "2" goes in the tens column and the "0" goes in the ones place. **Level III AA Students will:** **EE2.NBT.1**. Represent numbers through 30 with sets of tens and ones with objects in columns or arrays. Ex. Given a vertical pocket chart (3 columns of 10 each), insert colored index cards to fill in the column(s) to indicate the number of tens and ones. Ex. When hearing a story that involves groups of 10, collect groups of 10, and gather them, with remainder ones not included. Ex. Given popsicle sticks less than or equal to 30, make groups of tens and ones. Ex. Given an interactive whiteboard, create groups of tens and ones by pulling over items into a collection area. **Level II AA Students will:** **EE2.NBT.1.** Indicate that 10 ones equals one 10 and zero ones (base 10). Ex. Given 10 objects (i.e., 10 paperclips, 10 discs), place them on a straight-line grid. Ex. Given a model or a template, create one set of 10.

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		Level I AA Students will: **EE2.NBT.1.** Demonstrates one-to-one correspondence. Ex. Given five objects and five boxes, place one object in each box. Ex. Put a note into every student's cubby.
2.NBT.2. Count within 1000; skip-count by 5s, 10s, and 100s.	**EE2.NBT.2.a.** Count from 1 to 30 (count with meaning; cardinality).	**Level IV AA Students will:** **EE2.NBT.2.a.** Count beyond 30 (count with meaning; cardinality). Ex. Count objects beyond 30. Ex. Count tally marks beyond 30. Ex. During calendar time, count up to 31 days on the calendar. Ex. Count the students in line for lunch. Ex. Recognize errors in others' counting from 1 to 30. **Level III AA Students will:** **EE2.NBT.2.a.** Count from 1 to 30 (count with meaning; cardinality). Ex. Count 30 using counting cubes. Ex. Count the number of days (within 30) until a field trip. **Level II AA Students will:** **EE2.NBT.2.a.** Count numbers 1 to 20, skipping numbers or repeating. Ex. Count 1-5. Ex. Count 1-10. Ex. Count 1-20. **Level I AA Students will:** **EE2.NBT.2.a.** Repeat numbers 1 to 30. Ex. During calendar time, repeat the date. Ex. When swinging on the playground, imitate the teacher calling out the swings back and forth. Ex. Count with the teacher from 1 to 30.

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	EE2.NBT.2.b. Name the next number in a sequence between 1 and 10.	**Level IV AA Students will:** **EE2.NBT.2.b.** Count forward beginning from a given number within the known sequence 2 to 10 (instead of having to begin at one). Ex. During calendar time, start on the day's date and count forward up to 10. Ex. Using a number path, start on a given number and count forward up to 10. Ex. Given a number, count forward to 10. Ex. Given two sets and told the quantity in the first set, continue counting on the next set to find the total number of the two sets. **Level III AA Students will:** **EE2.NBT.2.b.** Name the next number in a sequence between 1 and 10. Ex. Given a sequence of numbers, responds with the next number in the sequence (e.g., 5, 6, 7, name 8). Ex. While playing the game, "Say the next number," correctly identify the next number between 1 and 10. Ex. When counting off, say the next number in correct sequence when called on. **Level II AA Students will:** **EE2.NBT.2.b.** Indicate the higher number in a progression of numbers (with or without gaps). Ex. Given a number sequence (e.g., given 1, 2, 3, 4, respond with any higher number). Ex. Given a number, pick a higher number. **Level I AA Students will:** **EE2.NBT.2.b.** Communicate a number.

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		Ex. When numbering off into groups, respond with any number when it's his or her turn. Ex. When taking lunch counts, indicate his or her part of the group with a number.
2.NBT.3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	**EE2.NBT.3.** Identify number symbols 1 to 30.	**Level IV AA Students will:** **EE2.NBT.3.** Express number symbols beyond 30. Ex. Asked to produce a number, correctly produce the number. Ex. Given a calendar and asked to identify a date, correctly identify the date. Ex. Given a numbers chart and asked to identify a number, correctly identify the number. **Level III AA Students will:** **EE2.NBT.3.** Identify number symbols 1 to 30. Ex. Play a game that requires number symbol recognition from 1 to 30 (e.g., BINGO). Ex. While playing the game "I Spy" with numbers around the room, identify the number called. Ex. Identify number symbols when they are arranged on the desk in front of them. **Level II AA Students will:** **EE2.NBT.3.** Identify number symbols 1-10. Ex. Given number cards from 1-10, win the card by identifying the number on the card. Ex. Given a number path from 1-10, identify the prompted number. Ex. Given numbered paper fish on fishing poles, identify the number on the fish.

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		Ex. Given number symbols written on the board, identify number symbols from 1 to 10. Ex. Use numbers 1 to 10 to represent quantities. **Level I AA Students will:** **EE2.NBT.3.a.** Differentiate between numbers and letters. Ex. When presented with a letter and a number, pick out the number.
2.NBT.4. Compare two, three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.	**EE2.NBT.4.** Compare sets of objects and numbers using appropriate vocabulary (more, less, equal).	**Level IV AA Students will:** **EE2.NBT.4.** Compare sets of objects and numbers using appropriate vocabulary as equal or more or less when two or fewer units apart. Ex. When given two sets of objects, a box with 10 and a box of nine identify that the box with 10 has one more and associate the numeral. Ex. When given two reward strips with stickers two or less units apart, determine which strip has more reward stickers on it. Ex. Given two groups of three red counters, determine that they are equal. **Level III AA Students will:** **EE2.NBT.4.** Compare sets of objects and numbers using appropriate vocabulary (more, less, equal). Ex. Given a four and a six, determine that six is more than four. Ex. Given two groups of three red counters, determine that they are equal. **Level II AA Students will:** **EE2.NBT.4.** Determine equality of sets of objects using appropriate vocabulary (equal). Ex. Given sets of two bears and two apples, be able to indicate that the sets are equal. Ex. Given two sets, two of which are equal, be able to indicate the sets

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		that are equal. Ex. John has three bears and Susie has two bears. John has one more bear than Susie. **Level I AA Students will:** **EE2.NBT.4.** Match groups of objects. Ex. Given two sets of objects match like groups. Ex. Given a set of two objects, assembles two objects in a group to match the given set. Ex. When presented with three groups of objects (e.g., two groups of one cube and a group of two cubes), match the two with the same number of objects in it.
Use place value understanding and properties of operations to add and subtract. **2.NBT.5.** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	**EE2.NBT.5.a.** Identify the meaning of the "+" sign (i.e., combine, plus, add), and the "=" sign (equal).	**Level IV AA Students will:** **EE2.NBT.5.a.** Identify the meaning of the "+" sign (i.e., combine, plus, add), the "=" sign (equal), and the "-" sign (minus, take away, less). Ex. Given three groups of objects representing a subtraction equation, identify the correct sign to use. Ex. Given a subtraction equation, place the minus sign and the equal sign in the correct places. **Level III AA Students will:** **EE2.NBT.5.a.** Identify the meaning of the "+" sign (i.e., combine, plus, add), and the "=" sign (equal). Ex. Given an equation, point to the plus or equal sign in an equation. Ex. Given three groups of objects (two addends and the sum), identify the "+" sign.

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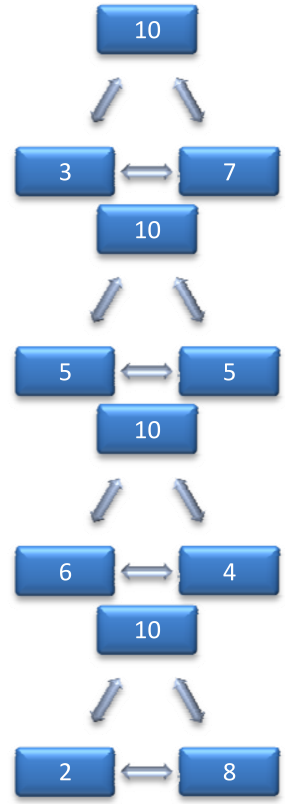
		Level II Students will: **EE2.NBT.5.a.** Recognize the "+" and "=" signs. Ex. When shown a group of symbols, point to/identify the plus/equal sign when prompted by the teacher. Ex. When shown the plus/equal signs taped on the floor, indicate the sign when prompted by the teacher. Ex. When shown the plus/equal signs drawn on the board, indicate the sign when prompted by the teacher. **Level I AA Students will:** **EE2.NBT.5.a.** Match the "+" and "=" signs. Ex. When given a cue, match the plus sign (e.g., The teacher shows a "+" sign and an "=" then points to the "+" sign. The teacher says, "This is a plus sign. Pick the one that is the same."). Ex. When given a cue, match the equal sign (e.g., The teacher shows a "+" sign and an "=" then points to the "=" sign. The teacher says, "This is an equal sign. Pick the one that is the same."). Ex. When given two cards with plus/equal signs and one distracter, match the appropriate sign.
	EE2.NBT.5.b. Using concrete examples, compose and decompose numbers up to 10 in more than one way.	**Level IV AA Students will:** **EE2.NBT.5.b**. Using numbers or representations, compose and decompose numbers up to 10 in more than one way. Ex. Given pictures of seven grizzly bears, identify one group of three and one group of four as decomposing seven, and one group of two and one group of five as decomposing seven. Ex. When shown the number five, indicate that it is made up of one and four, or two and three. Ex. Shown groups of dots, recognize the quantity automatically.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Given a triangle graphic organizer, with the number 10 in the tip, place numbers in the base angles to show the decomposition of 10.  Ex. Shown groups of dots for an amount up to 10, recognize without counting the quantity it represents and identify the numeral. **Level III AA Students will:** **EE2.NBT.5.b.** Using concrete examples, compose and decompose numbers up to 10 in more than one way.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Given eight bears in a row, place a straw and make a group of four and a group of four to show it makes eight. Ex. Given two groups of bears totaling 10 bears, put them together to create one group. Ex. Divide (decompose) 10 counting bears into two groups (e.g., eight and two, five and five, four and six, etc.) in at least two ways; then show with blocks that the total of the two groups is 10 (composed). Ex. Shown groups of dots for an amount up to 10, recognize without counting the quantity it represents. **Level II AA Students will:** **EE2.NBT.5.b.** Using concrete examples, compose and decompose numbers up to five in at least one way. Ex. Given four counters in a row, place a straw and make a group of two and a group of three and show it makes five. Ex. Given a group of five counters that has been divided (decomposed) into two groups of four and one, show with blocks that the total of the two groups is five (composed). Ex. Shown groups of dots for an amount up to five, recognize without counting the quantity it represents and identify the numeral. **Level I AA Students will:** **EE2.NBT.5.b.** Recognize that groups of objects can be put together or taken apart. Ex. Given a group of four counting bears on a circle mat, separate them into two groups. Ex. Given two separate groups of counters (one and three), put them together to make one group of four. Ex. Shown four objects and one taken away, counts the one taken away to

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		find how many were taken.
2.NBT.6. Add up to four two-digit numbers using strategies based on place value and properties of operations. **2.NBT.7**. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.	**EE2.NBT.6-7.** Use objects, representations, and numbers (0-20) to add and subtract.	**Level IV AA Students will:** **EE2.NBT.6-7.** Use objects, representations, and numbers beyond 20 to add and subtract. Ex. Given the lunch cards for the class and two absent students, subtract two to get the lunch count for the day. Ex. Using pictures of objects, tally marks, or number cards with numbers to 20, complete an addition or subtraction equation. Ex. Given 12 counting cubes, count eight more beginning from twelve (e.g., 12, 13, 14, 15, . . . 20). **Level III AA Students will:** **EE2.NBT.6-7.** Use objects, representations, and numbers (0-20) to add and subtract. Ex. Add two sets of objects to sum up to 20. Ex. Given a set of objects up to 20, take away a given number and indicate how many are left. Ex. Use objects to add by counting (e.g., "I have three apples and I get 10 more. How many do I have?" Student counts out three objects and then counts 10 more to find the total.). **Level II AA Students will:** **EE2.NBT.6-7.** Use objects, representations, and numbers (0-10) to add. Ex. Given a number path, move ahead two and indicate the new position. Ex. Given two milks for five students, determine that three more are needed for each student to have one. Ex. Given three counting cubes, determine how many more are needed to make six.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Use objects to add by counting (e.g. “I have three apples and I get two more. How many do I have?” Student counts out three objects and then counts two more to find the total.). **Level I AA Students will:** **EE2.NBT.6-7.** Count objects 1-10. Ex. Given three counting cubes, count one, two, three. Ex. Count the number of marks on a tally board.
2.NBT.8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900. **2.NBT.9.** Explain why addition and subtraction strategies work, using place value and the properties of operations.[6]	**EE2.NBT.8-9.** N/A	

[6] Explanations may be supported by drawings or objects.

Second Grade Mathematics: Measurement and Data

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Measure and estimate lengths in standard units. **2.MD.1.** Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. **2.MD.2.** Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.	**EE2.MD.1.** Measure the length of objects using non-standard units.	**Level IV AA Students will:** **EE2.MD.1.** Measure length of objects using standard tools, such as rulers, yardsticks, and meter sticks, by repeating the use of the measurement tool/unit. Ex. Given a row of three tile squares on the floor, measure the length of the tiles by repeating a ruler end to end. Ex. Given a hallway from the classroom to the bathroom across the hall, measure the distance with a yardstick by repeating the yardstick from end to end. Ex. Measure the top of the desk with a ruler by repeating the ruler from end to end. **Level III AA Students will:** **EE2.MD.1.** Measure the length of objects using non-standard units. Ex. Measure the length of a given distance using a given non-standard measuring device. Ex. Count the tiles on the floor to see how many it is from the door of the classroom to the drinking fountain. **Level II AA Students will:** **EE2.MD.1.** Begin to measure from an end point using a non-standard tool. Ex. Place the measurement tool (paperclip, block), on the left edge. Ex. Given an “All About Me” story and body outline, indicate that he or she needs to start at the feet or head and measure to the other end to measure height. Ex. Given three pictures with an X at the lower left, upper right, and middle, indicate that the picture with the X at the lower left illustrates the correct place to start measuring.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Lay nine cubes end-to-end next to a book to see how long the book is. **Level I AA Students will:** **EE2.MD.1.** Match objects of like length. Ex. Given three different objects - one shorter and two of the same similar length, match the two similar length objects. Ex. Given three pieces of paper of different length - two short, one long, match the two similar length objects.
2.MD.3. Estimate lengths using units of inches, feet, centimeters, and meters. **2.MD.4.** Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.	**EE2.MD.3-4.** Order by length using non-standard units.	**Level IV AA Students will:** **EE2.MD.3-4.** Use non-standard units to measure length of objects (i.e., paperclips, blocks). Ex. Determine how many footsteps it takes to cross the classroom. Ex. Determine how many handprints it will take to measure the length (across) a desktop. **Level III AA Students will:** **EE2.MD.3-4.** Order by length using non-standard units. Ex. Given three non-standard units of measurement, such as a paperclip, index card, and construction paper, order them by length, shortest to longest. Ex. Given a classroom of students, order them from shortest to tallest (brick walls help). **Level II AA Students will:** **EE2.MD.3-4.** Compare two non-standard units of length and determine which is shorter and which is longer. Ex. Given two pieces of string of differing lengths, determine which is shorter.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Given a paperclip and an index card, determine which is shorter. **Level I AA Students will:** **EE2.MD.3-4.** Compare an item to a model that is shorter or longer. Ex. Compare a full-length pencil to a golf pencil, identify that the golf pencil is shorter. Ex. Compare a yardstick to a ruler, identify that the yardstick is longer.
Relate addition and subtraction to length. **2.MD.5.** Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.	**EE2.MD.5.** Increase or decrease length by adding or subtracting unit(s).	**Level IV AA Students will:** **EE2.MD.5.** Increase or decrease length by adding or subtracting multiple units. Ex. Given a paper chain, increase the length by adding two links. Ex. Given a chain of 10 pop-beads, decrease the length by removing four beads. Ex. Given a row of counting cubes, increase the length by adding three cubes. **Level III AA Students will:** **EE2.MD.5.** Increase or decrease length by adding or subtracting unit(s). Ex. Given a string of three pop-beads, add one to make it longer (a length of four pop-beads). Ex. Given a group of three counting cubes, add one to make it longer - a group of four. Ex. Given a paper chain representing the number of days in the month, tear off a link at the end of each day to make it shorter (possibly countdown to an anticipated event). **Level II AA Students will:** **EE2.MD.5.** Increase length by adding a single unit.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Given a paper chain representing the first 20 days of school, add another link for one more day. Ex. Given counting cubes, increase the length by adding one more to the stack. **Level I AA Students will:** **EE2.MD.5.** Compare two objects and determine which is longer. Ex. Given a piece of string 12 inches long and a piece of string two inches long, determine which is longer. Ex. Given a short strip of paper and a long strip of paper, determine which is longer.
2.MD.6. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, . . . , and represent whole-number sums and differences within 100 on a number line diagram.	**EE2.MD.6.** Use a number line to add one more unit of length.	**Level IV AA Students will:** **EE2.MD.6.** Use a number line to add more than one unit of length. Ex. Given a number line with 1-foot units marked, add up to five feet and tell the total. Ex. Given a number line with 1-foot units marked on the floor and a starting point, add feet to reach a specified point. Ex. Tell the total length when adding feet from a given point on the number line. Ex. Tell the distance between two numbers on the number line. **Level III AA Students will:** **EE2.MD.6.** Use a number line to add one more unit of length. Ex. Given the number three on a number line showing length units marked, and asked to add one more, show the number four. Ex. Given the number two on a number path marked by foot units and asked to add one more, show/move to the number three feet. Ex. Given a number line and a starting point on the floor, add one more.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EE2.MD.6.** Count forward on a number line to 10 showing units of length. Ex. Count forward, taking steps from one foot to 10 feet with one-to-one correspondence with or without teacher modeling. Ex. Given a number path and a starting point, count forward to 10 on the number line. Ex. Given a number path and 10 cubes, place a cube on each number as it is counted. **Level I AA Students will:** **EE2.MD.6**. Indicate one more number on a number line and track left to right. Ex. Indicate one more on a number line by tracking to the right. Ex. Given a number line start on the left and move to the right.
Work with time and money. **2.MD.7.** Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	**EE2.MD.7.** Indicate the digit that tells the hour on a digital clock.	**Level IV AA Students will:** **EE2.MD.7.** Tell time to the hour on a digital and analog clock. Ex. When shown two digital clocks and asked to indicate the one that shows "5:00," indicate the correct clock. Ex. When shown an analog and a digital clock and a time check sheet and prompt, indicate the new hour on the digital clock (e.g., 5:00, 12:00). **Level III AA Students will:** **EE2.MD.7.** Indicate the digit that tells the hour on a digital clock. Ex. Given a digital clock, indicate the number(s) in the hour position. Ex. Given cards showing digital clocks - with one clock having the hour circled and one clock with the minutes circled, indicate the clock with the hour circled. Ex. Using a picture schedule, match the hour of one activity to the correct

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		picture of a digital clock. **Level II AA Students will:** **EE2.MD.7.** Indicate the relationship between a clock and their daily schedule. Ex. Given their schedules and two clocks with a specific activity highlighted, match the time on their schedule to the time on the digital clock. Ex. Select a clock showing noon when given two clocks, one set at 6:30 and one set at noon, when asked, "When do we go to lunch?" **Level I AA Students will:** **EE2.MD.7.** Indicate that a clock is used to tell time. Ex. Given a clock and a shoe, and asked, "Which tells time?" indicate that the clock tells time. Ex. Given two kinds of digital clocks and a distracter, match the two clocks as time-telling tools.
2.MD.8. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?	**EE2.MD.8.** Recognize that money has value.	**Level IV AA Students will:** **EE2.MD.8.** Recognize that money is used in exchange for goods. Ex. Given a classroom store, purchases goods with money. Ex. Given a school cafeteria, purchase goods with a predetermined amount of money. **Level III AA Students will:** **EE2.MD.8.** Recognize that money has value. Ex. Given blocks and quarters and asked, "If you want to buy a juice, which would you use?", indicate quarters. Ex. Given a schoolbook fair and asked, "If you want to buy a book at the

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		book fair, which would you need, a dollar or an apple?", indicate dollar. **Level II AA Students will:** **EE2.MD.8.** Sort money from other objects. Ex. Given three objects, select the coin. Ex. Given three objects, select the dollar. **Level I AA Students will:** **EE2.MD.8.** Understand that goods (items) have value. Ex. Given a group of goods (items), select a preferred item. Ex. Given a reward box, makes a desired selection.
Represent and interpret data. **2.MD.9.** Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.	**EE2.MD.9-10.** Create picture graphs from collected measurement data.	**Level IV AA Students will:** **EE2.MD.9-10.** Organize, represent, and interpret length/height data using concrete objects to create picture graphs. Ex. Make a decision based on the measurement data and information from graph. Ex. Compare data. Teacher draws height mark on wall at 3.5 feet. How many people are taller than the mark? How many people are shorter than the mark? Ex. Collect, graph, and interpret data about class hot and cold lunch preferences. Ex. When entering the classroom, place an icon in the appropriate bar on the graph (e.g., in/not in, buy lunch/bag lunch) and answer questions based on that graph. **Level III AA Students will:** **EE2.MD.9-10.** Create picture graphs from collected measurement data. Ex. Place picture card on the graph in a row for one of two possible choices

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
2.MD.10. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.		(e.g., likes peanut butter and jelly, likes macaroni and cheese). Ex. Given pictures of lunch choices, place selection on a graph with pictures from other students making the same selection to form a picture graph. **Level II AA Students will:** **EE2.MD.9-10.** Create picture graphs from collected measurement data using model. Ex. Given a model, create a picture graph using colored disks or paper squares. Ex. Given a model, create a picture graph using different shapes sorted into groups. **Level I AA Students will:** **EE2.MD.9-10.** Contribute to data collection. Ex. Select a picture that represents personal choice from options presented during data collection. Ex. Sort items into two groups.

Second Grade Mathematics Standards: Geometry

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Reason with shapes and their attributes. **2.G.1.** Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.[7] Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.	**EE2.G.1.** Describe attributes of two-dimensional shapes.	**Level IV AA Students will:** **EE2.G.1.** Describe mathematical attributes of two- and three-dimensional shapes. Ex. Play a game with a partner where one student describes attributes of a shape from a shape card, and the other student must select from a set of four shape cards which one fits the description. Ex. After the teacher places two- and three-dimensional shapes into a bag, feel one of the shapes and describe it without looking. Ex. Describe the number of sides for basic shapes (e.g., three – triangle, four – square). **Level III AA Students will:** **EE2.G.1.** Describe attributes of two-dimensional shapes. Ex. Given an array of colors and sizes, select attributes that describe the selected shape. Ex. Provided with a group of two-dimensional shapes, describe common attributes. Ex. Given a group of objects, sort them by any attribute; then identify what attribute was used to sort (i.e., size, shape, color). Ex. Play “I Spy” and find items in the environment with one common attribute (i.e., all circles, all red items, all things smaller than my nose). **Level II AA Students will:** **EE2.G.1.** Sort by one attribute (shape).

[7] Sizes are compared directly or visually, not compared by measuring.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Pull out the all of the circles from a bowl of circles and squares. Ex. Put all the triangles into a bowl from a pile of triangles and rectangles. Ex. Stack dishes by shape after cleaning (bowls, cups, spoons, etc.). Ex. Put away blocks sorted by shape. **Level I AA Students will:** **EE2.G.1.** Explore shapes with different attributes. Ex. Color all the squares blue and all the circles red with teacher prompt (e.g., "Here is a circle; color it red."). Ex. Using sand/water table, locate the shapes hidden in various materials. Ex. Play a game called "Same or Different" where the teacher holds up two objects and ask students if the objects are exactly the same or different. Ex. Identify things that are similar (e.g., yellow, square, big, little, soft, hard).
2.G.2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	**EE2.G.2.** N/A	
2.G.3. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that	**EE2.G.3.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
equal shares of identical wholes need not have the same shape.		

COMMON CORE ESSENTIAL ELEMENTS AND ACHIEVEMENT DESCRIPTORS FOR THIRD GRADE

Third Grade Mathematics Standards: Operations and Algebraic Thinking

<table>
<tr><th>CCSS Grade-Level Clusters</th><th>Common Core Essential Elements</th><th>Instructional Achievement Level Descriptor</th></tr>
<tr>
<td>Represent and solve problems involving multiplication and division.

3.OA.1. Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.

3.OA.2. Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example,</td>
<td>EE3.OA.1-2. Use repeated addition and equal groups to find the total number of objects to find the sum.</td>
<td>Level IV AA Students will:
EE3.OA.1-2. Use repeated addition to find the total number of objects arranged in a square or rectangular array.
Ex. Using tiles in a template, identify the total number of tiles by adding the tiles in the template.

<table>
<tr><td>1</td><td>1</td><td>1</td></tr>
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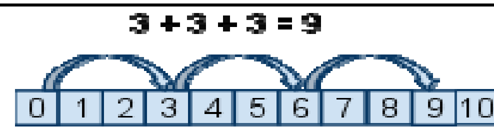
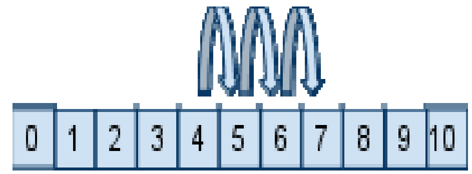
</table>
3 + 3 + 3 = 9

Ex. Fill space of squares and rectangles with 1-inch tiles, add tiles in rows or columns to determine total number of tiles it takes to fill the shape (square/rectangle).
Ex. Use an abacus to find the total.

Level III AA Students will:
EE3.OA.1-2. Use repeated addition and equal groups to find the total number of objects to find the sum.
Ex. Two birds + two Birds + two birds = six birds.
Ex. Given a repeated addition number sentence, use a number line to find the sum.</td>
</tr>
</table>

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.		 **Level II AA Students will:** **EE3.OA.1-2.** Use addition to find the total number of objects. Ex. Three apples + four apples = six apples. Ex. Add to find the total number of stars.  Ex. Skip count by twos to tell how many. **Level I AA Students will:** **EE3.OA.1-2.** Identify which group has more or less when objects are added or taken away. Ex. When an object is added to a group of three, “Is this more?” and “Is this less?” Ex. When an object is taken from a group of three, “Is this more?” and “Is this less?”
3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol	**EE3.OA.3.** See EE3.OA.1. for repeated addition, a foundational skill for multiplication and division. (Multiplication begins in grade 4 and division begins in grade 5).	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
for the unknown number to represent the problem.		
3.OA.4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?*	**EE3.OA.4.** Solve addition and subtraction problems when result is unknown with number 0-30.	**Level IV AA Students will:** **EE3.OA.4.** Solve addition and subtraction problems when any number in the problem is unknown (result, start, change, difference) with numbers to 50. Ex. Using base-10 pieces, add and subtract two-digit numbers to find the sum and the difference. Ex. Use pictures of numbers to add and subtract two-digit numbers to find the sum and the difference.  **Level III AA Students will:** **EE3.OA.4.** Solve addition and subtraction problems when result is unknown with number 0-30. Ex. Using base-10 pieces or counters, add and subtract. Ex. Use a 100s chart to find the sum or difference of given problems. Ex. Use count on strategies to add (e.g., When asked what is 5 + 2, the student says 5 . . . 6 . . . 7). **Level II AA Students will:** **EE3.OA.4.** Solve addition and subtraction problems with numbers 0-10. Ex. Use counters to add and subtract. Ex. Use number lines to add or subtract.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		 4+3=7 Ex. Match the symbol to more or less than. Ex. Add one to a number by indicating the next number when asked (e.g., when the teacher says 3, 4, 5, the student says 6). **Level I AA Students will:** **EE3.OA.4.** Identify numbers 1 to 9. Ex .Given a set of five, match it to the number. Ex .Given a set of three, identify the number of objects on number lines.
Understand properties of multiplication and the relationship between multiplication and division. **3.OA.5.** Apply properties of operations as strategies to multiply and divide.[8] *Examples: If 6 × 4 = 24 is*	**EE3.OA.5.** N/A (Multiplication begins at grade 4).	

[8] Students need not use formal terms for these properties.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)		
3.OA.6. Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*	**EE3.OA.6.** N/A (Division begins at grade 5).	
Multiply and divide within 100. **3.OA.7.** Fluently multiply and divide within 100, using strategies such as the relationship between	**EE3.OA.7**. N/A (Multiplication begins grade 4 and division begins in grade 5).	

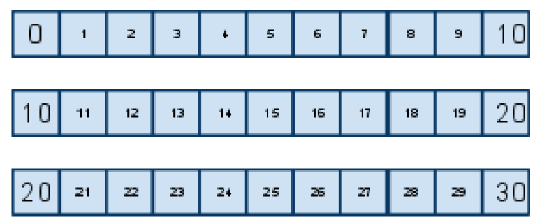
CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.		
Solve problems involving the four operations, and identify and explain patterns in arithmetic. **3.OA.8.** Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.[9]	**EE3.OA.8.** Add to solve real world one-step story problems from 0-30.	**Level IV AA Students will:** **EE3.OA.8.** Add to solve real world one-step story problems with sums up to 50 using various problem-solving models. Ex. Solve by adding (e.g. "There are 25 birds in a tree and 10 more joined them**.** How many birds are in a tree?"). Ex. Solve by adding (e.g., "I have 15 snacks on the cart and 25 snacks in the cupboard, how many snacks do I have all together?) Ex. Solve by adding (e.g., "Add the pencils in two boxes and tell how many pencils we have.") **Level III AA Students will:** **EE3.OA.8.** Add to solve real world one-step story problems from 0-30. Represent the problem in pictures or with objects. Ex. Solve by adding (e.g., "Here are 10 pencils. We need 10 more for each person to get a pencil. How many will we need in all?") Ex. Solve by adding (e.g., "Connie had five marbles. Juan gave her eight

[9] This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order.

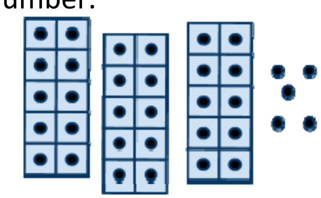
CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		more marbles. How many marbles does Connie have all together?") Ex. Solve by adding (e.g., "Add the crayons in these two boxes and show me how many we have in all.") **Level II AA Students will:** **EE3.OA.8.** Add to solve word problems identified through symbol representation. Ex. Complete word problems that have pictures rather than words. Ex. Solve by adding (e.g., "There are three ducks in the pond, two more joined**.** How many ducks are in the pond?" [picture representation]) **Level I AA Students will:** **EE3.OA.8.** Identify the object(s) that appear in a real world one-step story problem. Ex. Given a simple word problem and asked "What is the problem about?" point to an object from a choice of two that represents what the problem was about (e.g., box, toy). Ex. Indicate which object a word problem is about from an array of two choices.
3.OA.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and*	**EE3.OA.9.** Identify arithmetic patterns.	**Level IV AA Students will:** **EE3.OA.9.** Complete a complex arithmetic pattern. Ex. Complete the pattern using more than two numbers (i.e., A, B, C, A, B, C). Ex. Using a 100s number chart, complete the pattern identified. **Level III AA Students will:** **EE3.OA.9.** Identify arithmetic patterns. Ex. When provided arithmetic patterns on a 100s chart, identify the next

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
explain why 4 times a number can be decomposed into two equal addends.		number in the pattern. Ex. When given two number stamps, stamp an arithmetic pattern. **Level II AA Students will:** **EE3.OA.9.** Identify a pattern. Ex. Make pattern jumps on a number line. Ex. Sing songs and identify the pattern in the song. **Level I AA Students will:** **EE3.OA.9.** Follow patterns. Ex. Sing “Head, Shoulders, Knees, and Toes” and mimic the pattern. Ex. Using tactile objects (fur, sand, sand, fur) in a pattern, repeat the pattern. Ex. Using manipulatives, mimic the teacher to create a pattern.

Third Grade Mathematics Standards: Number and Operations in Base Ten

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Use place value understanding and properties of operations to perform multi-digit arithmetic.[10] **3.NBT.1**. Use place value understanding to round whole numbers to the nearest 10 or 100.	**EE3.NBT.1.** Identify the two 10s a number comes in between on a number line (numbers 0-30).	**Level IV AA Students will:** **EE3.NBT.1.** Identify the two 10s a number comes in between and tell which is closest (numbers 0-50). Ex. Use a color beaded number line to identify the number and round to the closest 10. Ex. Given a number line separated into tens (0-10, 10-20, etc.), stand on a number and identify the 10 that is closer. **Level III AA Students will:** **EE3.NBT.1.** Identify the two 10s a number comes in between on a number line (numbers 0-30). Ex. Use a color beaded number line to identify the two 10s a number falls between. Ex. Given the number 14, they would identify 10 and 20.  **Level II AA Students will:** **EE3.NBT.1.** Identify tens on a number line. Ex. Given a number line, circle the tens.

[10] A range of algorithms may be used.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Stand on a number chart on 10, 20, 30, etc. **Level I AA Students will:** **EE3.NBT.1.** Identify a number. Ex. Point to any number from one to three on a number line. Ex. Participate in a cake walk. When the music stops, look to see if they are on the number that is called out. Ex. Identify a number when point to or presented on a card. Ex. Given a number from one to three, point to the number symbol.
3.NBT.2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	**EE3.NBT.2.** Identify place value to tens.	**Level IV AA Students will:** **EE3.NBT.2.** Identify place value to 50. Ex. Build numbers with place value pieces. Ex. Identify the number in the ones and tens place value (i.e., the price of an item). Ex. Write the number in expanded form – 43 = 40 + 3. **Level III AA Students will:** **EE3.NBT.2.** Identify place value to tens. Ex. When given two-digit number cards, identify the number in the tens place value. Ex. When given a group of 10 frame models, arrange and count the value of the number.  I saw three groups of 10 and five extras, so three groups of 10 = 30 and 5 more makes 35.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EE3.NBT.2.** Count to 10 using one-to-one correspondence. Ex. Given a bag of Skittles, pull 10 Skittles out of the bag. Ex. Select a domino and tell what number the dots represent. Ex. Shown a set of 10 objects, create a duplicate collection. Ex. Given a container of pennies, count out 10 from the container. **Level I AA Students will:** **EE3.NBT.2.** Identify more or less. Ex. Given two collections of objects (group of 10, group of 20), indicate, "Which has more?" Ex. Given math manipulatives representing a single unit and multiple units, point to the multiple unit representation when asked "which is more?"
3.NBT.3. Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.	**EE3.NBT.3**. Count by tens using money.	**Level IV AA Students will:** **EE3.NBT.3.** Compare the value of money based on place value. Ex. Use money (dimes and pennies) to represent place value. Ex. Given 15 pennies, create a one group of 10 and a group of five ones. **Level III AA Students will:** **EE3.NBT.3.** Count by tens using money. Ex. Given three dimes, count by 10 to determine total. Ex. Given five dimes, count by 10 to determine total. **Level II AA Students will:** **EE3.NBT.3.** Identify whole numbers to 10. Ex. Given sets of 10 pennies, pair with numbers. Ex. Given sets of 10 pennies, pair with dimes.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level I AA Students will: **EE3.NBT.3.** Count pennies to 10.

Third Grade Mathematics Standards: Number and Operations--Fractions[11]

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Develop understanding of fractions as numbers. **3.NF.1.** Understand a fraction 1/*b* as the quantity formed by 1 part when *a* whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by *a* parts of size 1/*b.* **3.NF.2.** Understand a fraction as a number on the number line; represent fractions on a number line diagram. ▪ Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize	**EE3.NF.1-3.** Differentiate a fractional part from a whole.	**Level IV AA Students will:** **EE3.NF.1-3.** Identify halves or fourths as related to the whole. Ex. Identify pictures or objects that are split into fourths. Ex. Fold a square piece of paper into four equal parts and identify it as four parts of a whole. Ex. Complete a picture of half an object with the other half to make the whole. Ex. Given a set of pictures, color a half of each whole. Ex. Shown four halves, assemble them into two wholes and state the number of wholes. **Level III AA Students will:** **EE3.NF.1-3.** Differentiate a fractional part from a whole. Ex. Sort pictures of whole objects and parts into the appropriate category. Ex. Use a variety of real-world objects (pizza, segmented chocolate bar, etc.) to demonstrate that each piece represents a part of the whole. Ex. Shown four halves, assemble them into two wholes. **Level II AA Students will:** **EE3.NF.1-3.** Recognize that fractions are part of a whole. Ex. Using a self-sticking non-adhesive shape, take apart and put together fractional parts of a whole. Ex. Utilize wooden shapes, separate into halves and put back together into whole.

[11] Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, 8.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. ▪ Represent a fraction *a*/*b* on a number line diagram by marking off a lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line. **3.NF.3.** Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. ▪ Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. ▪ Recognize and generate simple		**Level I AA Students will:** **EE3.NF.1-3.** Identify a whole. Ex. Given a part of and the whole real-world object (pizza, segmented chocolate bar, segmented toy pie, etc.), point to the whole. Ex. Given a puzzle with missing pieces and a puzzle with complete pieces, identify the whole.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
equivalent fractions, (e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model. ▪ Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* ▪ Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the		

CCSS	Common Core Essential Elements	Instructional Achievement Level Descriptor
symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.		

Third Grade Mathematics Standards: Measurement and Data

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. **3.MD.1**. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	**EE3.MD.1.** Tell time to the hour on a digital clock.	**Level IV AA Students will:** **EE3.MD.1.** Tell time to the half hour using a digital clock. Ex. Look at a digital clock and read the time. Ex. When looking at a schedule, identify the hour. **Level III AA Students will:** **EE3.MD.1.** Tell time to the hour on a digital clock. Ex. Given a time written to the hour, write the digital time. Ex. Identify the time of a digital clock that is set to the hour. Ex. Given a time on a digital clock, say the time to the hour. **Level II AA Students will:** **EE3.MD.1.** Identify which is the hour on a digital clock. Ex. Relate the hour with the time on their daily schedule. Ex. Given cards showing digital clocks - with one clock having the hour circled and one clock with the minutes circled, indicate the clock with the hour circled. **Level I AA Students will:** **EE3.MD.1.** Differentiate a digital clock from other measurement tools as a tool for telling time. Ex. Given a digital clock and a measuring cup, identify the clock for telling time. Ex. Asked, "How do we know when it is time to go to lunch?" indicate a clock.
3.MD.2. Measure and estimate liquid volumes and masses of objects	**EE3.MD.2.** Identify standard units of measure for mass and liquid.	**Level IV AA Students will:** **EE3.MD.2.** Measure liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
using standard units of grams (g), kilograms (kg), and liters (l).[12] Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.[13]		Ex. Measure out items in a recipe. Ex. Compare the mass of two items using a two-pan balance (balance scale). Ex. Given a standard unit scale, weigh 10 grams of sand. **Level III AA Students will:** **EE3.MD.2.** Identify standard units of measure for mass and liquid. Ex. Sort the following real-world items as being measured by grams or liters when shown the measurement tools (apple measured in grams and juice in liters). Ex. When shown pictures of the tool, identify what would be measured grams or liters. **Level II AA Students will:** **EE3.MD.2.** Select the appropriate tool to measure a solid or a liquid. Ex. When provided two pictures, one showing a ruler and one showing a scale, identify which tool measures mass. Ex. When provided two tools, a measuring cup and a scale, identify which tool measures liquid. Ex. Select from a variety of tools the appropriate tool to measure either mass or volume. Ex. Given a rock and a glass of water, identify which would be measured using a measuring cup.

[12] Excludes compound units such as cm3 and finding the geometric volume of a container.
[13] Excludes multiplicative comparison problems (problems involving notions of “times as much”.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level I AA Students will: **EE3.MD.2.** Determine if an object is a solid and a liquid. Ex. Place objects from the room into the appropriate measurement category (solid or liquid). Ex. Given a rock and a glass of water, identify which is solid.
Represent and interpret data. **3.MD.3.** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*	**EE3.MD.3.** Use picture or bar graph data to answer questions about data.	**Level IV AA Students will:** **EE3.MD.3.** Interpret data to answer questions. Ex. Identify how they know there were no rainy days that week based on the chart. Ex. State two facts about the data on a graph. **Level III AA Students will:** **EE3.MD.3.** Use picture or bar graph data to answer questions about data. Ex. Identify from a picture or bar graph how many students in the class were identified as wearing blue shirts. Ex. State how many days were sunny as charted on a weather chart. **Level II AA Students will:** **EE3.MD.3.** Organize data. Ex. Take data collected from the lunch choices and place data into appropriate categories. Ex. Place data on a chart to represent the data collected. **Level I AA Students will:** **EE3.MD.3.** Collect data. Ex. Using two posters, one for the students with brown hair, and one for the students with "yellow" hair, place their picture on the poster board that indicates what color hair they have.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Use a daily survey to collect data on different interest.
3.MD.4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.	**EE3.MD.4.** Measure length of objects using standard tools, such as rulers, yardsticks, and meter sticks.	**Level IV AA Students will:** **EE3.MD.4.** Measure length of objects using standard tools, such as rulers, yardsticks, and meter sticks, by repeating the use of the measurement tool/unit. Ex. Given a row of three tile squares on the floor, measure the length of the tiles by repeating a ruler end to end. Ex. Given a hallway from the classroom to the bathroom across the hall, measure the distance with a yardstick by repeating the yardstick from end to end. Ex. Give one ruler length of yarn to each classmate for a project. **Level III AA Students will:** **EE3.MD.4.** Measure length of objects using standard tools, such as rulers, yardsticks, and meter sticks. Ex. Given an object and a measuring tool, use the tool to mark the length of the object. Ex. Given a ruler and snowfall, mark the depth of the snow with a ruler. Ex. Given a yardstick, measure different lengths or widths of the room and record the measurement. **Level II AA Students will:** **EE3.MD.4.** Measure length with non-standard units of measurement. Ex. Identify the length of items in the classroom using a yardstick end-to-end and record as number of yardsticks. Ex. When provided two non-standard measuring units, identify which one is most appropriate for what is to be measured (pencil or long stick to measure the length of the classroom).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level I AA Students will: **EE3.MD.4.** Place a standard measuring tool where one would begin to measure the length of an object. Ex. Given a string, place the ruler at the end of the string where one would begin a measure. Ex. Shown a picture of a boy standing against a height measure, and asked where you would look to find the boy's height, indicate the top of the boy's head. Ex. Given a bookshelf and a ruler, place the ruler on the lower left corner of the bookshelf front. (Anything with a definite lower left edge that will not allow the student to go beyond it will work.)
Geometric measurement: understand concepts of area and relate area to multiplication and to addition. **3.MD.5.** Recognize area as an attribute of plane figures and understand concepts of area measurement. ▪ A square with side length of 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure	**EE3.MD.5-7.** N/A (Area begins at grade 6).	

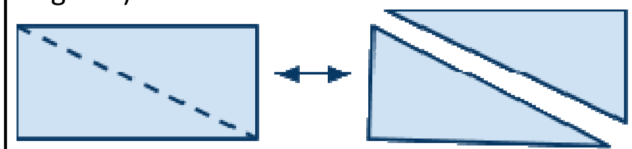
CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
area. ▪ A plane figure, which can be covered without gaps or overlaps by n unit squares, is said to have an area of *n* square units. **3.MD.6.** Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). **3.MD.7.** Relate area to the operations of multiplication and addition. ▪ Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. ▪ Multiply side lengths to find areas of rectangles with whole-number		

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. ▪ Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning. ▪ Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts,		

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
applying this technique to solve real world problems.		
Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. **3.MD.8.** Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	**EE3.MD.8.** N/A (Perimeter begins at grade 7).	

Third Grade Mathematics Standards: Geometry

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Reason with shapes and their attributes. **3.G.1.** Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.	**EE3.G.1.** Recognize that shapes in different categories can share attributes.	**Level IV AA Students will:** **DD3.G.1.** Identify the shared attributes of shapes in different categories. Ex. Given a Venn diagram, sort attributes of shapes (i.e., straight edges, curved edges, both). Ex. Trace the shared attributes of two different shapes. **Level III AA Students will:** **EE3.G.1.** Recognize that shapes in different categories can share attributes. Ex. Shown different shapes answers, "What is the same?" Ex. Place in the appropriate category shapes with common attributes. **Level II AA Students will:** **EE3.G.1.** Sort shapes by attributes. Ex. Given a sorting map, sort shapes by given attributes. Ex. Given a sorting map, sort different size same shapes into the same category (e.g., large and small triangle would go in the same category). **Level I AA Students will:** **EE3.G.1.** Match shapes (e.g., squares, rectangles, circles, triangles). Ex. Match shapes to the shape of objects within the classroom. Ex. Match shapes that are the same.
3.G.2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example,*	**EE3.G.2.** Recognize that shapes can be partitioned into equal areas.	**Level IV AA Students will:** **3.G.2.** Given shapes with multiple lines of symmetry, will be able to identify equal areas. Ex. Complete simple tangram puzzles with tangram pieces.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.		Ex. Identify equal areas on complex shapes (i.e., stars, rectangle cut on the diagonal)  **Level III AA Students will:** **EE3.G.2.** Recognize that shapes can be partitioned into equal areas. Ex. Given a shape, cut the shape into equal areas. Ex. Cut a pizza into equal areas to hand out to students in the class. **Level II AA Students will:** **EE3.G.2.** Create shapes. Ex. Work a pattern block puzzle that results in a shape. Ex. Given three small rectangles, rearrange them into a larger rectangle. **Level I AA Students will:** **EE3.G.2.** Match shapes. Ex. Match a picture of a shape, to a shape in the classroom. Ex. Match two shapes from an array of three in which one is different.

COMMON CORE ESSENTIAL ELEMENTS AND ACHIEVEMENT DESCRIPTORS FOR FOURTH GRADE

Fourth Grade Mathematics Standards: Operations and Algebraic Thinking

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Use the four operations with whole numbers to solve problems. **4.OA.1.** Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. **4.OA.2.** Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing	**EE4.OA.1-2.** Demonstrate the connection between repeated addition and multiplication.	**Level IV AA Students will:** **EE4.OA.1-2.** Apply repeated addition to solve a multiplication problem represented with numbers. Ex. Presented with a multiplication problem such as 3 x 6, use egg cartons and concrete objects to create arrays (e.g., sort three objects into six egg slots or six objects into three slots). Ex. When presented with two choices of arrays on the smart board and a multiplication problem, identify (i.e., eye gaze) the correct array. Ex. Use skip counting on a number line to solve multiplication problems (e.g., move two digits five times for the problem 2 x 5). **Level III AA Students will:** **EE4.OA.1-2.** Demonstrate the connection between repeated addition and multiplication. Ex. Skip count by two, five, and 10 to solve multiplication problems. Ex. Using three groups of two objects, communicate that 2 + 2 + 2 is equal to 3 x 2. Ex. Using plastic eggs and an egg carton to hold the eggs in place, place an object in each egg to illustrate 6 + 6 = 12 or 6 x 2 = 12. Ex. Represent the chairs in a class with three rows of four chairs in each (e.g., identify 4 + 4 + 4). **Level II AA Students will:** **EE4.OA.1-2.** Demonstrate repeated addition to sums of 10. Ex. Skip count by two and five to 10. Ex. Add 1 + 1 + 1.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
multiplicative comparison from additive comparison.		Ex. Add 2 + 2 + 2. Ex. Add 3 + 3 + 3. Ex. Add 2 + 2 + 2 + 2 + 2 to equal 10. Ex. Presented with a picture of two chairs in a row and given four pictures of individual chairs, arrange the additional four chairs into equal rows and count all of the chairs. **Level I AA Students will:** **EE4.OA.1-2.** Make a set of 10 and count to 10. Ex. Using fingers count to 10. Ex. Using a 10 frame, place a cube in each square. Ex. Use a switch to count to 10. Ex. Count like objects to make a set of 10.
4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies	**EE4.OA.3.** Solve one-step word problems using addition or subtraction.	**Level IV AA Students will:** **EE4.OA.3.** Solve two-step problems using addition or subtraction when a number in the problem is unknown (result, start, change, difference). Ex. Use a number line to solve two-step problems. Ex. Use a hundreds chart to solve a two-step problem. Ex. Solve a two-step word problem involving addition (e.g., "If Amy has 10 sheets of paper and you have 10 more sheets than Amy, how many sheets do you have? [addition – compare total unknown]). Ex. Solve a two-step word problem involving subtractions (e.g., "Sandi has 10 cats and 20 dogs – does she have more cats or dogs? How many more?" [subtraction - compare difference unknown]). **Level III AA Students will:** **EE4.OA.3.** Solve one-step problems using addition or subtraction. Ex. Use manipulatives to add or subtract two groups.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
including rounding.		Ex. Use manipulatives on a number line to solve addition or subtraction problems. Ex. Solve one-step word problem involving addition (e.g., "If Sam gave away 10 apples and has five apples left how many did he start with?" [addition – start unknown]). Ex. Solve one-step word problem involving subtractions (e.g., "If June had 50 dollars and spent ten, how much does she have left?" [subtraction – classic take away]). Ex. Solve one-step word problem involving addition (e.g., "If Jessie had 20 cakes and bought five more, how many does he have now?" [addition join-part/part – whole]). Ex. Solve one-step word problem involving subtractions (e.g., "If Sandy wanted to collect 35 cards and she already has 15, how many more does she need?" [subtraction deficit missing amount]). **Level II AA Students will:** **EE4.OA.3.** Solve one-step addition or subtraction problems when there is an unknown (result, start, change, difference) up to 10. Ex. Given a group of five items, determine how many more are need to make 10. Ex. Given a group of eight items, determine how many to take away to make five. **Level I AA Students will:** **EE4.OA.3.** Add up to five. Ex. Given a group of two, add objects to a total of five. Ex. Given a group of three, add objects to a total of five.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Gain familiarity with factors and multiples. **4.OA.4.** Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	**EE4.OA.4.** Show one way to arrive at product.	**Level IV AA Students will:** **EE4.OA.4.** Show multiple ways to arrive at the same product. Ex. Given a product, use manipulatives to create groups that represent the product. Ex. Given a number (product) of the day, match their factor cards to another student's factor card to equal the product. Ex. Given an equation on a dry erase board (e.g., 2 x 4 = 8), make equal groups to show possible factors for eight (e.g., one group of eight, two groups of four, four groups of two). **Level III AA Students will:** **EE4.OA.4.** Show one way to arrive at a product. Ex. Using a group of manipulatives, separate into equal groups. Ex. Provided with counters, pieces of string, or yarn and a work map, make equal sets to arrive at the product. Ex. Given eight objects that represent the product, make equal sets to represent the factors (e.g., 2 + 2 + 2 + 2) and count to arrive at the product (e.g., 8). **Level II AA Students will:** **EE4.OA.4.** Make equal sets and count to determine the product. Ex. Using two spinners, spin first spinner to determine the number of groups and the second spinner to determine how many in each group. Supply the numbers from the spinners as factors in the multiplication equation (e.g., __ x __ = ___). **Level I AA Students will:** **EE4.OA.4.** Replicate one way to arrive at a product. Ex. Copy a teacher-created model using manipulatives.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Given a set, replicate the equal set.
Generate and analyze patterns. **4.OA.5.** Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*	**EE4.OA.5.** Use repeating patterns to make predictions.	**Level IV AA Students will:** **EE4.OA.5.** Create a pattern based on a given rule and their prediction of what comes next. Ex. Given an AABCAABC rule, create a pattern based on the rule. Ex. Given a die with plus two, or plus three, rolls the die and creates a number pattern based on the outcome. **Level III AA Students will:** **EE4.OA.5.** Use repeating patterns to make predictions. Ex. Using a number line, predict what the next number will be when you apply the rule "add 2." Ex. Using a shape pattern (e.g., squares, circles, triangles) predict what will come next in the series of three shapes. Ex. Given a simple ABCABC pattern, indicate, "What comes next?" **Level II AA Students will:** **EE4.OA.5.** Replicate a pattern. Ex. Using wooden beads, copy a pattern. Ex. Rhythmic or tactile patterns. **Level I AA Students will:** **EE4.OA.5.** Differentiate between a pattern and a non-pattern. Ex. A pile of blocks vs. an ABAB pattern of blocks. Ex. Play listening game to determine rhythmic patterns versus non-patterns.

Fourth Grade Mathematics Standards: Numbers and Operations in Base Ten

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Generalize place value understanding for multi-digit whole numbers. **4.NBT.1.** Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*	**EE4.NBT.1.** Compare numbers to each other based on place value groups by composing and decomposing to 50.	**Level IV AA Students will:** **EE4.NBT.1.** Compare numbers to each other based on place value groups by composing and decomposing greater than 50. Ex. Given a number over 50, use place value blocks to indicate the value of each digit. Ex. Using popsicle sticks with beans glued to it in groups of 10 and loose beans, illustrate a multi-digit number. Ex. Show a number on the number line and answer the number of tens and ones in the given number. Ex. Decompose numbers to 50 in multiple ways (e.g., 36 is three 10s and six ones, or two 10s and 16 ones, or 36 ones). **Level III AA Students will:** **EE4.NBT.1.** Compare numbers to each other based on place value groups by composing and decomposing to 50. Ex. Given a two digit number up to 50, use place value blocks to indicate the tens value and the ones value. Ex. Use money (dimes and pennies) to represent place value. Ex. Decompose numbers to 50 (e.g., 15 is one 10 and five ones, 22 is two 10s and two ones, 36 is three 10s and six ones, 41 is four 10s and a one, 57 is five 10s and seven ones). Ex. Decompose numbers in one way (e.g. 36 is three sets of 10 and six ones). **Level II AA Students will:** **EE4.NBT.1.** Compose and decompose whole numbers to 20. Ex. Given 15 pennies, create a group of one 10 and a group of five ones. Ex. Use a number balance to determine what two numbers are needed to

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		equal the number on the other side. **Level I AA Students will:** **EE4.NBT.1.** Identify whole numbers to 10. Ex. Given sets, pair with numbers. Ex. Given numbers, match to sets.
4.NBT.2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	**EE4.NBT.2.** Compare whole numbers (<, >, =).	**Level IV AA Students will:** **EE4.NBT.2.** Compare whole numbers using symbols (<, >, =). Ex. Utilize a number line to compare two numbers greater than 50 and place a card with the correct symbol on the line to show the relationship (<, >). Ex. During P.E., compare scores of a game to determine the winner. Use the symbol to show the relationship between the scores. Ex. State or match meaning of >, <, and = as greater than, less than, or equal to. **Level III AA Students will:** **EE4.NBT.2.** Compare whole numbers (<, >, =). Ex. Given two groups of blocks, close or equal in value, determine which is greater, less, or equal. Ex. Using a floor number line, two students stand on two different numbers and determine which is greater or less than. **Level II AA Students will:** **EE4.NBT.2.** Compare whole numbers (<, >, =) from 0-20. Ex. Given two groups of objects, seven blocks and 10 blocks, determine which is greater or which is less. Ex. Play a fish game: One fish and two ponds, each with a certain number

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		of bugs, turn fish towards the pond with the most bugs. **Level I AA Students will:** **EE4.NBT.2.** Compare whole numbers (<, >) from 0-10. Ex. Use a 10 frame with two tactile dots and a 10 frame with 10 tactile dots, determine which is more or less. Ex. Given two sets of objects, determine which is more.
4.NBT.3. Use place value understanding to round multi-digit whole numbers to any place.	**EE4.NBT.3.** Round one- and two-digit whole numbers from 0—50 to the nearest 10.	**Level IV AA Students will:** **EE4.NBT.3.** Round one- and two-digit numbers, greater than 50, to the nearest 10. Ex. Roll the dice to count up the rounding tape and state the nearest 10. Ex. Using a hundreds chart and a given number between 50-100, round to the nearest tens place. **Level III AA Students will:** **EE4.NBT.3.** Round single one- and two-digit whole numbers from 0-50 to the nearest 10. Ex. Poster boards, distributed around the room, labeled by tens up to 50, be given a number, and asked to go to the nearest 10. Ex. Using pennies earned, exchange for dimes. **Level II AA Students will:** **EE4.NBT.3.** Round single one-digit numbers to the nearest 10. Ex. Using paper plates labeled zero and 10, given a card with a number zero to 10, place it on the correct plate. Ex. Use a number line to round to the nearest 10.

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		Level I AA Students will: **EE4.NBT.3.** Identify numbers that are more or less than five on a number line. Ex. Place their fingers on five on a number line and count to find a number greater than five. Ex. Shown five on a number line, identify a number that is less than five.
Use place value understanding and properties of operations to perform multi-digit arithmetic. **4.NBT.4.** Fluently add and subtract multi-digit whole numbers using the standard algorithm.	**EE4.NBT 4.** Add and subtract double-digit whole numbers.	**Level IV AA Students will:** **EE4.NBT.4.** Add and subtract multi-digit whole numbers. Ex. Given base ten pieces, make exchanges to solve multi-digit addition and subtraction problems. Ex. Use a calculator and show how the problem is solved. **Level III AA Students will:** **EE4.NBT.4.** Add and subtract double-digit whole numbers. Ex. Use a sorting box divided into two sections with manipulatives to add, subtract, and regroup to solve addition and subtraction problems. Ex. Use break-apart numbers (e.g., 20 + 30 = 50, 3 + 5 = 8, 40 + 8 = 48). Ex. Use a number line to demonstrate addition by tens. **Level II AA Students will:** **EE4.NBT.4.** Solve addition with numbers 20-50 and subtraction problems with numbers 0-20. Ex. Use counters to add and subtract. Ex. Use number lines to add or subtract. Ex. Produce addends to 10 fluently. Ex. The teacher orally states 14 – 1 = 13 and use magnetic symbols to display the problem.

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		Level I AA Students will: **EE4.NBT.4.** Solve single digit addition problems to add one to another number. Ex .Use counters to add one to another number. Ex .Use number lines to add one to another number.
4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**EE4.NBT 5.** N/A (See EE. 4.OA.1.)	
4.NBT.6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the	**EE4.NBT 6.** N/A	

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calculation by using equations, rectangular arrays, and/or area models.		

Fourth Grade Mathematics Standards: Number and Operations--Fractions[14]

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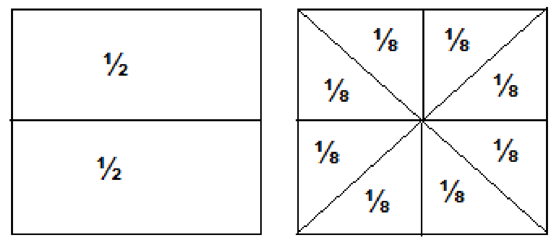
Extend understanding of fraction equivalence and ordering. **4.NF.1.** Explain why a fraction *a*/*b* is equivalent to a fraction (*n* × *a*)/(*n* × *b*) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. **4.NF.2.** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or	**EE4.NF.1-2.** Understand 2/4 = 1/2.	**Level IV AA Students will:** **EE4.NF.1-2.** Understand two fractions having unlike denominators are equivalent if they represent the same size portion of a whole. Ex. Given two squares of paper, one scored for 1/2s and one scored for 1/8s, fold the each paper as scored, then unfold the paper scored for 1/3s and compare to the one folded into 1/2 to find the same size portion (e.g., 4/8 = 1/2).  Ex. Use tangrams. **Level III AA Students will:** **EE4.NF.1-2.** Understand 2/4 = 1/2. Ex. Given two rectangles, cut one rectangle into half and a second into fourths and compare the rectangles to determine how many fourths equal a half. Ex. Working with two rectangles of the same size, fold one rectangle in half and the other in fourths and compare to find how many fourths equal half.

[14] Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100.

numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.		Ex. Using a picture of two circles, cut one in half and the other in fourths and compare them to find how many fourths equal half. **Level II AA Students will:** **EE4.NF.1-2.** Understand 4/4 or 2/2 = 1. Ex. Complete two- and four-piece puzzles. Ex. File folder game with self-sticking non-adhesive pieces that make a whole. **Level I AA Students will:** **EE4.NF.1-2.** Understand that two halves is equivalent to one whole. Ex. Wooden shapes are separated into halves and put back together into a whole. Ex. Plastic eggs are broken into halves and put back to whole.
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. **4.NF.3.** Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. ▪ Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. ▪ Decompose a fraction	**EE4.NF.3.** Differentiate between whole, half, and fourth.	**Level IV AA Students will:** **EE4.NF.3.** Differentiate fractional parts less than 1/4. Ex. With fraction bars labeled 1/2, compare the 1/2 to fraction bars less than. Ex. Using squares, fold it in 1/2, 1/4, 1/8, . . . **Level III AA Students will:** **EE4.NF.3.** Differentiate between whole, half, and fourth. Ex. Use fraction strips and fraction tiles to identify whole and half, and which is more. Ex. Using squares of paper, fold it in 1/2 and 1/4 and identify the parts. **Level II AA Students will:** **EE4.NF.3.** Differentiate between whole and half. Ex. Given a whole sandwich versus a half sandwich cut horizontally, vertically, and diagonally select the whole or half upon request. Ex. Show the halfway point on a number line.

into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.* ▪ Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. ▪ Solve word problems involving addition and subtraction of fractions referring to the same whole and having like		Ex. With pictures cut into halves and pictures not cut, sort the pictures into halves and wholes. **Level I AA Students will:** **EE4.NF.3.** Recognize that fractions are part of a whole. Ex. Using a self-sticking non-adhesive shape, take apart and put together fractional parts of a whole. Ex. Utilize wooden shapes, separate into halves and put back together into whole. Ex. Shown pictures of the whole class and part of the class, select the picture that shows part of the class upon request.

denominators, e.g., by using visual fraction models and equations to represent the problem.		
4.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. ▪ Understand a fraction *a*/*b* as a multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).* ▪ Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In*	**EE4.NF.4.** N/A (See EE. 4.OA.1-2.)	

▪ Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*		
Understand decimal notation for fractions, and compare decimal fractions. **4.NF.5.** Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective	**EE4.NF.5.** N/A (Decimals begin at grade 7).	

denominators 10 and 100.[15] *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.* **4.NF.6.** Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.* **4.NF.7.** Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.		

[15] Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.

Fourth Grade Mathematics Standards: Measurement and Data

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. **4.MD.1.** Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft. is 12 times as long as 1 in. Express the length of a 4 ft. snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), . . .*	**EE4.MD.1.** Identify the smaller measurement units that divide a larger unit within a measurement system.	**Level IV AA Students will:** **EE4.MD.1.** Solve problems by demonstrating whole units can be broken into smaller units. Ex. Use a one-cup measure to pour water into a pint jar to determine how many plants could be watered if each plant needs one cup of water. Ex. Pour soil from a 1/2-cup measuring cup into a pint to see how many starter pots could be filled with a pint of soil. Ex. Determine which is better for measuring a desktop, a ruler or a yardstick. Measure the tablet, mark the length on the ruler, and compare it to the yardstick. Ex. Pour tablespoons of water into a 1/2 cup a tablespoon at a time and determine how many one-tablespoon portions there are in a cup. **Level III AA Students will:** **EE4.MD.1.** Identify the smaller measurement units that divide a larger unit within a measurement system. Ex. Identify how many inches are the smaller units on a ruler. Ex. Identify how many feet are the smaller units on a yardstick. Ex. Identify how many cups are the smaller units on a pint measuring cup. Ex. Given several measurement tools, match three rulers to one-yard stick. **Level II AA Students will:** **EE4.MD.1.** Identify standard units of measurements. Ex. Use different measurement tools to measure sand in a tray. Ex. Use the inch worms on a foot ruler or yard stick to make the connection that while they both measure, one unit is smaller than the other.

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		Level I AA Students will: **EE4.MD.1.** Use measurement tools. Ex. Compare the length of a ruler to the length of a book. Ex. Use a balance scale to compare different sets of objects to determine which objects are <, >, or =.
4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	**EE4.MD.2.a.** Tell time to the half hour using a digital or to the hour using an analog clock.	**Level IV AA Students will:** **EE4.MD.2.a.** Tell time to the quarter hour using a digital or analog clock. Ex. Indicate time to the quarter hour on a digital clock. Ex. Place clock hands to show the quarter hour. **Level III AA Students will:** **EE4.MD.2.a.** Tell time to the half hour using a digital clock or to the hour using an analog clock. Ex. Identify which clock shows a stated time on a digital clock (i.e., 2:30). Ex. Move hands on a clock to show a stated half hour. Ex. Say the hour on an analog clock. **Level II AA Students will:** **EE4.MD.2.a.** Relate time to the hour to activities. Ex. Look at clock - 2:00 is time to go home. Ex. Identify activity on schedule by matching the hour on the schedule to the hour on the clock. Ex. Point to hour for next activity on personal schedule. **Level I AA Students will:** **EE4.MD.2.a.** Differentiate a digital and analog clock from other measurement tools as a tool for telling time. Ex. Given a digital or analog clock and a ruler, identify the clock for telling

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		time. Ex. Asked “How do we know when it is time to go to lunch?”, indicate a clock.
	EE4.MD.2.b. Select the appropriate measurement tool from two related options to solve problems.	**Level IV AA Students will:** **EE4.MD.2.b.** Use the appropriate measurement tools to solve problems. Ex. Select and use the appropriate measuring tool to measure different quantities for assigned tasks (e.g., cup for liquid and powder; scale for solids). Ex. On a field trip to the grocery store, use the scale to determine how much a bag of apples weighs. **Level III AA Students will:** **EE4.MD.2.b.** Select the appropriate measurement tool from two related options to solve problems. Ex. During a science experiment, select the best tool to use to measure various ingredients (e.g., tablespoon or cup, ruler or yardstick). Ex. Given a book, select the appropriate measuring tool to use to measure its length (e.g., ruler or yardstick). **Level II AA Students will:** **EE4.MD.2.b.** Select the appropriate measurement tool from two unrelated options to solve problems. Ex. Given options of unrelated measuring tools, choose the best tool for a particular task (e.g., “When making cookies, which would you use to measure flour, a cup or ruler?”). Ex. In a field trip to the grocery store, show which measuring tool should be used to weigh a bag of apples. Allow students to practice by choosing other fruits or vegetables to weigh.

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		Level I AA Students will: **EE4.MD.2.b.** Identify measurement tools. Ex. Sort non-standard and standard measurement tools into two different groups. Ex. Using pictures of standard and non-standard tools, identify which can be used to measure different items.
	EE4.MD.2.c. Use standard measurement to compare lengths of objects.	**Level IV AA Students will:** **EE4.MD.2.c.** Use standard measurements to compare length of objects and indicate how many each is by standard measures. Ex. Given a pencil and book, mark the length of each on a ruler to tell which is longer and approximately how many each is by inches. Ex. Given a tape measure, mark the length of a bookcase and the teacher's desk on the tape measure to show which is longer and approximately how many each is by feet. **Level III AA Students will:** **EE4.MD.2.c.** Use standard measurement to compare lengths of objects. Ex. Given a pencil and book, mark the length of each on a ruler to tell which is longer. Ex. Given a tape measure, mark the length of a bookcase and the teacher's desk on the tape measure to show which is longer. **Level II AA Students will:** **EE4.MD.2.c.** Measure length of objects using standard tools, such as rulers, yardsticks, and meter sticks. Ex. Given an object and a measuring tool, use the tool to mark the length of the object. Ex. Given a ruler and sand in a bucket, mark the depth of the sand on a

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		ruler. Ex. Given a yardstick, measure different lengths or widths of the room and record the length on the yardstick in number of yardsticks. **Level I AA Students will:** **EE4.MD.2.c.** Identify items as long or short. Ex. Given two different items, one much longer than the first, indicate long/short. Ex. After traveling to somewhere in the classroom and somewhere outside of room, indicate each distance as long or short.
	EE4.MD.2.d. Identify objects that have volume.	**Level IV AA Students will:** **EE4.MD.2.d.** Determine volume of a cube by counting units of measure. Ex. Use cubes to fill a box (small number, how many) and count the number of cubes needed to fill the box. Ex. Use liquid to fill bowl (how much, one cup, etc.). **Level III AA Students will:** **EE4.MD.2.d.** Identify objects that have volume. Ex. Given a group of pictures (cup, rock, fork), choose which one can be filled. Ex. Identify objects in the room that can be filled (cup, fish tank, etc.). Ex. Given a square and a cube, indicate cube. **Level II AA Students will:** **EE4.MD.2.d.** Demonstrate solid or full, empty and part full. Ex. Given a piece of paper and a cube, indicate, "Which one takes up more space?" Ex. Fill a cup half full from the water fountain.

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		Ex. As the teacher is filling a cup, say stop when it is half full. **Level I AA Students will:** **EE4.MD.2.d.** Identify vocabulary related to volume (full, empty). Ex. Match picture of unopened bottle of soda to "full." Ex. Identify an "empty" cup. Ex. Indicate which is full and/or which is empty when holding/feeling a full can of soda and an empty can of soda.
	EE4.MD.2.e. Identify coins (penny, nickel, dime, quarter) and their values.	**Level IV AA Students will:** **EE4.MD.2.e.** Identify relative value of different collections of coins. Ex. When asked what is worth five cents, chooses a nickel. When asked what is worth 25 cents, choose a quarter. Ex. Given two coins, identify the value of each and indicate which is more. Ex. Given 14 pennies and two dimes, indicate which set is worth more. **Level III AA Students will:** **EE4.MD.2.e.** Identify coins (penny, nickel, dime, quarter) and their values. Ex. Given two coins, choose correct coin by name and value. Ex. Shown a coin, names coin. Ex. Show relative values of penny, nickel, dime, quarter by arranging them in order from least to most. **Level II AA Students will:** **EE4.MD.2.e.** Match coins that are alike (penny, nickel, dime, quarter). Ex. Given a group of coins, match coins that are alike. Ex. Given a picture of a quarter, choose a quarter from a group of coins.

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		Level I AA Students will: **EE4.MD.2.e.** Select objects that are used for money. Ex. Given three pictures (two non-coins and one coin), identify which one is a coin. Ex. Given two choices, identify which one is a coin.
4.MD.3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*	**EE4.MD.3.** N/A (Area begins at 6th grade and perimeter begins at 7th grade).	
Represent and interpret data. **4.MD.4.** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in	**EE4.MD.4.a.** Insert data into a preconstructed bar graph template.	**Level IV AA Students will:** **EE4.MD.4.a.** Insert data into a graph to represent a data set with a scale equal to 10 (0 to 10 by ones). Ex. Using a bar graph, enter one unit for each student to show their favorite activity in the correct category (lunch, physical therapy, music, P.E.) to determine most popular and least popular. Ex. Go to the lost and found, categorize and count types of items and graph them to determine most and least. **Level III AA Students will:** **EE4.MD.4.a.** Insert data into a preconstructed bar graph template.

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line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*		Ex. Clean out desks, sort objects found into reusable, recyclable, reducible, or take home items and graph results with one bar for each – reuse, recycle, reduce, or take home. Ex. Given a preconstructed bar graph and data, enter the data on the bar graph by shading one unit of the bar for each piece of data. **Level II AA Students will:** **EE4.MD.4.a.** Identify an appropriate scale for the data set. Ex. Identify if it is appropriate to use degrees or ounces on a weather graph. Ex. Determine if it is appropriate to use inches or pounds on a height graph. **Level I AA Students will:** **EE4.MD.4.a.** Given a topic, identify appropriate data to collect. Ex. Using a weather graph, identify appropriate data given the choice between a picture of the sun and a picture of a shoe. Ex. Given the topic of snacks, determine whether jelly beans or books are appropriate for the graph.
	EE4.MD.4.b. Interpret data from a variety of graphs to answer questions.	**Level IV AA Students will:** **EE4.MD.4.b.** Create their own questions that can be answered by the data on a picture and bar graph. Ex. Cut simple graphs from newspapers/magazines and glue them onto card stock, create questions/answers based on the graph. Ex. Create their own questions/answers based on the information from a graph showing class preferences between two different activities.

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		Level III AA Students will: **EE4.MD.4.b.** Interpret data from a variety of graphs to answer questions. Ex. Answer questions based on information provided in a picture schedule. Ex. Tell how many sunny days there were in a month, based on a weather graph. **Level II AA Students will:** **EE4.MD.4.b.** Make observational statements about data in a picture and bar graph. Ex. Tell you what they observe on a graph of students' eye colors. Ex. Show students a graph of the Big 12 football teams and ask them what they think it is about. **Level I AA Students will:** **EE4.MD.4.b.** Demonstrate awareness that symbols may be used to represent objects and events. Ex. Picture of ice cream represents a favorite flavor. Ex. Picture of snow represents a snowy day.
Geometric measurement: understand concepts of angle and measure angles. **4.MD.5.** Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle	**EE4.MD.5.** Recognize angles in geometric shapes.	**Level IV AA Students will:** **EE4.MD.5.** Label different types of angles in geometric shapes. Ex. Construct geometric shapes using counting sticks. Then determine whether angles are right angles or not. Ex. Given a square, determine whether the angles are right angles or not and state a square has four angles. **Level III AA Students will:** **EE4.MD.5.** Recognize angles in geometric shapes. Ex. Draw an arc to identify the angles after teacher draws a geometric

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measurement: ▪ An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. ▪ An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.		shape on a whiteboard. Ex. Given pictures of different geometric shapes and angles that match the shapes, overlay shapes with matching angles. **Level II AA Students will:** **EE4.MD.5.** Identify an angle. Ex. Wipe away the shape that does not contain an angle when teacher draws a shape with an angle and a circle. Ex. Identify as many angles as they can see or feel on the playground. Ex. Given an angle template, hold it to shapes in the classroom and tell if it matches. Ex. Given a set of four shapes (one with angles and three with no angles), indicate the shape with angles. **Level I AA Students will:** **EE4.MD.5.** Identify shapes that contain angles. Ex. Given a square and a circle, identify the square. Ex. Find an object that is shaped like a square in the classroom.
4.MD.6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	**EE4.MD.6.** Identify angles as larger and smaller.	**Level IV AA Students will:** **EE4.MD.6.** Construct angles of various sizes. Ex. Construct right and acute angles. Ex. Replicate angles from geometric shapes containing right and acute angles.

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		Level III AA Students will: **EE4.MD.6.** Identify angles as larger and smaller. Ex. Given an angle shaded to less than 45^{o} and one shaded to more than 120^{o}, indicate "Which is larger?" Ex. Given two fraction puzzles pieces, one containing a significantly larger angle than the other, indicate "Which is smaller?" **Level II AA Students will:** **EE4.MD.6.** Differentiate angles in shapes. Ex. Given an angle and a circle, indicates "Which is an angle?" Ex. Given a ball and a cube, indicate "Which has an angle?" **Level I AA Students will:** **EE4.MD.6.** Replicate an angle. Ex. Use popsicle sticks to replicate a given angle. Ex. Bend a pipe cleaner to replicate a given angle.
4.MD.7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and	**EE4.MD.7.** N/A (See EE4.MD.5.)	

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mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.		

Fourth Grade Mathematics Standards: Geometry

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Draw and identify lines and angles, and classify shapes by properties of their lines and angles. **4.G.1.** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	**EE4.G.1.** Distinguish between parallel and intersecting lines.	**Level IV AA Students will:** **EE4.G.1.** Create a representation of parallel and intersecting lines. Ex. Using popsicle sticks, create parallel and intersecting lines. Ex. Play "Simon Says" to illustrate parallel and intersecting lines with arm movements (or eye gaze a picture of students making the correct movements). **Level III AA Students will:** **EE4.G.1.** Distinguish between parallel and intersecting lines. Ex. Using a road map rug, trace over the parallel lines and then trace over the intersecting lines. Ex. Using a map of the school on an interactive whiteboard, trace the classrooms that are in a parallel line and the hallways that intersect. Ex. Find parallel lines in shapes. **Level II AA Students will:** **EE4.G.1.** Identify an intersecting line. Ex. Use sidewalk chalk to draw an intersecting line. Ex. Go on an environment hunt and identify intersecting lines. Ex. Trace intersecting lines (e.g., roads or hallways) on a map. **Level I AA Students will:** **EE4.G.1.** Identify a line. Ex. Using yarn, stretch and glue a line on paper. Ex. Draw a line when directed. Ex. Walk on a line taped to the floor when directed. Ex. Given a line and a circle, indicate which is the line.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
4.G.2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	**EE4.G.2.** Distinguish between different attributes of shapes (lines, curves, angles).	**Level IV AA Students will:** **EE4.G.2.** Classify shapes according to attributes. Ex. After reading "The Button Box," determine which attributes can be used to sort geometric buttons (buttons can also be felt by visually impaired students or teacher can trace the shapes into the palm of a hand). Ex. Given several shapes, classify the shapes according to attributes such as shape and angles. (Teacher will trace geometric shape into student's palm and, after given choices of shapes, activate a switch to indicate a category of attribute.) **Level III AA Students will:** **EE4.G.2.** Distinguish between different attributes of shapes (lines, curves, angles). Ex. Sort different types of objects to show lines, curves, and angles. Ex. Find pictures that represent lines, angles, and curves. Ex. Draw a picture and identify the lines, angles, and curves used in the picture. **Level II AA Students will:** **EE4.G.2.** Identify attributes of geometric shapes. Ex. Use attribute blocks to sort shapes. Ex. Assigned a shape, cut out magazine pictures to represent the assigned shape. **Level I AA Students will:** **EE4.G.2.** Identify curves. Ex. Assemble a selection of curved items. Ex. Using a road map, use toy cars to find curves.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Given a square and a circle, indicate which is curved/round.
4.G.3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.	**EE4.G.3.** Recognize a line of symmetry in a simple shape.	**Level IV AA Students will:** **EE4.G.3.** Locate the line of symmetry in a geometric shape. Ex. Fold paper, in a geometric shape, and have student trace the fold line to identify the line of symmetry. Ex. Using magnetic shapes, match a given pattern of shapes to create a symmetrical design. **Level III AA Students will:** **EE4.G.3.** Recognize a line of symmetry in a simple shape. Ex. Place dots of paint on a coffee filter and fold in half. Place a pipe cleaner on the line of symmetry. Ex. Use a symmetry mirror, move it around on shapes until the students see that both sides match. **Level II AA Students will:** **EE4.G.3.** Recognize polygons. Ex. Given a "mystery bag" with a geometric shape in it, find three objects, from around the school that match the shape and bring them back to class. Takes turns showing their items and have the rest of the students guess what the "mystery shape" is. Ex. Identify polygons in pictures/shape. **Level I AA Students will:** **EE4.G.3.** Recognize simple shapes (square, triangle, and rectangle). Ex. Identify the shapes of environmental signs. Ex. Match the name to a shape from two choices.

COMMON CORE ESSENTIAL ELEMENTS AND ACHIEVEMENT DESCRIPTORS FOR FIFTH GRADE

Fifth Grade Mathematics Standards: Operation and Algebraic Thinking

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Write and interpret numerical expressions. **5.OA.1.** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. **5.OA.2.** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation “add 8 and 7, then multiply by 2” as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*	**EE5.OA.1-2.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Analyze patterns and relationships. **5.OA.3.** Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*	**EE5.OA.3.** Identify and extend numerical patterns.	**Level IV AA Students will:** **EE5.OA.3.** When given a rule, generate the pattern. Ex. Show me a pattern that increases by two and starts at 0 (i.e., 0, 2, 4, 6, . . .). Ex. Show me a pattern that increases by five and starts with 0 (i.e., 0, 5, 10, 15, . . .). **Level III AA Students will:** **EE5.OA.3.** Identify and extend numerical patterns. Ex. Identify the following pattern as counting by twos and extend the pattern: 2, 4, 6, __, __, __. Ex. Identify the following pattern as counting by tens and extend the pattern: 23, 33, 43, __, __. **Level II AA Students will:** **EE5.OA.3.** Extend a picture pattern. Ex. Given red, red, blue, red, red, _________, identify the missing color. Ex. Square, circle, triangle, square, _______, triangle. Identify the missing shape. **Level I AA Students will:** **EE5.OA.3.** Repeat a pattern. Ex. Teacher claps twice, student claps twice. Ex. Activate a switch or indicate which choice shown repeats the pattern shown.

Fifth Grade Mathematics Standards: Number and Operations in Base Ten

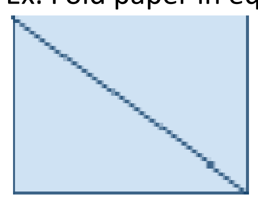
CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Understand the place value system. **5.NBT.1.** Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	**EE5.NBT.1.** Compare numbers to each other based on place value groups by composing and decomposing to 99.	**Level IV AA Students will:** **EE5.NBT.1.** Compare numbers by composing and decomposing in two different ways. Ex. Decompose numbers by place value and compare by hundreds, tens, and ones (with the understanding that one 100, two 10s, and three ones combined is 123 ones). Ex. Compose numbers based on place value and compare to another number on the number line. Ex. Compare two numbers with different numbers in the tens place (e.g., 20 compared to 60 on the number line and explain 20 has two 10s or 20 ones and 60 is made of six 10s or 60 ones as it is written. **Level III AA Students will:** **EE5.NBT.1.** Compare numbers to each other based on place value groups by composing and decomposing to 99. Ex. Compare two numbers with different numbers in the tens place (e.g., 20 compared to 60 on the number line). Ex. Demonstrate the difference between two numbers using dimes (e.g., 10 compared to 50). Ex. Decompose a number into tens and ones, given two different numbers (with the understanding that two 10s and three ones combined is 23 ones). Ex. Compare numbers on a table of ones and tens, given two different numbers. **Level II AA Students will:** **EE5.NBT.1.** Compare numbers to 20. Ex. Using a number line and given two numbers, indicate where on the

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		number line the numbers belong between the 10 markers. Ex. Given two numbers, indicate which one is greater, or less, or which comes first or last. **Level I AA Students will:** **EE5.NBT.1.** Compare numbers 0-10. Ex. Given two numbers, indicate if numbers are same or different. Ex. Find two numbers that are the same/ or two that are different.
5.NBT.2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	**EE5.NBT.2.** Recognize patterns in the number of zeros when multiplying a number by powers of 10.	**Level IV AA Students will:** **EE5.NBT.2.** Extend patterns in the number of zeros when multiplying by the powers of 10 up to 1,000, order numbers to 100. Ex. Place numbers in order. Ex. Given a range of numbers (e.g. 200-300-253), arrange in order. Ex. Indicate (e.g. head stick, pointing) correct order up to 100. Ex. Given 20 dimes, count from 10 to 100 by tens and indicate that it is $2. **Level III AA Students will:** **EE5.NBT.2.** Recognize patterns in the number of zeros when multiplying a number by powers of 10. Ex. Presented with lists of number sentences (e.g., 10 x 1 = 10, 10 x 2 = 20, 10 x 3 = 30), identify the pattern. Ex. Arrange numbers in order when presented with tens place value number cards out of order. Ex. Presented numbers 10, 20, 30, 40, __, indicate the next correct number in the sequence. Ex. Given 10 dimes, count from 10 to 100 by tens and indicate that is $1.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EE5.NBT.2**. Order multiples of ten ranging from 0-50 in sequential order least to greatest. Ex. Presented a range of numbers 0-50, indicate whether they are in correct order. Ex. Presented a range of numbers (e.g., 30-50), indicate if numbers are in correct order. Ex. Given five dimes, count from 10 to 50 by tens and indicate that is 50 cents. **Level I AA Students will:** **EE5.NBT.2.** Indicate the sequential order of numbers to 10. Ex. Indicate if numbers 1-10 are in correct order when presented (in and out of order). Ex. Indicate where on number line each number belongs. Ex. Given 10 pennies, count to 10.
5.NBT.3. Read, write, and compare decimals to 1000ths. ▪ Read and write decimals to 1000ths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).	**EE5.NBT.3.** Round two-digit whole numbers to the nearest 10 from 0—90.	**Level IV AA Students will:** **EE5.NBT.3.** Round three-digit whole numbers to hundreds place. Ex. Choose card with correct answer on it after being presented a three-digit number and told to round to nearest hundreds place value. Ex. Given a three-digit number, generate (speaks, types, etc.) the answer for rounding to the nearest hundreds place value. **Level III AA Students will:** **EE5.NBT.3.** Round two-digit whole numbers to the nearest 10 from 0-90. Ex. Given a number between 1-89 and cards with the answer on one, pick correct number when ask to round to nearest 10. Ex. Using a number line, round to nearest 10.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
▪ Compare two decimals to 1000ths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.		**Level II AA Students will:** **EE5.NBT.3.** Determine if a single-digit number is closer to zero or 10. Ex. Given a number between one and nine, indicate if the number is closer to zero or 10. Ex. Using a number line, indicate if given number is closer to 10 or zero. **Level I AA Students will:** **EE5.NBT.3.** Indicate more or less than five. Ex. Using a pegboard with pegs placed in the holes divided into two different sets, indicate which has more or less. Ex. Presented with a set of five, and another set, indicate if second set is more or less than five. Ex. Presented with three pennies or five pennies, choose which is more. Ex. Given a number line, indicate if two or four is closer to five.
5.NBT.4. Use place value understanding to round decimals to any place.	**EE5.NBT.4.** Round money to a nearest dollar.	**Level IV AA Students will:** **EE5.NBT.4.** Round money to the nearest dime. Ex. Round cents to the nearest tenth of a dollar (e.g., 0.82 is closer to 0.80). Ex. Using advertisements with costs of items, identify how many whole dollars it would take to purchase the item (e.g., if an item costs $3.65, is $3.64 would it take $3.60 or $3.70 to pay for it?). **Level III AA Students will:** **EE5.NBT.4.** Round money to the nearest dollar. Ex. Round coins to the nearest dollar. Ex. Identify how many whole dollars it would take to purchase an item (e.g., if an item costs three dollars and three quarters ($3.75), it would take $4, not $3 to pay for it.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Pick an item from an ad and tell how many dollars it would take to buy the item. **Level II AA Students will:** **EE5.NB.4.** Round money to the nearest dime. Ex. Given 12 pennies, indicate whether one dime or two is closest. Ex. Using pennies earned, exchange for dimes. **Level I AA Students will:** **EE5.NB.4.** Indicate which money amount is more. Ex. Given three pennies or a quarter, indicate the quarter is more. Ex. Offered three pennies and one dime, indicate the dime is more. Ex. Offered a dime and a quarter, indicate the quarter is more.
Perform operations with multi-digit whole numbers and with decimals to hundredths. **5.NBT.5.** Fluently multiply multi-digit whole numbers using the standard algorithm.	**EE5.NBT.5.** Multiply whole numbers up to 5 x 5.	**Level IV AA Students will:** **EE5.NBT.5.** Identify basic multiplication facts for numbers greater than five. Ex. Identify 36 as the answer to 6 x 6. Ex. When shown a flash card with 7 x 3, identify 21 as the answer. **Level III AA Students will:** **EE5.NBT.5.** Multiply whole numbers up 5 x 5. Ex. Choose correct answer for 3 x 3. Ex. When asked what 4 x 4 equals, identify 16 from an array of choices. **Level II AA Students will:** **EE5.NBT.5.** Use repeated addition to show multiplication with single digits 1-5. Ex. Add 2 + 2 + 2 to justify 2 x 3.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. When given a picture of a garden with two rows of five carrot plants in each, identify 5 + 5. **Level I AA Students will:** **EE5.NBT.5.** Use concrete representations to show numbers 1-5. Ex. Given pictures of five cars, arrange them into one row. Ex. Count four chairs in a row.
5.NBT.6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **5.NBT.7.** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies	**EE5.NBT.6-7.** Illustrate the concept of division using fair and equal shares.	**Level IV AA Students will:** **EE5.NBT.6-7.** Apply the concept of fair share and equal shares to solve a division problem. Ex. Divide a snack equally among classmates. Ex. Divide a square piece of paper equally among classmates. Ex. Divide themselves into equal teams. Ex. Divide a quantity into equal shares (e.g., “If I find 20 dollars, how could five people share this?” 20/5=4 (division structure partitive/fair shares). **Level III AA Students will:** **EE5.NBT.6-7.** Illustrate the concept of division using fair and equal shares. Ex. Fold paper in equal shares.  Ex. Given 10 counting cubes divided among three students, recognize when students have the same number (equal share) and when students do not have the same number (not equal share).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.		**Level II AA Students will:** **EE5.NBT.6-7.** Construct equal sets. Ex. Using sorting tray and colored blocks to construct equal sets. Ex. Given 16 pencils, share equally onto four students. Ex. Use an organizer to group or partition objects into two or more sets. Ex. Create a model of equal sets by counting the objects in each set. **Level I AA Students will:** **EE5.NBT.6-7.** Replicate an equal set from a model. Ex. Count out three objects after teacher counts out three objects. Ex. Given a set of three objects, finding a matching set.

Fifth Grade Mathematics Standards: Number and Operations--Fractions

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Use equivalent fractions as a strategy to add and subtract fractions. **5.NF.1.** Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd).*	**EE5.NF.1.** Differentiate between halves, fourths, and eighths.	**Level IV AA Students will**: **EE5.NF.1.** Differentiate fractional parts less than 1/4. Ex. With fraction bars labeled 1/4, compare the 1/4 to fraction bars to those less than 1/4 and identify the fraction using numerals. Ex. Using squares, fold it in 1/4, and then 1/8, and tell which is more and which is less. Ex. Divide a square into 1/4 and then 1/8 and tell which is more. Ex. Divide a circle into the correct fractions when shown the numerical representation of 1/2, 1/4, or 1/8. **Level III AA Students will:** **EE5.NF.1.** Differentiate between halves, fourths, and eighths. Ex. With pictures cut into halves, pictures cut into fourths, and pictures cut in eighths, sort the pictures. Ex. Using fraction bars, identify the bar that is 1/2, 1/4, or 1/8 of the whole using a template. Ex. Given a partitioned shape, shade it to show 1/2, 1/4, or 1/8 when asked. Ex. Using an analog clock, shade the clock to show the quarter hour. **Level II AA Students will:** **EE5.NF.1.** Differentiate between whole and a part. Ex. Given a whole sandwich, cut the sandwich in half (e.g., cut horizontally, vertically, and diagonally), indicate which is half and which is whole. Ex. Draw a square on a dry erase board; then draw a line to cut the square in half. Ex. When playing a game in which the class is divided into two teams, indicate that only half the class is on each team.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level I AA Students will: **EE5.NF.1.** Recognize that fractions are part of a whole. Ex. Assemble a simple puzzle to demonstrate pieces of a whole. Ex. Using a self-sticking non-adhesive shape, take apart and put together fractional parts of a whole.
5.NF.2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*	**EE5.NF.2.** Solve two-step word problems using addition and subtraction of whole numbers.	**Level IV AA Students will:** **EE5.NF.2.** Solve two-step word problems using addition and subtraction of numbers after showing the problem in numerals. Ex. Susan has 35 compact disks. She bought three more and gave four to her little brother, Dylan. How many compact discs does Susan have now? Show the problem and explain why the answer is reasonable. Ex. Johnny has a bag of 36 cookies. He ate four of them and gave two to Amy. How many cookies does he have? Show the problem and explain why answer is reasonable. **Level III AA Students will:** **EE5.NF.2.** Solve two-step word problems using addition and subtraction of whole numbers. Ex. Billy jumped rope for 10 minutes, played basketball for 15 minutes, and ran for five minutes. How many minutes did he spend exercising? Ex. Jenny has 30 text messages left on her cell phone plan. She sent 10 messages to Gary and received eight messages from her mom. How many text messages are left on her plan? **Level II AA Students will:** **EE5.NF.2.** Solve one-step problems using addition and subtraction. Ex. Connie had five marbles. Juan gave her eight more marbles. How many marbles does Connie have all together?

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. You have eight pennies. Give me two pennies. How many pennies do you have now? **Level I AA Students will:** **EE5.NF.3.** Recognize words that are used for addition and subtraction. Ex. Using flash cards, indicate whether the word is used for addition or subtraction (e.g., more, increased, less, take away, decreased). Ex. Build a wall of words used for addition—sum, all together, add, more, increased, etc. Ex. Build a wall of words used for subtraction—difference, decreased, take away, less, spent, etc. Ex. Indicate the concept of more (addition) and less (subtraction).
Apply and extend previous understandings of multiplication and division to multiply and divide fractions. **5.NF.3.** Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using	**EE5.NF.3.** N/A (See EE5.NF.1)	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*		
5.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. ▪ Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of	**EE5.NF.4-5.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
operations $a \times q \div b$. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)* ▪ Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.		

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
5.NF.5. Interpret multiplication as scaling (resizing), by: ▪ Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. ▪ Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence		

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
a/*b* = (*n* × *a*)/(*n* × *b*) to the effect of multiplying *a*/*b* by 1.		
5.NF.6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. **5.NF.7.** Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.[16] ▪ Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story*	**EE5.NF. 6-7**. N/A	

[16] Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3. ▪ Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.* ▪ Solve real world problems involving division of unit fractions by non-zero whole numbers and		

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*		

Fifth Grade Mathematics Standards: Measurement and Data

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Convert like measurement units within a given measurement system. **5.MD.1.** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	**EE5.MD.1.a.** Tell time using an analog or digital clock to the half or quarter hour.	**Level IV AA Students will:** **EE5.MD.1.a.** Tell time using a digital clock to the minute and an analog clock to the nearest five minutes. Ex. Tell time to the minute on a digital clock. Ex. Place hand on a clock within five minutes of the stated time. **Level III AA Students will:** **EE5.MD.1.a.** Tell time using an analog or digital clock to the half or quarter hour. Ex. Indicate time to the quarter hour on a digital clock. Ex. Place clock hands to show the half hour on an analog clock. **Level II AA Students will:** **EE5.MD.1.a.** Tell time to the half hour using a digital clock and to the half hour using an analog clock. Ex. Identify which clock shows a stated time on a digital clock (3:30). Ex. Move hands on a clock to show a stated hour. **Level I AA Students will:** **EE5.MD.1.a.** Identify morning and afternoon. Ex. Identify activity on schedule and relate to morning (before lunch) to afternoon (after lunch).
	EE5.MD.1.b. Use customary units to measure weight and length of objects.	**Level IV AA Students will:** **EE5.MD.1.b.** Use two customary units to measure weight and length of objects. Ex. Weigh an object in pounds and weigh again using ounces. Ex. Weigh objects in ounces and weigh again in pounds.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Measure a variety objects in inches and measure again in feet. Ex. Measure an object using feet and measure again using inches. **Level III AA Students will:** **EE5.MD.1.b.** Use customary units to measure weight and length of objects. Ex. Weigh a variety of objects in pounds. Ex. Weigh a variety of objects in ounces. Ex. Measure length of objects using feet. Ex. Measure length of objects using inches. **Level II AA Students will:** **EE5.MD.1.b.** Identify customary units of measurement for weight and length. Ex. Given an object, choose pounds or inches to weigh a person. Ex. Shown a scale and a ruler, choose correct tool to measure weight of objects (use inch ruler if possible). **Level I AA Students will:** **EE5.MD.1.b.** Identify which tools are used to weigh. Ex. Identify which tool you use to weigh a person. Ex. Indicate which tool is used to measure length. Ex. Indicate which tool is used to measure flour and sugar in a recipe.
	EE5.MD.1.c. Indicate relative value of collections of coins.	**Level IV AA Students will:** **EE5.MD.1.c.** Indicate relative value of coins and bills to each other. Ex. Given a quarter and a collection of nickels, select five nickels to trade for one quarter. Ex. Given a dollar and offered three quarters in exchange, indicate that the

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		dollar is worth more. Ex. Given a dollar and a collection of dimes, select 10 dimes in exchange for the dollar. **Level III AA Students will:** **EE5.MD.1.c.** Indicate relative value of collections of coins. Ex. When asked what is worth five cents, chooses a nickel. When asked what is worth 25 cents, choose a quarter. Ex. Given two coins, identify the value of each and indicate which is more. Ex. Given 25 pennies and two dimes, indicate which set is worth more. **Level II AA Students will:** **EE5.MD.1.c.** Identify coins (penny, nickel, dime, quarter) and their values. Ex. Given two coins, choose correct coin by name and value. Ex. Shown a coin, names coin. Ex. Show relative values of penny, nickel, dime, quarter by arranging them in order from least to most. **Level I AA Students will:** **EE5.MD.1.c.** Match coins that are alike (penny, nickel, dime, quarter). Ex. Given a group of coins, match coins that are alike. Ex. Given a picture of a quarter, choose a quarter from a group of coins.
Represent and interpret data. **5.MD.2.** Make a line plot to display a data set of measurements in fractions	**EE5.MD.2.a.** Represent and interpret data on a picture, line plot, or bar graph given a model and a graph to complete.	**Level IV AA Students will:** **EE5.MD.2.a.** Collect, organize, and interpret data. Create a graph using a graph template, and display the data on the graph. Ex. Count number of students who like dogs and number who like cats. Show where on the graph to put the bar for dogs and for cats and where to indicate the number of votes and enter the results on the graph.

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of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*		Determine if the result shown seems reasonable and why (e.g., graph shows that students have more snakes as pets than dogs). Ex. Based on class observation (how many wore red today), determine how to graph data and show graph telling which was more, less, or the same. **Level III AA Students will:** **EE5.MD.2.a.** Represent and interpret data on a picture, line plot, or bar graph given a model and a graph to complete. Ex. Given data, plot data points on a given graph. Determine which has more, less, or the same. Ex. Take given data from a survey and put the same data on a given graph using a model. Tell one thing the graph says about the survey. **Level II AA Students will:** **EE5.MD.2.a.** Display data on a picture, line plot, or bar graph and answer questions about the graph. Ex. Indicate where data should go on the graph, and shade/color correct amount of spaces on given graph, answer a question about the graph (e.g., Is this about dogs?). Ex. Use objects to display data on graph and indicate type of graph. **Level I AA Students will:** **EE5.MD.2.a.** Identify a simple graph. Ex. Identify a simple picture graph or schedule. Ex. Pick out a graph when presented with a graph and a non-graph.

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Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. **5.MD.3.** Recognize volume as an attribute of solid figures and understand concepts of volume measurement. ▪ A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. ▪ A solid figure, which can be packed without gaps or overlaps using *n* unit cubes, is said to have a volume of *n* cubic units. **5.MD.4.** Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised	**EE5.MD.3-5.** Determine volume of a cube by counting units of measure.	**Level IV AA Students will:** **EE5.MD.3-5.** N/A **Level III AA Students will:** **EE5.MD.3-5.** Determine volume of a cube by counting units of measure. Ex. Given cubes that fill a box with no gaps (small number, how many), determine by counting the number of cubes needed to fill the box. Ex. Given a cube 4 x 4 x 4 inches constructed of one square inch cube, disassemble it to determine by counting how many cubes were required. **Level II AA Students will:** **EE5.MD.3-5.** Identify objects that have volume. Ex. Given a group of pictures (cup, rock, fork), choose which one can be filled. Ex. Identify objects in the room that can be filled (e.g., cup, fish tank). Ex. Given a square and a cube, indicate cube. **Level I AA Students will:** **EE5.MD.3-5.** Demonstrate solid or liquid, full or empty. Ex. Given a glass of water and a paper weight, indicate which one you can pour. Ex. Given a glass of water and a paper weight, demonstrate that the water is liquid by pouring into another container. Ex. Given a glass full of water and an empty glass, indicate which one is full and which one is empty.

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units. **5.MD.5.** Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. ▪ Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. ▪ Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms		

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to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. ▪ Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.		

Fifth Grade Mathematics Standards: Geometry

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Graph points on the coordinate plane to solve real-world and mathematical problems. **5.G.1.** Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond	**EE5.G.1-5.** Sort two-dimensional figures and describe the common attributes such as angles, number of sides, corners (dimension), and color.	**Level IV AA Students will:** **EE5.G.1-5.** Sort into quadrant tables and describe figures by two common attributes. Ex. Sort figures by color and shape. Ex. Sort figures by congruent and non-congruent. Ex. Sort figures by angle and number of sides. **Blue circles** / **Red circles** **Blue squares** / **Red squares** **Level III AA Students will:** **EE5.G.1-5.** Sort two-dimensional figures and describe the common attributes such as angles, number of sides, corners (dimension), and color. Ex. Given shapes, sort by angles and indicate how you sorted them. Ex. Given shapes sorted based on the number of sides, sort them by another attribute. **Level II AA Students will:** **EE5.G.1-5.** Sort figures based on a given attribute. Ex. Sort figures by shape. Ex. Sort figures by size. **Level I AA Students will:** **EE5.G.1-5.** Indicate two-dimensional shapes named. Ex. Touch the rough triangle. Ex. Touch the circle.

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(e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate). **5.G.2.** Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. **5.G.3.** Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles. **5.G.4.** Classify two-dimensional figures in a hierarchy based on properties.		

COMMON CORE ELEMENTS AND ACHIEVEMENT DESCRIPTORS FOR SIXTH GRADE

Sixth Grade Mathematics Standards: Ratios and Proportional Relationships

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Understand ratio concepts and use ratio reasoning to solve problems. **6.RP.1.** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."* **6.RP.2.** Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a*	**EE6.RP.1.** Demonstrate a simple ratio relationship.	**Level IV AA Students will:** **EE6.RP.1.** Use a ratio to describe a relationship using numbers and objects. Ex. Given an even number of red and twice as many green beads, identify the ratio of green beads compared to red beads. Ex. While preparing a recipe, fill in a ratio of flour to sugar (e.g., one cup of sugar to four cups of flour.) Ex. Compare the number of male students to female students. Ex. Given the quantity of materials available and the number of groups who will conduct a science experiment, use a ratio relationship to describe how much each group will receive. **Level III AA Students will:** **EE6.RP.1.** Demonstrate a simple ratio relationship. Ex. Give a pen and a pencil to each classmate. Ex. After the teacher explains what materials each group needs, use an AAC to tell another student to get two cups for one table. **Level II AA Students will:** **EE6.RP.1.** Complete a pattern given a simple ratio. Ex. Take two steps on a number line each time the teacher says "step." Ex. Give a ratio of two-to-one, complete a AABAABAAB pattern (e.g., jump, jump, clap; jump, jump, clap). **Level I AA Students will:** **EE6.RP.1.** Identify a one-to-one relationship. Ex. Given a stack of napkins, give a napkin to each classmate.

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ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."[17] **6.RP.3.** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. ▪ Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the		Ex. When sorting mail in the main office, place one copy of the school newsletter in each teacher's mailbox. Ex. Touch each object as teacher counts.

[17] Expectations for unit rates in this grade are limited to non-complex fractions.

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coordinate plane. Use tables to compare ratios. ▪ Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* ▪ Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. ▪ Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when		

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
multiplying or dividing quantities.		

Sixth Grade Mathematics Standards: The Number System

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Apply and extend previous understandings of multiplication and division to divide fractions by fractions. **6.NS.1.** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How*	**EE6.NS.1.** Compare the relationships between two unit fractions.	**Level IV AA Students will:** **EE6.NS.1.** Compare the relationships between the three unit fractions (1/2, 1/4, 1/8). Ex. Given three measuring cups filled to 1/2, 1/4, and 1/8 with water, compare fractional amounts to determine which is greater. Ex. Given pictorial representations of shaded pictures and/or fraction bars, compare fractions to determine which is a smaller or lesser amount. Ex. Using circle shaped fraction puzzles, compare a 1/2, 1/4, and 1/8 to determine which is greater. **Level III AA Students will:** **EE6.NS.1.** Compare the relationships between two unit fractions. Ex. Given two measuring cups of 1/2 and 1/4 full of sand, compare the amounts in each of the measuring cups to a whole cup. Which is more? Ex. Given two measuring cups of 1/4 and 1/8 full of water, compare the amounts in each of the measuring cups to a whole cup. Which is more? Ex. When given a group of even-numbered objects that represents 1/2 and 1/4, determine which set is more or less. Ex. Split an even-numbered group of objects into two equal groups to show one half of the group; then split each group again to show fourths of the whole; and split each group again to show eighths of the whole. **Level II AA Students will:** **EE6.NS.1.** Demonstrate an amount of 1/2. Ex. Fold one piece of paper in half to show two halves in every one whole. Ex. Shade a shape to show 1/2. Ex. Given a whole and a half, identify the half (e.g., a whole or half sandwich).

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many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi? Compute fluently with multi-digit numbers and find common factors and multiples.		Ex. Shown a glass that is full and a glass that is 1/2 (half) full, select the half-full glass. **Level I AA Students will:** **EE6.NS.1.** Distinguish between more or less. Ex. Given two groups of objects with significantly different amounts (three vs. 10), determine which group has more or less. Ex. Given a picture of a familiar symmetrical object cut in half, combine both halves to make a whole.
Compute fluently with multi-digit numbers and find common factors and multiples. **6.NS.2.** Fluently divide multi-digit numbers using the standard algorithm.	**EE6.NS.2**. Apply the concept of fair share and equal shares to divide.	**Level IV AA Students will:** **EE6.NS.2**. Solve a division problem using the concept of equal shares. Ex. Given a real-life division problem, solve the problem using manipulatives. Ex. Given a group of objects, determine what number to give each classmate to create equal shares. Ex. Divide students into four equal groups for a sports tournament. Ex. When planting seeds for a science experiment, divide the seeds into equal shares. **Level III AA Students will:** **EE6.NS.2**. Apply the concept of fair share and equal shares to divide. Ex. When planting seeds for a science experiment, divide the seeds into 10 equal shares. Ex. Divide construction paper equally among classmates. Ex. Divide students in the classroom into two equal teams. Ex. Divide 10 one dollar bills into two fair shares (e.g., "If I find 10 dollars and I divide it equally with someone, how much do we each get?").

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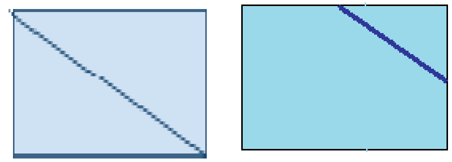
		Level II AA Students will: **EE6.NS.2**. Identify the concept of division using fair and equal shares. Ex. Given a paper folded in half, identify whether they are equal shares.  Ex. Distribute cards in a card game giving each student a fair share. Ex. Given a set of books, divide them into two buckets. Ex. Given Ziploc baggies with an equal number of pencils in them, say the number of baggies and the number of pencils in each bag. **Level I AA Students will:** **EE6.NS.2**. Replicate equal sets. Ex. Given a model, replicate equal sets using rings and pattern blocks. Ex. Given a model, place five different colors in equal sets.
6.NS.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	**EE6.NS.3.** Solve two factor multiplication problems with products up to 50 using concrete objects and/or calculators.	**Level IV AA Students will:** **EE6.NS.3.** Solve multiplication problems with whole number products to 50 using numerical representations. Ex. Given a set of multiplication problems in numerical form, find the product. Ex. Given a computer program with multiplication problems, find the product. Ex. Find the product of whole numbers to 20 via multiple algorithms (e.g., different ways to get to 20 = 10 x 2, 2 x 10, 10 + 10 or 5 + 5 + 5 + 5). Ex. Given a story problem, find the product and represent it numerically (e.g., If I have three shirts and two pair of paints how many outfits can one

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		make? If I have five rows of desks and 10 desks in each row, how many desks will I have? If I babysat for five days and earned 10 dollars each day how much money would I make?). **Level III AA Students will:** **EE6.NS.2.** Solve two factor multiplication problems with products up to 50 using concrete objects and/or calculators. Ex. Given a set of manipulatives, make three groups of three and then find the product. Ex. Given a 100s board, show 3 x 10, three sets of 10, and state the product. Ex. Given numbers paired with concrete representations, select the correct answer. **Level II AA Students will:** **EE6.NS.2.** Solve repeated addition problems where the addends are the same (i.e., 5 + 5 + 5 = 15 is equal to three groups of five) using concrete manipulatives and/or a calculator. Ex. Given a story problem, find the sum of a repeated addition problem using objects or their representations (e.g., If I have two rows of desks and three desks in each row how many desks will I have? If I babysat for three days and earned four dollars each day how much money would I make? [Given play money as a manipulative]). Ex. Given a picture of three groups of three pencils, represent and solve the repeated addition problem. Ex. Before starting an art project, gather two pieces each of five different colored papers and describe how many total pieces of paper are required.

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		Level I AA Students will: **EE6.NS.2.** Identify a group of a given quantity. Ex. Given a group of objects with no greater than three items, identify how many are in the group that matches the teacher's handheld numeric symbol (e.g., group of two, group of one, group of three - match to the numbers two, one, and three). Ex. Subitize sets of four (e.g., using a die). Ex. Given a set number of sounds, no greater than three, identify the quantity of sounds heard (e.g., indicating three dots or the number three). Do this twice and identify if the number of sounds are the same or different as the first round. Ex. When shown a repeating pattern of three objects, three objects, three objects, tell the teacher how many objects are in the repeated pattern.
6.NS.4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as*	**EE6.NS.4.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
4 (9 + 2). Apply and extend previous understandings of numbers to the system of rational numbers.		
Apply and extend previous understandings of numbers to the system of rational numbers. **6.NS.5.** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	**EE6.NS.5-8.** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero).	**Level IV AA Students will:** **EE6.NS.5-8.** Apply positive and negative numbers to a real-world context from greater than positive 10 and less than negative 10. Ex. Given three negative and positive temperatures on three thermometers, order the temperatures from least to greatest (e.g.,-15, 0, 15). Ex. When given a thermometer reading -5 degrees, tell how much the temperature will have to rise to get to 15 degrees? Ex. Given three bank statements, order the statement balances from least to greatest. **Level III AA Students will:** **EE6.NS.5-8.** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero). Ex. Given a number line and asked to show the number that is opposite of 5, select -5. Ex. Given two temperatures on two thermometers, one positive and one negative, determine which temperature is the coldest. Ex. Look at the records (wins/losses) of three baseball teams (positive numbers to indicate number of wins and negative numbers to indicate number of losses) and then rank the teams in order from the greatest number of wins/least amount of losses. Ex. Look at a bank statement/checkbook register and tell if there is a

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6.NS.6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. ▪ Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite. ▪ Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by		positive or negative balance (do you have any money or do you owe the bank money?). **Level II AA Students will:** **EE6.NS.5-8.** Order positive numbers from least to greatest. Ex. Given three temperatures above zero, put them in order from coldest to hottest. Ex. Sequence positive numbers correctly on a number line (e.g., temperatures). Ex. Look at three checkbook registers with positive balances and order the balances from least to greatest. Ex. Given temperatures from three seasons put them in order from coldest to hottest. **Level I AA Students will:** **EE6.NS.5-8.** Identify which is greater than and less than using fewer than 10. Ex. Given two sets of manipulatives, identify which has the greater amount or which has the lesser amount. Ex. In a science experiment growing plants, determine how many plants have lived and how many have died to determine if more lived or died. Ex. Joe has three marbles, Frank has six. Who has more? Ex. Farmer John has five cows and nine pigs. Are there more cows or pigs? Ex. Given a representation of a thermometer, indicate which direction implies a greater temperature. Ex. On a number line, which number is closer to zero: three or five? Ex. Given two temperatures above zero, indicate which is greater.

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signs, the locations of the points are related by reflections across one or both axes. ▪ Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. **6.NS.7.** Understand ordering and absolute value of rational numbers. ▪ Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret -3 > -7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right.*		

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▪ Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write -3^o C > -7^o C to express the fact that -3^{o}C is warmer than -7^{o}C.* ▪ Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of -30 dollars, write |-30| = 30 to describe the size of the debt in dollars.* ▪ Distinguish comparisons of absolute value from statements about order. *For example,*		

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recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars. **6.NS.8.** Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.		

Sixth Grade Mathematics Standards: Expressions and Equations

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Apply and extend previous understandings of arithmetic to algebraic expressions. **6.EE.1.** Write and evaluate numerical expressions involving whole-number exponents. **6.EE.2.** Write, read, and evaluate expressions in which letters stand for numbers. ▪ Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.* ▪ Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one	**EE6.EE.1-2.** Identify equivalent number sentences.	**Level IV AA Students will:** **EE6.EE.1.** Generate a two-step math sentence using appropriate numbers and symbols. Ex. Given a two-step word problem, identify the numerical equivalent (e.g., "John has two apples, Mary has three. John ate one apple. How many apples are left?" Student produces the math sentence (2 + 3 – 1 =) or (2 – 1 + 3 =). Ex. Given a two-step word problem, identify the numerical equivalent (e.g. "Trudy has three cakes. She was given one more. Frank has two cakes. Show who has the greater number of cakes." (3 + 1 > 2), (3 + 1 = 4, 4 > 2). **Level III AA Students will:** **EE6.EE.1.** Identify equivalent number sentences. Ex. Given a word problem, identify the numerical equivalent (e.g. "John has one pencil. He is given five more. How many pencils does he have?" Student identifies 1 + 5 = as an equivalent to the statement.). Ex. Given a word problem, identify the numerical equivalent (e.g. "Teacher places group of three pencils and a group of four pencils to the left of student. Teacher then places a second group of five pencils and two pencils to the right of the student and asks, "does this group of pencils have the same amount as the other group of pencils?" (3 + 4 = 5 + 2). Ex. Given a number problem, select from choices an equivalent problem (e.g., 1 + 3 has the same result as 2 + 2). **Level II AA Students will:** **EE6.EE.1.** Match number sentence with the correct picture representation. Ex. Given a picture showing single addition, identify correct number sentence.

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or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.* ▪ Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6\ s^2$ to find the volume and surface area of a cube with sides of*		Ex. Given a picture and a correct and incorrect number sentence, choose one that is correct. **Level I AA Students will:** **EE6.EE.1.** Identify math symbol "=" as meaning equal to. Ex. Indicate the symbol in a math sentence. Ex. Given picture representations of two equal groups of objects with an equal sign between, responds that they are the same.

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length s = 1/2.		
6.EE.3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* **6.EE.4.** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the*	**EE6.EE.3-4.** Demonstrate understanding of equivalent expressions.	**Level IV AA Students will:** **EE6.EE.3-4.** Solve equivalent expressions to illustrate that they are equivalent. Ex. Fill in the blank to make a true statement: 2 + 6 = 6 + ___. Ex. Fill in the blank to make a true statement: 3 + 5 = ___ + 3. Ex. Fill in the blank to make a true statement: 4 + ___ = 3 + 4. **Level III AA Students will:** **EE6.EE.3-4.** Demonstrate understanding of equivalent expressions. Ex. Indicate that 2 + 3 is the same as 3 + 2. Ex. Answer yes or no when asked, "Is 2 + 3 equal to 3 + 2?" Ex. Answer yes or no when asked, "Is 2 + 3 equal to 4 + 2?" **Level II AA Students will:** **EE6.EE.3-4.** Recognize different displays of the equal quantities. Ex. Given a model, create an expression using manipulatives (e.g., three blocks plus two blocks equals five blocks). Ex. Given a group of three objects, a group of four objects, and a group of seven objects, match to 3 + 4 = 7. **Level I AA Students will:** **EE6.EE.3-4.** Match different displays of the same quantity. Ex. Match pictures of quantities of objects to their numerical equivalent (e.g., four balls matches to the number 4).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
same number regardless of which number y stands for. Reason about and solve one-variable equations and inequalities.		
Reason about and solve one-variable equations and inequalities. **6.EE.5.** Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. **6.EE.6.** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown	**EE6.EE.5-7.** Match an equation to a real-world problem in which variables are used to represent numbers.	**Level IV AA Students will:** **EE6.EE.2.** Using a variable, generate an equivalent equation that represents a real-world problem. Ex. Arrange symbols and numbers to show this equation: Joe has three cups and Sue has some more cups. If they have eight cups together, how would we write this? Answer: 3 + X = 8. Ex. Show how to write this equation: two students have apples, one student has five apples, the other student has more apples, and there are 12 apples altogether. How would you write this? Answer 5 + X = 12. Ex. Together Pete and Joe have five candies. Pete has two. How many does Joe have? Show the problem with manipulatives using X to represent the unknown, how would you write the equation using X. Answer: 2 + X = 7. **Level III AA Students will:** **EE6.EE.2.** Match an equation to a real-world problem in which variables are used to represent numbers. Ex. Match an equation using X to represent how many Fred has: Fred and June have five apples. June has two. Show me this problem. Answer: 2 + X = 5. Ex. Tell that X means “how many” in 2 + =5 and insert X in the box. Ex. Match an equation to this word problem: I know Tommy has three tickets. How many more tickets will he need if he wants to take five

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
number, or, depending on the purpose at hand, any number in a specified set. **6.EE.7.** Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers. **6.EE.8.** Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x <$ c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.		friends to a movie? Answer: 3 + X = 5. **Level II AA Students will:** **EE6.EE.2.** Determine what is unknown in an equation. Ex. After hearing a story problem, indicate what is unknown (the teacher labels that as X). Ex. Tell that X means "how many" in 2 + =5 and insert X in the box. Ex. Indicate the X when asked, "What number do I not know in this equation? **Level I AA Students will:** **EE6.EE.2.** Identify the letter in a mathematical sentence. Ex. Point to or indicate the letter/fixed/variable. Ex. Indicate "X" in the equation when asked.
Represent and analyze quantitative relationships between dependent and	**EE6.EE.9.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
independent variables. **6.EE.9.**Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.		

Sixth Grade Mathematics Standards: Geometry

<table>
<tr><th>CCSS Grade-Level Clusters</th><th>Common Core Essential Elements</th><th>Instructional Achievement Level Descriptor</th></tr>
<tr>
<td>Solve real-world and mathematical problems involving area, surface area, and volume.

6.G.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real world and mathematical problems.

6.G.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge</td>
<td>EE6.G.1-2. Demonstrate area.</td>
<td>Level IV AA Students will:
EE6.G.1-2. Find area.
Ex. Determine how many tiles in a single layer are required to cover a rectangle.

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3 + 3 + 3 = 9 tiles

Ex. Determine how many cubes in a single layer are required to cover the bottom of a box and state the number required.

Level III AA Students will:
EE6.G.1-2. Demonstrate area.
Ex. Given two representations, identify which has area (e.g. line segment, angle, square).
Ex. Use squares of colored paper to cover their desk or tray on a wheelchair.
Ex. Tell which figure is larger inside.

Level II AA Students will:
EE6.G.1-2. Determine what is the larger area.</td>
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CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
lengths of the prism. Apply the formulas *V = l w h* and *V = b h* to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real world and mathematical problems.		**Level I AA Students will:** **EE6.G.1-2.** Indicate the inside of a space. Ex. Fill in the inside of a figure when the difference between the inside and outside is clear. Ex. Answer yes or no when asked, "Here is a basket. Here is a ball. Put the ball inside the basket. Is the ball inside or outside the basket?" Ex. Point around the room or spread arms when asked "Are we inside or outside our classroom?" Ex. Point to the inside of a box or frame when asked, "Where is the inside?"
6.G.3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.		
6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures.	**EE6.G.4.** Identify common three-dimensional shapes.	**Level IV AA Students will:** **EE6.G.4.** Relate real-world items as three-dimensional shapes to their two-dimensional representations. Ex. Match the picture of the soda can to the picture of the cylinder, etc. Ex. Identify in the environment items that are three-dimensional when presented with in the two-dimensional format.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Apply these techniques in the context of solving real-world and mathematical problems.		**Level III AA Students will:** **EE6.G.4.** Identify common three-dimensional shapes. Ex. When presented with a sphere and a cube, name the three-dimensional shape. Ex. Identify spheres and cubes in the classroom. **Level II AA Students will:** **EE6.G.4.** Sort three-dimensional shapes and two-dimensional shapes. Ex. When given a bag of three-dimensional shapes and their two-dimensional pictures, sort into the appropriate three-dimensional or two-dimensional shape. Ex. Label objects as three-dimensional and two-dimensional shapes in the classroom. **Level I AA Students will:** **EE6.G.4.** Match shapes. Ex. When given a picture of a shape, find like shapes in the classroom. Ex. Shape BINGO.

Sixth Grade Mathematics Standards: Statistics and Probability

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Develop understanding of statistical variability. **6.SP.1.** Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.* **6.SP.2.** Understand that a set of data collected to answer a statistical question has a distribution, which can be described by its center, spread, and overall shape.	**EE6.SP.1-2.** Display data on a graph or table that shows variability in the data.	**Level IV AA Students will:** **EE6.SP.1-2.** Collect, display, and describe data on a graph or table. Ex. Collect data for a classroom experiment and chart height of plants, temperature of soil, etc. Ex. Collect data from a class survey of height and create a table showing the variance in height (e.g., shortest person is 4'6", the tallest person is 5'4"). Ex. Collect weather data and graph to show variance (e.g., five sunny days, three cloudy, two rainy). Ex. Describe data laid out on a graph showing a distribution of responses. For example, students have different heights, but there are many with similar heights, while some are much taller or shorter. **Level III AA Students will:** **EE6.SP.1-2.** Display data on a graph or table that shows variability of data. Ex. Given weather data for the week, display it on a graph to show variance (e.g., five sunny days, three cloudy, two rainy). Ex. Given data about the ages of students in the class (e.g., 12, 13, and 14), display data in a table showing the variance in age (e.g., fewest are 12 years old, most are 13 years old). **Level II AA Students will:** **EE6.SP.1-2.** Organize data. Ex. Survey students in the classroom concerning favorites among three choices and represent responses (e.g., how many pick each of three stories or each of three subjects). Ex. Given data, sort to determine how many (e.g., how many students have certain number of siblings).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level I AA Students will: **EE6.SP.1-2.** Sort information into categories of same and different. Ex. After charting the weather for a week, identify if today's weather was the same or different than yesterday. Ex. Given a graphic organizer with three categories of colors identified, sort seven discs of three different colors into the categories and place them in the appropriate place on the graphic organizer.
6.SP.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	**EE6.SP.3.** N/A	
Summarize and describe distributions. **6.SP.4.** Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	**EE6.SP.4.** N/A (See EE6.SP.1-2)	
6.SP.5. Summarize numerical data sets in relation to their context, such as by: ▪ Reporting the number of observations.	**EE6.SP.5.** Summarize data distributions on a graph or table.	**Level IV AA Students will:** **EE6.SP.5.** Summarize the data on a graph or table. Ex. When looking at a table of what students like to eat for lunch, summarize the data in multiple ways (i.e., chicken nuggets has the most, pizza has the least). Ex. When looking at a graph of temperatures from the week, summarize

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▪ Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. ▪ Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. ▪ Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.		the data in multiple ways (i.e., three days were above 70 degrees, six days were between 60-70 degrees, and two days were 50-60 degrees). **Level III AA Students will:** **EE6.SP.5.** Summarize data distributions on a graph or table. Ex. When looking at a graph of temperatures from the week, summarize the data in one way (i.e., three days were above 70 degrees). Ex. When looking at a table of what students like to eat for lunch, summarize the data in one way (e.g., chicken nuggets has the most; pizza has the least). **Level II AA Students will:** **EE6.SP.5.** Use a graph to determine which category has the most. Ex. Looking at a bar graph on the students' favorite subject in school, identify which is the most preferred subject. Ex. Looking at a pictograph of the students' favorite sports teams, identify which is the most preferred team. **Level I AA Students will:** **EE6.SP.5.** Identify which has more or less. Ex. Given two items on a bar graph, identify which has more or less. Ex. Given two towers of interlocking cubes, identify which has more or less.

COMMON CORE ESSENTIAL ELEMENTS AND ACHIEVEMENT DESCRIPTORS FOR SEVENTH GRADE

Seventh Grade Mathematics Standards: Ratios and Proportional Relationships

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Analyze proportional relationships and use them to solve real-world and mathematical problems. **7.RP.1.** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction $^{1/2}/_{1/4}$ miles per hour, equivalently 2 miles per hour.* **7.RP.2.** Recognize and represent proportional relationships between quantities. ▪ Decide whether two quantities are in a proportional	**EE7.RP.1-3.** Use a ratio to model or describe a relationship.	**Level IV AA Students will:** **EE7.RP.1-3.** Complete the ratio using numbers to show relationships. Ex. Given one component of a ratio in standard form (1:_) complete the ratio. Ex. Given a family picture, what is the ratio of people wearing hats compared to the total number of people in the picture? Ex. Describe the relationship between miles driven and the time taken by creating a ratio (e.g., Katie knows she can drive one mile in two minutes is 1:2.) **Level III AA Students will:** **EE7.RP.1-3.** Use a ratio to model or describe a relationship. Ex. Given a bag of green and red chips, identify the ratio of green chips compared to red chips. Ex. Use a pictorial representation to show part-whole relationship (e.g., What part of the picture is shaded? Three parts are shaded and one part is not.). **Level II AA Students will:** **EE7.RP.1-3.** Demonstrate a simple ratio relationship. Ex. Using a dry ease board demonstrate a ratio relationship of squares to circles. Ex. When playing a board game, move one space for every dot on the die. Ex. Complete a pattern given a simple ratio.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. ▪ Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. ▪ Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.* ▪ Explain what a point (*x*, *y*) on the graph of a		**Level I AA Students will:** **EE7.RP.1-3.** Identify one item as it relates to another. Ex. When given two baskets with markers, count the number in each basket and compare. Ex. Given two cards with attendance cards, compare the number here and absent. Ex. Given a half an apple and a whole apple, identify "the whole" apple.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*) where r is the unit rate. **7.RP.3.** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.		

Seventh Grade Mathematics Standards: The Number System

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. **7.NS.1.** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. ▪ Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.* ▪ Understand $p + q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on	**EE7.NS.1.** Add fractions with like denominators (halves, thirds, fourths, and tenths) so the solution is less than or equal to one.	**Level IV AA Students will:** **EE7.NS.1.** Same as Level III AA Students. **Level III AA Students will:** **EE7.NS.1.** Add fractions with like denominators (halves, thirds fourths, and tenths) so the solution is less than or equal to one. Ex. Use fraction bars or fraction circles to add so that answer is less than or equal to one. Match a numerical representation to the model. Ex. Given tenths, construct the whole and recognize that 10 tenths are needed to make a whole. (Connect to money -- 10 dimes = one whole dollar). **Level II AA Students will:** **EE7.NS.1.** Use models to add halves, thirds, and fourths. Ex. Given thirds, construct the whole and add the number of thirds needed to make a whole. Ex. Given fourths, construct the whole and add the number of fourths needed to make a whole. Ex. Given a recipe that calls for a 1/4 cup of sugar, shade a picture of a measuring cup marked into fourths to show how much sugar is needed to double the recipe (1/4 + 1/4 = 2/4 or 1/2). Ex. Demonstrate that a whole can be divided into equal parts, and when reassembled, recreates the whole using a model. **Level I AA Students will:** **EE7.NS.1.** Use models to identify the whole and find the missing pieces of a whole. Ex. Given three choices, identify which is more, a whole or a half.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. ▪ Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.		Ex. Presented with a whole object and the same object with a piece missing, identify the whole. Ex. Given 1/2 a pizza, identify the missing part (concrete model or touch board). Ex. Shown papers cut in halves, thirds, etc., choose the object cut in halves. Ex. Given boxes with one-third shaded, one-half shaded, and the whole shaded, choose the one with the whole shaded.
Apply properties of operations as strategies to add and subtract rational numbers. **7.NS.2.** Apply and extend previous understandings of	**EE7.NS.2.a.** Solve multiplication problems with products to 100.	**Level IV AA Students will:** **EE7.NS.2.a.** Solve multiplication problems with products to 144. Ex. Given a multiplication problem, solve independently using a variety of methods. Ex. Given the product and three possible multiplication problems, identify the correct multiplication problem for the answer.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
multiplication and division and of fractions to multiply and divide rational numbers. ▪ Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.		**Level III AA Students will:** **EE7.NS.2.a.** Solve multiplication problems with products to 100. Ex. Given the model of a multiplication problem, identify the multiplication problem and the corresponding answer. Ex. Given a multiplication problem (4 x 3) and three answer choices, use a calculator to solve the problem and choose the correct answer. Ex. Given an array of models, show which array depicts a problem (e.g., 5 x 7 = 35). Ex. Solve word problems using multiplication (e.g., I want bring 10 people to my party and I have two party hats for each person. How many party hats do I have?). **Level II AA Students will:** **EE7.NS.2.a.** Solve multiplication problems using factors 1 – 10. Ex. Use repeated addition to solve multiplication problems. Ex. Using a multiplication chart, identify the answer to multiplication problems. Ex. Create arrays to model multiplication facts. Ex. Use 100s board or touch board to model skip counting (i.e., 2, 4, 6, 8 . . .). Ex. Group items to model multiplication (e.g., 3 x 5 could be modeled by three groups with five in each group). **Level I AA Students will:** **EE7.NS.2.a.** Skip count by twos and tens. Ex. Model repeated addition. Ex. Use a 100s board or touch board to skip count (i.e., 2, 4, 6, 8, . . .). Ex. Given bundles of pipe cleaners (10 in each bundle), skip count to find the total.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
▪ Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.	**EE7.NS.2.b.** Solve division problems with divisors up to five and also with a divisor of 10 without remainders.	**Level IV AA Students will:** **EE7.NS.2.b.** Solve division problems with divisors up to 10 using numbers. Ex. Given a real-world problem, find the solution using division (e.g., "If I have the area of a hall that is 50 feet and one side has a length of 5 feet, how long is the other side?). Ex. Given a problem involving money, find the solution using division (e.g., "If a friend and I find 20 dollars, how will we split it up so that we each get the same amount?"). Ex. If I have a large bowl with eight cups of beans, how many two-cup servings can I get out of that bowl? Ex. Given a computer program with division problems, find the quotient. Ex. When planting seeds for a science experiment, divide the seeds into 10 equal shares and represent the problem in numerals. **Level III AA Students will:** **EE7.NS.2.b.** Solve division problems with divisors up to five and also with a divisor of 10 without remainders. Ex. Use money to solve division problems (e.g., If a friend and I find 10 dollars, how will we split it up so that we each get the same amount? Divide the paper money to find the answer.). Ex. Given 10 manipulatives, divide into two equal groups of five. Show that 10 / 2 = 5. Ex. Divide the classroom into four equal groups for a sports tournament. Ex. Use the number line to show how many times you can subtract five out of 15. Ex. If you give each person two cups of soup and you have 10 cups of soup, how many people could come to your soup party?

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EE7.NS.2.b.** Determine how many times a number can be subtracted from an equally divisible number. Ex. Given a number divisible by five or 10, subtract out five or 10, show the number of times this number can be subtracted (e.g., "Show me how many sets of five pipe cleaners you can divide 20 pipe cleaners into"). Ex. Given a number line, demonstrate how many times a number can be subtracted from an equally divisible number (e.g., "Show me how many times can you subtract five from 25 using the number line"). Ex. Given pictures of pairs of shoes, subtract pairs to determine how many people (e.g., "If there are 10 shoes in the room, how many people are there?"). **Level I AA Students will:** **EE7.NS.2.b.** Associate value with the number one by recognizing the group/set that has more than one. Ex. Given a stack of library books and a single book, identify which set has more than one. Ex. Compose a set with more than one manipulative.
▪ Apply properties of operations as strategies to multiply and divide rational numbers. ▪ Convert a rational number to a decimal using long division; know that the decimal form of a rational	**EE7.NS.2.c-d.** Compare fractions to fractions and decimals to decimals using rational numbers less than one.	**Level IV AA Students will:** **EE8.NS.2.c-d.** Compare and order fractions and decimals when all numbers are fractions or when all numbers are decimals or when fractions and decimals are mixed. Ex. Divide a whole pizza into different fractions (1/4 and 1/2). Ex. Order fractions or decimals from least to greatest (1/4, 1/2, and 3/4) on a number line. Ex. Sort fractions and decimals and match monetary amounts (1/4 of a dollar = 25¢, 1/2 of a dollar = $0.50).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
number terminates in 0s or eventually repeats.		**Level III AA Students will:** **EE8.NS.2.c-d.** Compare fractions to fractions and decimals to decimals using rationale numbers less than one. Ex. Compare two fractions and locate them on a number line. Ex. Use pictorial representations to compare fractions to fractions and decimals to decimals. Ex. Point to the measuring cup that shows 1/2. Ex. Given a quarter and a dime, show which has a smaller value. Ex. Given two clocks, one on the hour and one on the half hour, choose which shows a half hour. **Level II AA Students will:** **EE8.NS.2.c-d.** Identify the location of a fraction or decimal used in the real world and/or on a number line. Ex. Label the location of a fraction or decimal on a number line. Ex. Given a number 2 1/2, point to the number on a number line. Ex. Locate a decimal used in the real world on a number line to tell which is more (e.g., “If an item cost \$0.58 and another item cost \$0.59 cents, find both amounts on the number line and tell which costs more.”). Ex. Locate a fraction used in the real world on a number line to tell which is more (e.g., If I have 3/4 of a pie and you have 1/2 of a pie using the number line, show who has more pie. Find the location of the number 0.5 on a number line.). **Level I AA Students will:** **EE8.NS.2.c-d.** Identify decimals or fractions. Ex. Given a whole number and a decimal, choose the decimal. Ex. Given a ball, a block, and a decimal, point to the decimal. Ex. Select 1/2 of an object when asked to show 1/2 (i.e., 1/2 of an apple).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.[18]	**EE7.NS.3.** Demonstrate the value of various money amounts using decimals.	**Level IV AA Students will:** **EE7.NS.3.** Determine the total value of money written as a decimal given real-world situations. Ex. Use a calculator to determine how much money they have total in decimal form. Ex. Count money using decimals/calculator to "shop" for items and determine how much money to pay the cashier when given the total of the purchase. **Level III AA Students will:** **EE7.NS.3.** Demonstrate the value of various money amounts using decimals. Ex. Given a variety of coins and bills, write the value of the given money using a decimal. Ex. Given a variety of coins, bills, and cards with amounts written with decimals, match the cards to the value of the coins. Ex. Use a calculator to show the value of coins in decimals (e.g., quarters ($0.25), dimes ($0.10) nickels ($0.05), and pennies ($0.01). **Level II AA Students will:** **EE7.NS.3.** Identify the decimal value of various coins. Ex. Given pictures of coins, identify the value of each coin in cents. Ex. Given cards with different coin amounts written in decimals ($0.05, $0.10, $0.20, etc.), match the amount with the correct coin. Ex. Given more than one of the same coin, identify the total value of the

[18] Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		given coins. **Level I AA Students will:** **EE7.NS.3.** Identify money. Ex. Given a group of coins representing different values, sort coins by like amounts. Ex. Given a picture of a coin, match real coins to the picture. Ex. Differentiate between dollar money and change (coins). Ex. Choose money versus non-money (e.g., colored chips, etc.) to pay for purchases.

Seventh Grade Mathematics Standards: Expressions and Equations

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Use properties of operations to generate equivalent expressions. **7.EE.1.** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. **7.EE.2.** Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*	**EE7.EE.1-2.** Use the relationship within addition and/or multiplication to illustrate that two expressions are equivalent.	**Level IV AA Students will:** **EE7.EE.1-2.** Apply the commutative property to complete an equation. Ex. Given 12 objects and an equation with three groups on one side of the equals sign and two groups on other side, create a balanced equation by recognizing that the side with three groups will have two objects in each group, and the side with two groups will have three objects in each group. Ex. 5 x 7 = ____ x _____ (<u>7 x 5</u>) Ex. ____ + ____ = 4 + 8 (<u>8 + 4</u>) **Level III AA Students will:** **EE7.EE.1-2.** Use the relationship within addition and/or multiplication to illustrate that two expressions are equivalent. Ex. 4 + 7 = 7 + ____ Ex. 2 x 4 = ____ x 2 Ex. 3 + ____ = 5 + 3 **Level II AA Students will:** **EE7.EE.1-2.** Use the relationship within addition to illustrate that two expressions are equivalent. Ex. Given a model showing five objects plus two objects on one side of an equals sign and two objects on the other side, recognize that five objects are needed to get the same amount. Ex. Is 2 + 3 = to 3 + 2? Answer yes/no. Ex. Is 2 + 3 = to 4 + 2? Answer yes/no. **Level I AA Students will:** **EE7.EE.1-2.** Understand that different displays of the same quantity are equal.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Recognize that three discs and three squares are the same quantity. Ex. Recognize that different arrangements of the same amount are equal (e.g., different arrangements of 4 dots – connection to subitizing).
Solve real-life and mathematical problems using numerical and algebraic expressions and equations. **7.EE.3.** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an*	**EE7.EE.3-4.** Use the concept of equality with models to solve one-step addition and subtraction equations.	**Level IV AA Students will:** **EE7.EE.3-4.** Solve two-step addition and subtraction equations. Ex. After determining that 5 + 5 = 10, decompose 10 into three and seven. Ex. After determining that 9 - 6 = 3, determine that three is composed of 3 + 1). **Level III AA Students will:** **EE7.EE.3-4.** Use the concept of equality with models to solve one-step addition and subtraction equations. Ex. If there is a quantity of five on one side of the equation and a quantity of two on the other side, what quantity is added to make it equal? Ex. If I have three balls and I get some more balls – how many did I get if I now have seven? Ex. Given 4 + ___ = 12, identify the missing amount using models. Ex. Given 12 - ___ = 5, identify the missing amount using models. Ex. Given 10 = 2 + ____, identify the missing amount using models. **Level II AA Students will:** **EE7.EE.3-4.** Identify the amount needed to equal the value on the given side of an equation. Ex. Three objects + two objects will equal five objects. Ex. Given a number from 2 to 10, decompose the number to create a balanced equation (connection to decomposition of numbers).

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additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation. **7.EE.4.** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. ▪ Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently.		**Level I AA Students will:** **EE7.EE.3-4.** Recognize equal quantities on both sides of an equation. Ex. Match equal quantities: three triangles is the same quantity as three circles. Ex. Give the digit 5, count out five objects as an equal quantity.

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Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* ▪ Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you*		

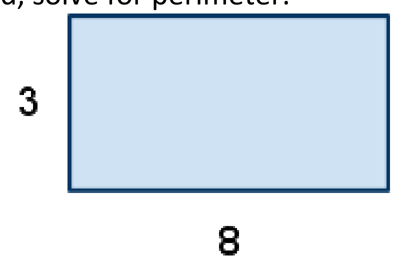
CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
need to make, and describe the solutions.		

Seventh Grade Mathematics Standards: Geometry

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Draw construct, and describe geometrical figures and describe the relationships between them. **7.G.1.** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. **7.G.2.** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	**EE7.G.1-2.** Draw or classify and recognize basic two-dimensional geometric shapes without a model (circle, triangle, rectangle/square).	**Level IV AA Students will:** **EE7.G.1-2.** Draw or model two-dimensional shapes including a trapezoid and rhombus without a model. Ex. Draw/create a trapezoid. Ex. Draw/create a rhombus. Ex. Replicate a geometric shape with given dimensions. Ex. Draw a shape that is twice as big in one dimension (length or width) as a given shape (e.g., given a coordinate grid, have the student draw a rectangle that is twice as long and twice as high as the one he/she is given). **Level III AA Students will:** **EE7.G.1-3.** Draw or classify and recognize basic two-dimensional geometric shapes without a model (circle, triangle, rectangle/square). Ex. Recognize and group together different types of rectangles and circles Ex. State the name of circle, triangle, rectangle, and square. Ex. Draw a rectangle and circle. **Level II AA Students will:** **EE7.G.1-2.** Demonstrate the ability to complete a two-dimensional shape (circle, triangle, rectangle, square). Ex. Compare shapes when given manipulatives/pictures and asked to tell what shapes are the same and what shapes are is different. Ex. Given an arc, complete the drawing of a circle. Ex. Given concrete pieces, complete a specified shape (i.e., four equal length popsicle sticks to create a square).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level I AA Students will: **EE7.G.1-2.** Demonstrate the ability to recognize a two-dimensional shape (circle, triangle, rectangle, square) when given a complete shape. Ex. Recognize a shape. Ex. When given a shape, find another shape like the one just given. Ex. Compare shapes when given manipulatives – to say two shapes are the same (congruent) after matching the sides on each. Ex. Use various media for students to form a simple geometric shape (i.e. sand, shaving cream) Ex. Given a sample shape, trace the shape (touch board, raised paper, wiki sticks, etc.)
7.G.3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	**EE7.G.3.** Match a two-dimensional shape with a three-dimensional shape that shares an attribute.	**Level IV AA Students will:** **EE7.G.3.** Pair two- and three-dimensional shapes to complete a real-world task. Ex. Given a three-dimensional shape and several different two-dimensional shapes (e.g., cube, cylinders), select the two-dimensional shape that represents one face of the three-dimensional shape (e.g., square, circle). Ex. Given a diagram to show the placement of different shaped objects in a storeroom, use the two-dimensional shape in the diagram to place three-dimensional objects appropriately on the shelf (e.g., square boxes on squares, rectangular boxes on rectangles, and bottles on circles). **Level III AA Students will:** **EE7.G.3.** Match a two-dimensional shape with a three- dimensional shape that shares an attribute. Ex. Given a circle, find objects that are three-dimensional counterparts (e.g., ball, globe, sphere).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Given a square, find objects that are three-dimensional counterparts (e.g., box, locker). Ex. Given a square, find three-dimensional objects that share one attribute (e.g., square with cube, circle with cylinder). **Level II AA Students will:** **EE7.G.3.** Identify the attributes of a three-dimensional shape (color, number of sides, faces, size, textures, shape, etc.). Ex. Given a red ball and communication device, identify words that describe the attributes of the ball. Ex. Given a group of shapes, describe common attributes. Ex. Given a class of objects, identify common attributes and choose one to sort by. **Level I AA Students will:** **EE7.G.3.** Replicate the two-dimensional cross-section of a three-dimensional shape (cube, sphere, cylinder) when given a complete shape. Ex. Given a cube, outline the base to form a square. Ex. Given a soda can, outline the base to form a circle.
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. **7.G.4.** Know the formulas for the area and circumference of a circle	**EE7.G.4.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.		
7.G.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	**EE7.G.5.** Find the perimeter of a rectangle given the length and width.	**Level IV AA Students will:** **EE7.G.5.** Solve simple perimeter problems with rectangles. Ex. Given a rectangle with identified dimensions, determine the perimeter. Ex. A bulletin board is 5’ by 5’. How much border paper is needed for the perimeter? Ex. When given a picture of a garden with only the length and width identified, solve for perimeter.  3 + 8 + 3 + 8 = 22 yards **Level III AA Students will:** **EE7.G.5.** Find the perimeter of a rectangle given the length and width. Ex. Determine the perimeter of a rectangle given a visual model and a calculator. Ex. Given a rectangle with tic marks indicating a length of six and a width of four, determine the perimeter by counting (6 + 4 + 6 + 4). Ex. Shown a taped rectangle on the floor with tic marks or floor tiles

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		denoting squares within the rectangle, walk around the rectangle, counting steps/tiles/tic marks, to determine the perimeter. Ex. Measure the length and width of a desk and other rectangular objects in the classroom (i.e., books, picture frames). **Level II AA Students will:** **EE7.G.5.** Identify the length and width of a rectangle. Ex. Cover a rectangle with squares (i.e., color tiles) and identify the sum of numbers of tiles of the top/bottom and the sides. Ex. Given a circle, measure the distance around the circle (circumference – perimeter of a circle). Ex. Place a string around the perimeter of an object and then measure the length of the string to tell the distance around the object. Ex. Given a gridded rectangle, identify the length of the top/bottom and the sides. **Level I AA Students will:** **EE7.G.5.** Outline the perimeter of an object. Ex. Use wiki sticks to outline the border of a square/rectangle. Ex. Outline the perimeter of a rectangular pan by tracing the edge with a finger. Ex. Outline the perimeter of a tablet by laying string around the edge.

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<tr><th>CCSS Grade-Level Clusters</th><th>Common Core Essential Elements</th><th>Instructional Achievement Level Descriptor</th></tr>
<tr><td></td><td></td><td>Ex. Count the number of squares around the outside of a gridded rectangle.
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<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>12</td><td></td><td></td><td></td><td>6</td></tr>
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</table></td></tr>
<tr><td>7.G.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</td><td>EE7.G.6. Find the area of a rectangle given the length and width using a model.</td><td>Level IV AA Students will:
EE7.G.6. Solve simple area problems with rectangles.
Ex. A rectangular rug is 4’ by 5’. What is the area of the rug? Use a calculator to apply to the given model problem and find the answer.
Ex. Given a rectangle with identified length and width dimensions, determine the area.

Level III AA Students will:
EE7.G.6. Find the area of a rectangle given the length and width using a model.
Ex. Given rectangles (including squares) with grids, count squares to calculate the area.
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Ex. Partition rectangular figures into rows and columns of the same-size squares without gaps and overlaps and count them to find the area.
Ex. Given a picture of a rectangle, have students divide the interior of the figure into equally squared units and determine the number of squared</td></tr>
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CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		units within the rectangle. **Level II AA Students will:** **EE7.G.6.** Identify the length and width (dimensions) of a rectangle. Ex. Cover a given rectangle with squares (i.e., color tiles) and identify the numerical value of the total number of square units. Ex. Given a gridded rectangular box place smaller boxes side-by-side (in one layer) to count how many small boxes the large box holds and identify the numerical value (sum) of the grids inside the rectangle. **Level I AA Students will:** **EE7.G.6.** Duplicate the area of a rectangle (square). Ex. Cover a square pan with pieces of toast, square crackers, etc. in a single layer. Ex. Use squares of colored paper to cover their desk or tray on a wheelchair.

Seventh Grade Mathematics Standards: Statistics and Probability

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Use random sampling to draw inferences about a population. **7.SP.1.** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. **7.SP.2.** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the	**EE7.SP.1-2.** Answer a question related to the collected data from an experiment, given a model of data, or from data collected by the student.	**Level IV AA Students will:** **EE7.SP.1-2.** Answer a question about data collected from an experiment and explain or demonstrate the results. Ex. Poll classmates to determine where to go on a field trip and explain results. Ex. Given data on height of students in two classes, identify which class has the tallest students. **Level III AA Students will:** **EE7.SP.1-2.** Answer a question related to the collected data from an experiment, given a model of data, or from data collected by the student. Ex. Given data (i.e., a frequency table) of favorite pizza toppings, which type of pizza would be ordered most often. Ex. Asked what their favorite season is, place themselves in one of the four groups and answer a question about the results. (What is the group's favorite season? What is the group's least favorite season?) **Level II AA Students will:** **EE7.SP.1-2.** Collect data to answer a given question. Ex. Ask fellow classmates what their favorite activity subject is and keep tally marks of the responses. Ex. Use a grid to record the number of tennis shoes in the classroom. **Level I AA Students will:** **EE7.SP.1-2.** Answer a question for data collection. Ex. Answer a question about what they ate for breakfast. Ex. Answer a question about their favorite candy bar.

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same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*		
Draw informal comparative inferences about two populations. **7.SP.3.** Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the*	**EE7.SP.3.** Compare two sets of data within a single data display such as a picture graph, line plot, or bar graph.	**Level IV AA Students will:** **EE7.SP.3.** Compare data from two picture graphs, two line plots, or two bar graphs. Ex. Given two bar graphs showing the number of pets students from two different classrooms have, determine which classroom of students has the most pets. Ex. Given two bar graphs, showing the number of boys and the number of girls from two different classrooms, determine which classroom has the least number of girls (or the least number of boys, or the greatest number of boys, or the greatest number of girls). **Level III AA Students will:** **EE7.SP.3.** Compare two sets of data within a single data display such as a picture graph, line plot, or bar graph. Ex. Compare the change in the number of days of sunlight in summer and

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basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable. **7.SP.4.** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*		winter on a line plot on a given graph. Ex. Given a bar graph, compare the number of red M&Ms to blue M&Ms. **Level II AA Students will:** **EE7.SP.3.** Summarize data on a graph or table in one way. Ex. When looking at a graph of temperatures from the week, summarize the data in one way (i.e., three days were above 70 degrees). Ex. When looking at a table that contains data about what students like to eat or what students like to do, summarize the data in one way (i.e., "watch movies" has the most). **Level I AA Students will:** **EE7.SP.3.** Read data from one given source. Ex. Using a pictograph, identify the number of students who have a dog, are present, eat breakfast, etc. Ex. Using a bar graph, identify which is more or which is less.

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Investigate chance processes and develop, use, and evaluate probability models. **7.SP.5.** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. **7.SP.6.** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the	**EE7.SP.5-7.** Describe the probability of events occurring as possible or impossible.	**Level IV AA Students will:** **EE7.SP.5-7.** Differentiate and describe examples of a situation that is possible, a situation that is likely, and a situation that is impossible. Ex. State a situation that is impossible. Ex. State a situation that is possible. **Level III AA Students will:** **EE7.SP.5-7.** Describe the probability of events occurring as possible or impossible. Ex. Answer, "Is it possible that a squirrel attends school with you?" Ex. Answer, "Is it possible that a cow will ever drive a car?" Ex. Answer, "If you only own only three shirts - a red one, a blue one, and a black one - is it possible to pull a white one from your drawer?" **Level II AA Students will:** **EE7.SP.5-7.** Identify possible events that could occur in the natural environment. Ex. Given the lunch menu of pizza and hamburgers, identify whether it is possible to get a hamburger for lunch. Ex. Given a weekly chart of classroom jobs (different jobs every day of the week), answer "What job is possible for Monday?" **Level I AA Students will:** **EE7.SP.5-7.** Identify outcomes based on a possible event. Ex. Given a picture of a person wearing a heavy coat, scarf, and hat, identify if the clothing is appropriate for a picture of some weather condition. Ex. "We are going on a field trip in town. In which of the following would it be possible to transport the entire class (show pictures of a rocket, bicycle,

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probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.* **7.SP.7.** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. ▪ Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected*		and a bus)?”

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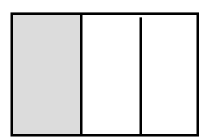
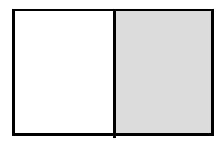
and the probability that a girl will be selected. ▪ Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*		

COMMON CORE ESSENTIAL ELEMENTS AND ACHIEVEMENT DESCRIPTORS FOR EIGHTH GRADE

Eighth Grade Mathematics Standards: The Number System

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Know that there are numbers that are not rational, and approximate them by rational numbers. **8.NS.1.** Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.	**EE8.NS.1.** Subtract fractions with like denominators (halves, thirds, fourths, and tenths) with minuends less than or equal to one.	**Level IV AA Students will:** **EE8.NS.1.** Subtract fractions with like denominators (halves, thirds, fourths, and tenths) with minuends that may be greater than one. Ex. Subtract two fractions with like denominators with models or numbers. Ex. If I have 1 3/4 and I take 1/4 away, how many wholes and fourths are left? **Level III AA Students will:** **EE8.NS.1.** Subtract fractions with like denominators (halves, thirds, fourths, and tenths) with minuends less than or equal to one. Ex. Use fraction bars or fraction circles to add and match a numerical representation to the model so the answer is less than or equal to one. Ex. Given 3/4, take 1/4 away and tell or show how many fourths are left. Ex. Given 7/10, recognize that 3/10 are needed to make a whole. (Connect to money – 10 dimes = one whole dollar) **Level II AA Students will:** **EE8.NS.1.** Use models to subtract halves, thirds, and fourths. Ex. Given a whole divided into thirds, tell me how many times they can take a third out of the whole. Ex. Presented a rectangle with 1/3 of the whole shaded, tell how many thirds are left. 

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level I AA Students will: **EE8.NS.1.** Use models to identify the whole and find the missing pieces of a whole using halves. Ex. Presented an object with a piece missing and a whole object, identify the whole. Ex. Given 1/2 of a pizza, identify the missing part (concrete model or touch board). Ex. Given a whole with 1/2 shaded, identify the missing part. 
8.NS.2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations*	**EE8.NS.2.** Represent different forms and values of decimal numbers using fractions with numerators that are multiples of five and a denominator of 100.	**Level IV AA Students will:** **EE8.NS.2.** Represent different forms and values of decimal numbers to the hundreds place (decimal, fraction, hundreds grid, and money representation). Ex. Given a hundreds grid, shade in an approximation to a given decimal or fraction. Ex. Given a picture of a shaded hundreds grid, determine the decimal or fractional part. Ex. When given coins representing 60 cents, write the decimal amount as \$0.60. **Level III AA Students will:** **EE8.NS.2.** Represent different forms and values of decimal numbers using fractions with numerators that are multiples of five and a denominator of 100. Ex. Given a hundreds grid with one fourth shaded-in, identify the correct decimal representation from choices 25/100, 10/100, or 100/100.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. When given coins representing 50 cents, write the decimal value as \$0.50. **Level II AA Students will:** **EE8.NS.2.** Distinguish between a part represented by a decimal and a whole number without decimals. Ex. Given a dollar and two quarters, identify which represents the whole (dollar) and the decimal part (two quarters). Ex. Given a fully shaded-in hundreds grid and a partially shaded-in hundreds grid, identify which represents the whole and which represents the decimal (part of a whole). **Level I AA Students will:** **EE8.NS.2.** Identify a part of a whole in concrete real-world objects. Ex. When shown an apple with a missing piece, identify the part that is missing. Ex. When given a student's schedule for the day with one activity missing, identify what activity is missing from their schedule. Ex. Show which piece is missing from a familiar object.

Eighth Grade Mathematics Standards: Expressions and Equations

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Expressions and Equations. Work with radicals and integer exponents. **8.EE.1.** Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$. **8.EE.2.** Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where *p* is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational. **8.EE.3.** Use numbers expressed in the form of a single digit times a whole-number power of 10 to	**EE8.EE.1-4.** Compose and decompose numbers to three digits.	**Level IV AA Students will:** **EE8.EE.1-4.** Use powers of 10 to compose and decompose numbers. Ex. Recognize $3 \times 10^2 = 300$ as another way to state 3 x 100 = 300. Ex. $5 \times 10^1 =$ ___. **Level III AA Students will:** **EE8.EE.1-4.** Compose and decompose numbers to three digits. Ex. 300 + 50 + 7 = _____. Ex. 57 = _____ + _____. Ex. Show that twelve is one 10 and two ones, or 12 ones, or seven ones and five ones, etc. **Level II AA Students will:** **EE8.EE.1-4.** Use models to represent the composition of numbers. Ex. Illustrate a number using models. Ex. Show that 12 is one 10 and two ones. Ex. Compose numbers to five. Ex. Compose numbers to 10. Ex. Model numbers using base ten blocks. Ex. Distinguish the value of the digits in 134 (e.g., 1 = 100, 3 = 30, and 4 = 1). Ex. Given two nickels, show the correct number to represent that value. **Level I AA Students will:** **EE8.EE.1-4.** Recognize the specific value a number represents. Ex. Recognize a number using pictorial representations. Ex. Match a numerical value with a pictorial representation or concrete objects.

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estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as 3 times 10^8 and the population of the world as 7 times 10^9, and determine that the world population is more than 20 times larger.* **8.EE.4.** Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation		Ex. Look at a model and determine the numeric value. Ex. Given a jig or a model with 10 spaces, put one object per space and assemble a group of 10. Ex. Given three bears, select the number three card.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
that has been generated by technology.		
Understand the connections between proportional relationships, lines, and linear equations. **8.EE.5.** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. **8.EE.6.** Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a	**EE8.EE.5-6.** Graph a simple ratio using the x and y axis points when given the ratio in standard form (2:1) and convert to 2/1.	**Level IV AA Students will:** **EE8.EE.5-6.** Graph a simple ratio using the x and y axis points when given the ratio in standard form (2:1) and expand on the ratio by two or more points. Ex. Given a ratio 2:1 (there are two balloons for every child), graph the linear equation on a graph labeled x axis and the y axis. This equation would have a slope of 2. Ex. Given there is one boy for every one girl, graph points for the ratio of 1:1 (this linear equation will have a slope of 1). Ex. Given two plotted data points, plot a third point using pictures. Ex. Given a ratio of 3:1 indicating that each student needs three items, convert the ratio to fraction form (2/1) and plot on a pre-labeled graph this point and two additional points that are functions of the original ratio (3:1, 6:2, 9:3). **Level III AA Students will:** **EE8.EE.5-6.** Graph a simple ratio using the x and y axis points when given the ratio in standard form (2:1) and convert to 2/1. Ex. Given two pieces of data, place on a graph. Ex. Given a ratio of 3:1 indicating that each student needs three items, guide student in converting ratio to fraction form (2/1) and plot on a pre-labeled graph. **Level II AA Students will:** **EE8.EE.5-6.** Identify a specific data point when given the coordinates. Ex. Read and plot coordinates on a map.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
line through the origin and the equation *y* = *mx* + *b* for a line intercepting the vertical axis at *b*.		Ex. Given three widespread data points and coordinates, identify named point. Ex. Given a standard multiplication chart, find the product of two numbers using coordinate skills. Ex. Indicate with coordinates what data points mean or the data revealed by the specify point. **Level I AA Students will:** **EE8.EE.5-6.** Place or locate data on a simple two-category graph. Ex. Use distance landmark to tell if something is close or far away. Ex. Finds objects after movement (searches a small area comprehensively). Ex. Locate objects on a map (with or without coordinates).
Analyze and solve linear equations and pairs of simultaneous linear equations. **8.EE.7.** Solve linear equations in one variable. ▪ Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given	**EE8.EE.7.** Solve algebraic expressions using simple addition and subtraction.	**Level IV AA Students will:** **8.EE.7.** Solve algebraic expressions using two-digit addition and subtraction. Ex. Solve 20 + x, when x =25. Ex. Solve 35 – x, when x = 12. **Level III AA Students will:** **EE8.EE.7.** Solve algebraic expressions using simple addition and subtraction. Ex. Mark had 10 dollars and needs 15. How many more dollars does he need? Ex. Given a set of basketballs, some in a bag and five outside of the bag, solve for find the total number of basketballs in the set when the bag contains two basketballs. Ex. Find the difference when given the total and the solution (e.g., A student has 10 chocolate chips and a bag of chocolate chips. Solve for the

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). ▪ Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.		amount the bag contains when the total is 25.) **Level II AA Students will:** **EE8.EE.7.** Solve simple addition and subtraction problems. Ex. Playing a game, roll two dice and add up the dots (dice with dots or dice with numerals). Ex. Using a pictorial representation of numbers, solve the addition and subtraction problems (i.e. three balloons minus one balloon). **Level I AA Students will:** **EE8.EE.7.** Distinguish between a letter and a number. Ex. When asked to write their home address, identify between the letters and numbers in the address. Ex. When a book is read to them, identify the page number. Ex. When looking in a telephone book identify the telephone number vs. the name.
8.EE.8. Analyze and solve pairs of simultaneous linear equations. ▪ Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations	**EE8.EE.8.** N/A (See EE.8.EE.5-6)	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
simultaneously. ▪ Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.* ▪ Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*		

Eighth Grade Mathematics Standards: Functions

<table>
<tr><th>CCSS Grade-Level Clusters</th><th>Common Core Essential Elements</th><th>Instructional Achievement Level Descriptor</th></tr>
<tr>
<td>Define, evaluate, and compare functions.

8.F.1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.[19]

8.F.2. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an</td>
<td>EE8.F.1-3. Given a function table, identify the missing number.</td>
<td>Level IV AA Students will:
EE8.F.1-3. Given a function table, identify the rule and express the rule for the missing variable (e.g., n times 2).
Ex. Given a function table, identify the rule to find the missing number.
<table>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>n</td></tr>
<tr><td>2</td><td>4</td><td>6</td><td>8</td><td>X</td></tr>
</table>
Ex. Given a function table, identify the rule to find the missing number.
<table>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>n</td></tr>
<tr><td>5</td><td>10</td><td>15</td><td>20</td><td>X</td></tr>
</table>
Level III AA Students will:
EE8.F.1-3. Given a function table, identify the missing number.
Ex.
<table>
<tr><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>2</td><td>4</td><td>X</td><td>8</td></tr>
</table>
Level II AA Students will:
EE8.F.1-3. Identify the relationship between two numbers.
Ex. Given choices, tell the relationship between two numbers (e.g., How much more is five than three? Five is two more than three.).
Ex. Identify the relationship between two given numbers (e.g., If you double four, you have eight).</td>
</tr>
</table>

[19] Function notation is not required in Grade 8.

<table>
<tr><th>CCSS Grade-Level Clusters</th><th>Common Core Essential Elements</th><th>Instructional Achievement Level Descriptor</th></tr>
<tr><td>algebraic expression, determine which function has the greater rate of change.

8.F.3. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.</td><td></td><td>Level I AA Students will:
EE8.F.1-3. Given a sequence, match the element of a sequence.
Ex. Given the sequence 1, 2, 1, 2 and a 1, match to number 1.
Ex. Given a sequence of triangle, circle, triangle, circle and a circle, match the circle.</td></tr>
<tr><td>Use functions to model relationships between quantities.

8.F.4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial</td><td>EE8.F.4. Determine the values or rule of a function using a graph or a table.</td><td>Level IV AA Students will:
EE8.F.4. Given the input values and a rule, complete the output.
Ex. Complete the table by adding three to each input value.
<table>
<tr><th>x</th><th>y</th></tr>
<tr><td>1</td><td></td></tr>
<tr><td>2</td><td></td></tr>
<tr><td>3</td><td></td></tr>
<tr><td>4</td><td></td></tr>
</table></td></tr>
</table>

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
value of the function from a description of a relationship or from two (*x*, *y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.		**Level III AA Students will:** **EE8.F.4.** Determine the values or rule of a function using a graph or a table. Ex. Given a table, determine rule applied. <table><tr><td>x</td><td></td><td>y</td></tr><tr><td>1</td><td>1 + __ =</td><td>4</td></tr><tr><td>2</td><td>2+ __ =</td><td>5</td></tr><tr><td>3</td><td>3 + __ =</td><td>6</td></tr></table> Ex. Given a table, determine increase or decrease. <table><tr><td>x</td><td>y</td></tr><tr><td>1</td><td>4</td></tr><tr><td>2</td><td>5</td></tr><tr><td>3</td><td>6</td></tr></table> **Level II AA Students will:** **EE8.F.4.** Navigate, read, use, or apply a graph or table. Ex. Given a set of coordinates, locate on a graph. Ex. Given a location, identify coordinates. Ex. Using a basic map of town, identify two streets over. **Level I AA Students will:** **EE8.F.4.** Identify the different parts of a graph or a table. Ex. Recognize more or less.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Recognize a graph. Ex. Recognize a table. Ex. Identify rows/columns.
8.F.5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	**EE8.F.5.** Describe how a graph represents a relationship between two quantities.	**Level IV AA Students will:** **EE8.F.5.** Describe how a graph represents a relationship between two quantities and use the graph to answer questions using that relationship. Ex. Given a chart showing the numbers of each colored disk in a bag, show how the graph relates color to number (e.g., Point to the axis that tells you the number and to the axis that tells you the color and point to the bar that shows the color with the highest number.). Ex. Given a line graph showing days of consecutive snowfall and inches of accumulated snow, show how the graph relates number of days to amount of accumulated snow (e.g., Say the name of the axis that shows inches of snow and the axis that show consecutive days of snowfall and then tell which point on the graph shows the most snow and most consecutive days of snowfall.). **Level III AA Students will:** **EE8.F.5.** Describe how a graph represents a relationship between two quantities. Ex. Given a chart showing the numbers of each colored disk in a bag, show how the graph relates color to number (e.g., Point to the axis that tells you the number and to the axis that tells you the color.). Ex. Given a line graph showing days of consecutive snowfall and inches of accumulated snow, show how the graph relates number of days to amount of accumulated snow (e.g., say the name of the axis that shows inches of snow and the axis that shows consecutive days of snowfall).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EE8.F.5.** Answer questions about data from a graph. Ex. Given a chart of colors in an M&M bag, answer a question about the information on the graph (e.g., Which is the most common color?). Ex. Given a bar graph representing numbers of colored disks found in a bag, answer a question about the information (e.g., A bag of colored discs contains 15 red, 12 blue, eight green, and five yellow. Which bar shows how many red discs are in the bag?). Ex. Given a picture graph showing a five-day forecast showing snow showers for all days, identify which point shows how much snow is expected to fall on the fifth day. **Level I AA Students will:** **EE8.F.5.** Place data in a graph. Ex. Place stickers of the same type (e.g., color, animal) on the same bar in a graph? Ex. Group data into categories and place on a graph (e.g., types of music, types of food).

Eighth Grade Mathematics Standards: Geometry

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Understand congruence and similarity using physical models, transparencies, or geometry software. **8.G.1.** Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines. **8.G.2.** Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and	**EE8.G.1-3.** Identify similarity and congruence (same) in objects and shapes containing angles without translations.	**Level IV AA Students will:** **EE8.G.1-3.** N/A **Level III AA Students will:** **EE8.G.1-3.** Identify similarity and congruence (same) in objects and shapes containing angles without translations. Ex. Match an angle in one shape with the same angle in another shape with manipulatives or pictures. Ex. Given different size shapes, find the two shapes that are similar and tell why. Ex. Given a picture of a shape, match that picture to the congruent object on the table. Ex. Using a picture of a door at a 45 or 90-degree angle adjust the classroom door to the same angle. **Level II AA Students will:** **EE8.G.1-3.** Match similar shapes. Ex. Match a square to a square. Ex. Match a large square with a large square. Ex. Given shapes, find the two shapes that are similar and tell why. **Level I AA Students will:** **EE8.G.1-3.** Match shapes using a three-dimensional object. Ex. Overlay the outline of a shape with a three-dimensional object using angles in the outline as guides (e.g., building with blocks). Ex. Tell, which socks match in color, shape, and size. Ex. If a sock is upside down and another sock is right side up, can you make them match?

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **8.G.3.** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.		
8.G.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	**EE8.G.4.** Identify similar shapes with and without rotation.	**Level IV AA Students will:** **EE8.G.4**. Determine if geometric shapes are similar with rotations or reflections. Ex. Sort shapes into groups of similar shapes with rotation and similar shapes with reflections. Ex. Matches combinations of similar shapes to each other (e.g., match similar shapes with rotations to each other and match similar shapes with reflections to each other). **Level III AA Students will:** **EE8.G.4.** Identify similar shapes with and without rotation. Ex. Given a shape find its similar rotation. Ex. Compare shapes in the environment to find a similar shape that is rotated. Ex. When given a group of triangles, select two that are similar when one is rotated. Ex. Select the shape that is not similar from a group of three shapes.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EE8.G.4.** Identify similar geometric shapes. Ex. Sort regular polygons into groups of similar shapes. Ex. When given a shape, select a similar shape. Ex. Match the shape of one small square to the shape of a large square. **Level I AA Students will:** **EE8.G.4.** Recognize geometric shapes. Ex. Same thing comparer – compare to shapes to see if they are the same. Ex. Select the named shape. Ex. When shown a shape, name the shape. Ex. Point to a triangle when shown a circle and a triangle. Ex. Trace around a geometric shape.
8.G.5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms*	**EE8.G.5.** Compare measures of angles to a right angle (greater than, less than, or equal to).	**Level IV AA Students will:** **EE8.G.5.** Compare measures of angles formed by intersecting lines. Ex. Given intersecting lines, identify linear pair angles. Ex. Given a pair of parallel lines intersected by a third line, identify angles that are the same measure. **Level III AA Students will:** **EE8.G.5.** Compare measures of angles to a right angle (greater than, less than, or equal to). Ex. Locate an angle with a measure greater than the measure of a right angle. Ex. Use a right-angle tool (square corner - corner of a note card), to find right angles.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
of transversals why this is so.		**Level II AA Students will:** **EE8.G.5.** Recognize a right angle. Ex. Identify a right angle in the school environment. Ex. Which of these is a right angle? Ex. Teacher creates on a geoboard. Is this a right angle? **Level I AA Students will:** **EE8.G.5.** Recognize an angle. Ex. Find angles in given shapes. Ex. Find a corner in the classroom (e.g., corner of the room or a table).
Understand and apply the Pythagorean Theorem. **8.G.6.** Explain a proof of the Pythagorean Theorem and its converse. **8.G.7.** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. **8.G.8.** Apply the Pythagorean Theorem to find the distance between	**EE8.G.6-8.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
two points in a coordinate system.		
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres. **8.G.9.** Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	**EE8.G.9.** Identify volume of common measures (cups, pints, quarts, gallons, etc.).	**Level IV AA Students will:** **EE8.G.9.** Apply knowledge of volume. Ex. Use simple units to fill a container with accurate counting. Ex. Uses cubes to fill a small container and estimate the number of cubes it took by mathematical reasoning (addition or multiplication of row/column). Ex. Select appropriate tool to fill a pitcher (e.g., tsp., cup, bucket). Ex. Select appropriate tool to measure flour for a cake – cup or bucket. Ex. Convert – how many cups in a pint? **Level III AA Students will:** **EE8.G.9.** Identify volume of common measures (cups, pints, gallons, etc.). Ex. Tell which holds more when using cubes to fill two boxes (e.g., count the cubes that fit in one box as compared to another). Ex. Identify which is a cup when given a cup, teaspoon, and a gallon container. Ex. Show which is a gallon when given a teaspoon, ball, and a gallon container. Ex. Given a gallon, tell if it will take longer to fill the gallon with cups or with pints? **Level II AA Students will:** **EE8.G.9**. Identify which is more or less? Ex. Compares two containers using a third for transitive reasoning – pours one container into two others to see which holds more because one may overflow and one may not become full.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Which container has more marbles in it? Ex. Which container has less marbles in it? **Level I AA Students will:** **EE8.G.9.** Experience volume. Ex. Compare two containers – which holds more? Ex. Point to the empty cup. Ex. Point to the full container.

Eighth Grade Mathematics Standards: Statistics and Probability

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Investigate patterns of association in bivariate data. **8.SP.1.** Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. **8.SP.2.** Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.	**EE8.SP.1-3.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
8.SP.3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*		
8.SP.4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to	**EE8.SP.4.** Construct a graph or table from given categorical data and compare data categorized in the graph or table.	**Level IV AA Students will:** **EE8.SP.4.** Conduct an experiment, collect data, and construct a graph or table. Ex. Conduct an experiment to find if plants grow faster in the sun or in the shade. Graph plant height over time and make a conclusion. Ex. Ask 10 people how many hours of TV they watch a day. Put the findings into a table. **Level III AA Students will:** **EE8.SP.4.** Construct a graph or table from given categorical data and compare data categorized in the graph or table. Ex. Given data about boys' and girls' favorite games, create a bar graph and compare the preferences of boys and girls. Ex. Given two graphs (hours of TV watched by boys and hours of TV

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*		watched by girls), answer questions to compare the habits of each. **Level II AA Students will:** **EE8.SP.4.** Collect and organize data. Ex. Organize objects into groups (teddy bears, balls, crayons). Ex. Examine a basic bus route schedule in table form and highlight which buses run at 5:00 p.m. Ex. Given five students, organize them shortest to tallest. **Level I AA Students will:** **EE8.SP.4.** Organize data into groups. Ex. Survey five people and ask if they like hamburgers or pizza better. Keep track of the findings. Ex. Organize disks by color and count how many of each. Which is most and which is least? Ex. Organize clothing by type (e.g., shirt, pants, socks) and count how many of each. Which is most and which is least?

COMMON CORE ESSENTIAL ELEMENTS AND ACHIEVEMENT DESCRIPTORS FOR HIGH SCHOOL

High School Mathematics Standards: Number and Quantity - The Real Number System

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Extend the properties of exponents to rational exponents. **N-RN.1.** Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.*	**EEN-RN.1.** Solve division problems with remainders using concrete objects.	**Level IV AA Students will:** **EEN-RN.1.** Illustrate concept of remainders using objects and numerical representations. Ex. Divide 15 objects into two groups of six and one group of three. Show representation and objects in numerical representation (e.g., 15/6 = 2 r 3). Ex. A group of six students sits down to have a snack. You have 25 cookies. How many cookies does each student get? Are there any leftover? (e.g., Write number sentence 25/6 = 4 r 1). Ex. If a pack of gum costs $0.49 and there are five sticks per pack, how much does each stick cost? Use real objects (gum and coins) to show division (e.g., 49/5 = 9 r 4). **Level III AA Students will:** **EEN-RN.1.** Solve division problems with remainders using concrete objects. Ex. Divide 13 into equal groups (two groups of six with a remainder of one, three groups of four with a remainder of one, one group of 13, four groups of three with a remainder of one, six groups of two with a remainder of one, 13 groups of one). Ex. A group of six students sits down to have a snack. You have 15 cookies. How many cookies does each student get? Are there any leftover? Ex. A student has five quarters and wants to buy a soda that costs $1.00. How much money is left over? Ex. A class of seven students earns $20 doing a service project. How much does each student receive? (Solve using money, calculator, etc.)

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EEN-RN.1.** Identify the difference between equal and not equal groups. Ex. Using drawings or groups of cubes, determine if the groups are equal or not equal. Ex. When passing out 10 pencils to nine people, do you have one for each person? Are there some left over? Ex. Do 10 pennies = $0.10? Ex. Are two nickels equal to $0.11? Ex. Given two clocks, one shows 20 minutes after the hour and another shows 30 minutes after the hour. Which clock shows the later time? **Level I AA Students will:** **EEN-RN.1.** Recognize that a whole can be divided into parts. Ex. Use models to represent quantities as parts of a whole. Ex. Given two sets of objects with one set divided into smaller groups, point to the quantities that have been divided when prompted.
N-RN.2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.	**EEN-RN.2.** N/A	
Use properties of rational and irrational numbers. **N-RN.3**. Explain why the sum or product of two rational numbers is rational; that the sum of a	**EEN-RN.3**. N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.		

High School Mathematics Standards: Number and Quantity - Quantities

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Reason quantitatively and use units to solve problems. **N-Q.1.** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **N-Q.2.** Define appropriate quantities for the purpose of descriptive modeling. **N-Q.3.** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	**EEN-Q.1-3.** Express quantities to the appropriate precision of measurement.	**Level IV AA Students will:** **EEN-Q.1-3.** Express solutions to problems using the appropriate precision of measurements. Ex. Determine elapsed time (watch a TV show that starts at 8 p.m. and ends at 8:30 p.m.). Ex. Using a measuring tape, determine if a large item purchased in a store will fit in the car to take it home. Ex. If it takes 30 minutes to get home, will I be home by 6:00 p.m. if I leave at 5:45 p.m.? **Level III AA Students will:** **EEN-Q.1-3.** Express quantities to the appropriate precision of measurement. Ex. Measure the length of an object to the nearest half and quarter of an inch. Ex. Measure time in hours (e.g., determine elapsed time when watching a TV show that starts at 8:00 p.m. and ends at 9:00 p.m.). Ex. Measure ingredients for a recipe accurately. **Level II AA Students will:** **EEN-Q.1-3.** Select the appropriate type of unit as a measurement tool. Ex. What label would you use to describe the length of a football field (inches, yards, or miles)? Ex. When you want to know how much ground meat you have, what kind of measuring do you need to do? (Weight, length, and temperature). Ex. What unit of measure would you use to measure the length of the room? (Length, weight, volume). Ex. What unit of measurement would you use to measure produce at the

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		grocery store? (Weight, volume, length). Ex. Which is best to describe your weight – pounds or inches? Ex. Record the daily temperature for a week using degrees. Ex. Match a thermometer to two non-standard units of measurement. **Level I AA Students will:** **EEN-Q.1-3.** Identify measurement tools. Identify the attribute to be measured (weight, length, and temperature). Ex. Of these items, which is a measurement tool? (pencil, ruler, can) Ex. If I wanted to measure the desk, would I use a ruler or a pen? Ex. Match units of measurement to measurement tools (days and hours measure time, inches and feet measure length).

High School Mathematics Standards: Number and Quantity - The Complex Number System

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Perform arithmetic operations with complex numbers. **N-CN.1**. Know there is a complex number *i* such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	**EEN-CN.1.** N/A	
N-CN.2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	**EEN-CN.2.** Use the operations of addition, subtraction, and multiplication with decimals (decimal value x whole number) in real world situations using money as the standard units ($20, $10, $5, $1, $0.25, $0.10, $0.05, and $0.01).	**Level IV AA Students will:** **EEN-CN.2.** Apply the operations of addition, subtraction, and multiplication in real world situations using money as the standard units ($50, $20, $10, $5, $1, $0.25, $0.10, $0.05, and $0.01). Ex. Using a checkbook register: $55.55 – 10.10 = _____. Ex. Using a checkbook register: $20 X 0.05 = _____. Ex. If you have $20, how much change will you receive if you spend $11.75? Ex. Calculate the cost of six movie tickets that are $7.50 each. Ex. If I have $4.20 cents and I buy an item for $3.50, how much change will I get? Ex. Jean earns $7.50 an hour. She worked six hours. How much did she earn? **Level III AA Students will:** **EEN-CN.2.** Use the operations of addition, subtraction, and multiplication with decimals (decimal value x whole number) in real-world situations

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		using money as the standard units ($20, $10, $5, $1, $0.25, $0.10, $0.05, and $0.01). Ex. Using a checkbook register: Add $6.50 + $3 (e.g., If you have $6.50 in your bank account and you receive a gift for $3.00, how much money do you have in your bank account?) Ex. Calculate the cost of two movie tickets that are $6.50 each. Ex. Find the cost of two pizzas if each pizza is $5.50. **Level II AA Students will:** **EEN-CN.2.** Use the operations of addition, subtraction, and multiplication up to the tenths place with decimals. Ex. If I have a nickel and two dimes, how much money do I have? Ex. If I have $3.50 and I spend $2.50, how much money do I have? **Level I AA Students will:** **EEN-CN.2.** Use the operations of addition, subtraction, multiplication, and multiplication with whole numbers less than 20. Ex. If Sam got three cats and they each cost $2, how much did he pay for all three cats (3 x 2 = 6). Ex. 4 + 36 = __. Ex. 67 – 33 = __. Ex. 20 x 3 = __. Ex. Mary got $2 from her uncle and $5 from her sister for her birthday, how much money did she receive?
Use complex numbers in polynomial identities and equations.	**EEN-CN.7.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
N-CN.7. Solve quadratic equations with real coefficients that have complex solutions.		

High School Mathematics Standards: Algebra - Seeing Structure in Expressions

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Interpret the structure of expressions. **A-SSE.1.** Interpret expressions that represent a quantity in terms of its context. ▪ Interpret parts of an expression, such as terms, factors, and coefficients. ▪ Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1+r)^n$ *as the product of P and a factor not depending on P.*	**EEA-SSE.1.** Match an algebraic expression involving one operation to represent a given word expression with an illustration.	**Level IV AA Students will:** **EEA-SSE.1.** Write or match an algebraic expression for a given word expression involving more than one operation. Ex. Write an expression to represent the problem, six weeks minus two weeks plus four weeks, to find the total number of weeks you are working? Ex. How would you represent five dogs plus two cats plus one mouse to find the total number of animals in a pet store? Ex. Shown pictures representing two expressions, select the one for two drinks, plus three slices of pizza, plus two salads if *d* represents drinks, *s* represents salad, and *p* represents pizza? Ex. Match two dimes, three nickels, and four pennies to an expression when d represents dimes, n represents nickels, and p represents pennies. Ex. Match 2r + 3b + 4y with two red disks, three blue disks, and four yellow when given colored disks. **Level III AA Students will:** **EEA-SSE.1.** Match an algebraic expression involving one operation to represent a given word expression with an illustration. Ex. Match the correct algebraic expression to a picture of three boys and two girls if *b* represents boys and *g* represents girls (3b + 4g) when asked, "Which is the correct way to express three boys and two girls if *b* represents the number of boys and *g* represents the number of girls in the classroom?" Ex. Shown a picture of three hamburgers at $4 each, match an expression to the picture given two expressions when asked, "Which is the correct way to express the cost of three hamburgers if each hamburger is $4.00? (three hamburgers x $4).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Shown two drinks plus three slices of pizza, match an expression to the picture given two expressions when asked, "Which one shows two drinks plus three slices of pizza if *d* represents drinks and *p* represents pizza?" Ex. Match two dimes and three nickels to an expression where d represents dimes and n represents nickels. Ex. Match the expression of 2r + 3b with two red disks and three blue disks when given an assortment of colored disks. **Level II AA Students will:** **EEA-SSE.1.** Identify the operation used for word expressions as indicated by an illustration. Ex. Nancy has 10 balloons. She gives three away to her friend. What operation (addition or subtraction) do you use to find how many are left as indicated by an illustration or manipulatives. Ex. Dave has 10 cookies. His friend gives him two more cookies. What operation (addition or subtraction) should Dave use to determine how many cookies he has in all as indicated by an illustration or manipulatives? Ex. Jose has three times as many baseball cards as his brother. What operation (addition or multiplication) do you use to find how many baseball cards Jose has as indicated by an illustration? Ex. One box has six books in it and another box only has two. How many books are there together? Ex. Match words (and, more, take away, times) to (addition, subtraction, multiplication). Ex. Given a word problem (June has four marbles and Cho has two marbles. How many marbles do they have all together?) Student will identify if they should add or subtract to find the answer as indicated by an illustration. Ex. When given a pictorial number sentence, complete an algebraic

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		representation of the pictures by placing/drawing in the correct sign for the operation. **Level I AA Students will:** **EEA-SSE.1.** Recognize the symbol for an operation. Ex. What does this mean? + means add. Ex. What does this mean? – means subtract or take away.
A-SSE.2. Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 - y^4$ *as* $(x^2)^2 - (y^2)^2$*, thus recognizing it as a difference of squares that can be factored as* $(x^2 - y^2)(x^2 + y^2)$*.*	**EEA-SSE.2.** N/A	
Write expressions in equivalent forms to solve problems. **A-SSE.3.** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal	**EEA-SSE.3.** Solve simple one-step equations (multiplication and division) with a variable.	**Level IV AA Students will:** **EEA-SSE.3.** Solve one-step equations (multiplication and division of two digits) with a variable. Ex. Solve the equation x ÷ 6 = 2 (If I buy two cakes and they were $6 each, how much money did I spend?). Ex. Solve the equation $8.00 x ___ = 24 (If a ticket to the movies costs $8, how many tickets did I buy if I spent 24 dollars?). Ex. Solve the equation 5 x __ = 45 (If I have five rows of desks and 45 desks total – how many desks are in each row?). **Level III AA Students will:** **EEA-SSE.3.** Solve simple one-step equations (multiplication and division) with a variable.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*		Ex. ___ seats ÷ 8 people = 2 cars Ex. 2 x N = 6 (box) Ex. 2 apples x ___ people = 16 apples **Level II AA Students will:** **EEA-SSE.3.** Solve basic equations. Ex. 4 + 3 = ___ (If I have four cups and I get three more, I will have N cups). Ex. Adds on objects to "make one number into another." If I have five and I add two, I get seven. Ex. Use a number line to show how seven is made of many different combinations: 5 + 2, 6 + 1, etc. Ex. Solve picture problems: 2 balloons (picture) + 2 balloons. Ex. If you have $10 and spend $4, what will your change be? Ex. Given pictures of monetary value, determine how much money they have altogether? Ex. Given money, count how much they have. **Level I AA Students will:** **EEA-SSE.3.** Identify quantity and match to the number. Ex. Match number of objects to correct numerals. Ex. Count objects (e.g., up to 10) and match the numerals. Ex. Match five $1 to the number 5. Ex. Count three tallies and match to the number 3.
A-SSE.4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula	**EEA-SSE.4** Identify the missing part in any other equivalent ratio when given any ratio.	**Level IV AA Students will:** **EEA-SSE.4.** Find the missing components when given various ratios that form proportions. Ex. Complete ratios such as 2:5 is equivalent to (4):10.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
to solve problems. *For example, calculate mortgage payments.*		Ex. Complete the ratio table. <table><tr><td>3</td><td>3</td></tr><tr><td>?</td><td>4</td></tr><tr><td>9</td><td>6</td></tr></table> **Level III AA Students will:** **EEA-SSE.4.** Identify the missing part in any other equivalent ratio when given any ratio. Ex. If there are two worms for every bird, how many worms would three birds get? <table><tr><td>Worms</td><td>Birds</td></tr><tr><td>2</td><td>1</td></tr><tr><td>4</td><td>2</td></tr><tr><td>?</td><td>3</td></tr><tr><td>8</td><td>4</td></tr></table> Ex. Complete a ratio table. <table><tr><td>2</td><td>5</td></tr><tr><td>4</td><td>10</td></tr><tr><td>6</td><td>?</td></tr></table>

<table>
<tr><th>CCSS Grade-Level Clusters</th><th>Common Core Essential Elements</th><th>Instructional Achievement Level Descriptor</th></tr>
<tr><td></td><td></td><td>Ex. Complete the ratio table with symbols or objects.
<table>
<tr><td>|</td><td>|||</td></tr>
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<tr><td>|||</td><td>?</td></tr>
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Level II AA Students will:
EEA-SSE.4. Identify the missing part in the next ratio using concrete objects when given a ratio (1:_).
Ex. Find the pattern that exists between two-colored chips with the pattern of AABAABAABAAB.
Ex. A student has one red dot and two blue dots. If another red dot is given to the student, the student will identify how many blue dots should be added to maintain the ratio of 1:2.
Ex. Bead a necklace with a given ratio (three red beads, four yellow beads, three red beads, etc.).

Level I AA Students will:
EEA-SSE.4. Identify or demonstrate a ratio relationship (See the recommendation for 6.RP.1 Level II).
Ex. Set out 10 envelopes; match three pieces of correspondence to each envelope to complete task.</td></tr>
</table>

High School Mathematics Standards: Algebra - Arithmetic with Polynomials and Rational Expressions

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Perform arithmetic operations on polynomials. **A-APR.1.** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	**EEA-APR.1** N/A	

High School Mathematics Standards: Algebra - Creating Equations

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Create equations that describe numbers or relationships. **A-CED.1.** Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*	**EEA-CED.1.** Solve an algebraic expression using subtraction.	**Level IV AA Students will:** **EEA-CED.1.** Solve an algebraic expression with more than one variable. Ex. If I have two bills, one of them is a $5 and one of them is unknown. What is the value of the unknown bill if I have $10 total? Ex. If I have some money in my pocket and some money in the other pocket and I still need $3 more to buy the bird that cost $10, how much money is in my pockets? **Level III AA Students will:** **EEA-SSE.3.** Solve an algebraic expression using subtraction. Ex. If I need $10 and I have $5, how much more money do I need? Ex. If I have two bills, one of them is a $5 and one of them is a $1, how much money do I need to have $10? **Level II AA Students will:** **EEA-SSE.3.** Solve simple equations with unknown/missing values (without variables). Ex. If I have three dogs and one runs away, how many dogs are left? Ex. I walked to the store to buy a book. I gave the cashier $10 and she gives me back $7. How much was the book? Ex. If I have two pens in my backpack when I get to school and I left home with five pens, how many pens were given away on the trip from home to school? Ex. 5 – [__] = 2. Ex. [__] x 2 = 8. **Level I AA Students will:** **EEA-SSE.3.** Identify what is unknown.

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		Ex. John has three cats and some dogs. Do we know the number of dogs John has? Ex. Allen ate some apples. Do we know how many he ate?
A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **A-CED.3.** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* **A-CED.4.** Rearrange formulas to highlight a quantity of interest, using	**EEA-CED.2-4.** Solve one-step inequalities.	**Level IV AA Students will:** **EEA-CED.2-4.** Solve two-step inequalities with a variable. Ex. If I buy two movie tickets for \$5 each and two drinks at \$4 each, will \$15 be enough money? Ex. I walked to the store to buy a book. I gave the cashier \$10. She said, “You need twice this amount.” How much is the book? Ex. I went to the store to buy two items that cost x dollars each plus a \$5 membership fee. The total cost is more than \$25. How much must each item cost? $2x + 5 > 25$. **Level III AA Students will:** **EEA-CED.2-4.** Solve one-step inequalities. Ex. Sally wants to buy a shirt that costs \$15. She has \$10. How much more money does she need? Ex. Mike has six apples. Two of his friends are joining him for snack. Mike wants to share his apples with his friends. Does he have enough to give each friend two apples? **Level II AA Students will:** **EEA-CED.2-4.** Verify the solution to an inequality with one variable. Ex. You have \$10 and buy socks that cost \$2. Will you get change? Ex. I walk to the store and buy a book. If I give the cashier \$10 and she says I do not have enough money, is the book more or less than \$10? Ex. You have \$1 and your breakfast costs \$2. Do you need more money?

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the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*		**Level I AA Students will:** **EEA-CED.2-4.** Identify quantities that are greater than or less than a given quantity. Ex. Using a number line indicate greater than or less than a given number. Ex. Mike has five oranges and Mary has two oranges. Who has more oranges? Ex. Sarah has $50 and Cindy has $30. Who has more money? Ex. Is five more or less than three? Ex. If Sue has baseball cards and Tim has five, who has the most/fewest baseball cards?

High School Mathematics Standards: Algebra - Reasoning with Equations and Inequalities

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Understand solving equations as a process of reasoning and explain the reasoning. **A-REI.1.** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. **A-REI.2.** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	**EEA-REI.1-2.** N/A	
Solve equations and inequalities in one variable.	**EEA-REI.3.** N/A (See EEA-ECED.1-2.)	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **A-REI.4.** Solve quadratic equations in one variable. ▪ Use the method of completing the square to transform any quadratic equation in *x* into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. ▪ Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex		

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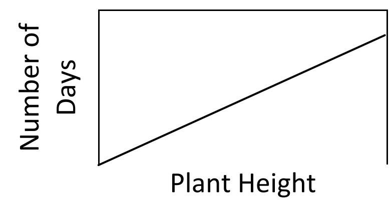
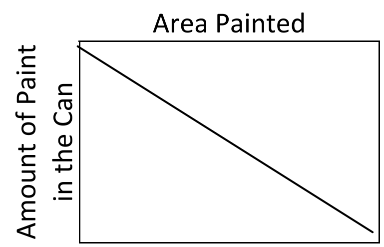
solutions and write them as *a* ± *bi* for real numbers a and b.		
Solve systems of equations. **A-REI.5.** Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	**EEA-REI.5.** N/A	
A-REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. **A-REI.7.** Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of	**EEA-REI.6-7.** N/A (See EEA-REI.10-12.)	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.		
Represent and solve equations and inequalities graphically. **A-REI.10.** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). **A-REI.11.** Explain why the *x*-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$	**EEA-REI.10.-12.** Determine the two pieces of information that are plotted on a graph of an equation with two variables that form a line when plotted.	**Level IV AA Students will:** **EEA-REI.10.** Make a prediction using the graph of an equation with two variables that form a line when plotted using the trend of the line. Ex. Given the graph of a linear function based on real-world situations (e.g., How much money do I earn (y) if I work a given number of hours (x) at $5 dollars per hour; (y = 5 x hours), use this information to make predictions (e.g., If you work six hours, how much will you make?). Ex. Given the graph of a linear function based on cost per pizza and the number of pizzas bought [e.g., If pizza is $5, then the total cost (y) = 5 x the number bought (x)], use this information to make predictions. **Level III AA Students will:** **EEA-REI.10.** Determine the two pieces of information that are plotted on a graph of an equation with two variables that form a line when plotted. Ex. Follow the line on the graph to tell the two pieces of information in each point (total cost and Items bought). Ex. Given the graph of a linear function based on cost per pizza and the number of pizzas bought (e.g., number of pizzas bought and total price), follow the line on the graph to tell the two pieces of information at a given point. **Level II AA Students will:** **A-REI.10.** Use a graph of two variables to find the answer to a real-world problem. Ex. Locate objects using a map with pictorial cues using two coordinates to

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
and/or *g*(*x*) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. **A-REI.12.** Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.		find one position on a simple map. Ex. Gain basic information from a graph (total cost of two items). **Level I AA Students will:** **A-REI.10.** Identify major parts of a graph. Ex. Point to the numbers that tell me how many items I bought. Ex. Point to the numbers that tell me how much the total cost is. Ex. Trace the line with your finger – show where the line would go if it continued.

High School Mathematics Standards: Functions - Interpreting Functions

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Understand the concept of a function and use function notation. **F-IF.1.** Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*). **F-IF.2**. Use function notations, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	**EEF-IF.1-3.** Use the concept of function to solve problems.	**Level IV AA Students will:** **EEF-IF.1-3.** Use the concept of functions to identify how the two variables are affected. Ex. Given a graph showing the growth of a plant over a period of one month, identify that, as the number of days increase, plant height increases.  Ex. Given a graph that shows the amount of paint in can and the area painted, identify that, as the area painted increases, the amount of paint in the can decreases.  Ex. Tell the cost of movie tickets for five people if movies tickets are $3 per ticket. Ex. The amount of change you get from a drink machine if each drink cost $0.65. The amount of change you receive will be a function of how much you put into the machine.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
F-IF.3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.*		**Level III AA Students will:** **EEF-IF.1-3.** Use the concept of function to solve problems. Ex. Using a store scenario, one store charges students $2 more than another store for the same item. Tom purchases a caramel apple for $5. What should Becky expect to pay for an identical apple at the more expensive store? Ex. Look at a graph to identify relationship between two variables (distance - time, cost - product, etc.) If every item cost $1 at a store, how much would five items cost? Ex. Determine the total distance traveled in 20 minutes using a table if you are traveling at a constant speed of one mile every 10 minutes. **Level II AA Students will:** **EEF-IF.1-3.** Solve problems using a table that shows basic relationships (may not involve a true function). Ex. Look at a weather chart to identify relationships between the day of the week and the temperature. Ex. Determine the number of shoes worn by four people using a graph that incorporates picture representations. Ex. From a given table displaying the cost of movie tickets, determine the cost of one ticket, two tickets, and three tickets. Ex. From a five-day weather forecast, identify the weather for Wednesday. **Level I AA Students will:** **EEF-IF.1-3.** Identify basic information located on graphs. Ex. Tell the day of the week on a graph/point to the activity on the graph. Ex. Identify a line on a line graph. Ex. Identify the highest bar on a bar graph. Ex. Recognize different types of graphs.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Interpret functions that arise in applications in terms of the context. **F-IF.4**. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity*. **F-IF.5.** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function*	**EEF-IF.4-6.** Interpret rate of change (e.g., higher/lower, faster/slower).	**Level IV AA Students will:** **EEF-IF.4-6.** Evaluate key features of a graph (e.g. increasing, decreasing, constant.). Ex. Determine parts of graph illustrating an increase or decrease in speed. Ex. Using a graph illustrating change in temperature over a day, indicate times when the temperature increased, decreased, or stayed the same. **Level III AA Students will:** **EEF-IF.4-6.** Interpret rate of change (e.g. higher/lower, faster/slower). Ex. Compare two graphs with different slopes to determine faster/slower rate Ex. Compare a bus schedule with two buses, look and determine if one bus runs more frequently than the next bus on the route. **Level II AA Students will:** **EEF-IF.4-6.** Graph a simple linear equation represented by a table of values. Ex. Match the graph to its corresponding story. Ex. Plot the points from a table of values less than 10. **Level I AA Students will:** **EEF-IF.4-6.** Read a table. Ex. From a given table, find information. Ex. Read a bus schedule. Ex. Given a daily schedule, determine the time of lunch during the school day.

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h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. **F-IF.6.** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.		
Analyze functions using different representations. **F-IF.7.** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts,	**EEF-IF.7.** N/A (See EEF-IF.1-3)	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. d. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.		
F-IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	**EEF-IF.8.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t, y = (1.01)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay.		
F-IF.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an*	**EEF-IF.9.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
algebraic expression for another, say which has the larger maximum.		

High School Mathematics Standards: Functions - Building Functions

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Build a function that models a relationship between two quantities. **F-BF.1.** Write a function that describes a relationship between two quantities. ▪ Determine an explicit expression, a recursive process, or steps for calculation from a context. ▪ Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*	**EEF-BF.1.** Select the appropriate graphical representation (first quadrant) given a situation involving constant rate of change.	**Level IV AA Students will:** **EEF.BF.1.** Complete the appropriate graphical representation (first quadrant) given a situation involving constant rate of change. Ex. Given this scenario and a graphical representation with missing information: If I mow one lawn and I make \$25 and if I mow three lawns and I make \$75, how much will I make if I mow two lawns? Ex. Given this scenario and a graphical representation with missing information: If hamburgers are four for \$1 and I buy four, it will cost \$1; if I buy 12, it will cost \$3 – complete the graph for eight hamburgers. **Level III AA Students will:** **EEF-BF.1.** Select the appropriate graphical representation (first quadrant) given a situation involving constant rate of change. Ex. Given this scenario and two completed graphs, show me the graph that shows the following: If I mow one lawn, I make \$25; if I mow two lawns, I will make \$50; and if I mow three lawns I will make \$75. Ex. Given this scenario and two completed graphs, show me the graph that depicts that there are two cookies for every student. **Level II AA Students will:** **EEF-BF.1.** Select the appropriate graphical representation (first quadrant) given a situation involving constant rate of change where the difference is very clear.

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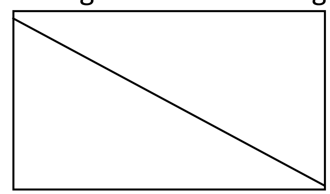
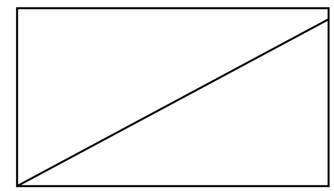
		Ex. Every dog has one bone. Pick the graph that would represent this concept when given the following graphs.   **Level I AA Students will:** **EEF-BF.1.** Identify the terms in a sequence. Ex. Identify an ABABABABAB pattern out of two different pattern sets of colored blocks using black (B) and white (W) and one set is BWBWBWBWBW and the other pattern set is BBWBBWBBWBBW. Ex. Place two pencils in front of each student in the classroom.
F-BF.2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	**EEF-BF.2.** Build an arithmetic sequence when provided a recursive rule with whole numbers.	**Level IV AA Students will:** **EEF-BF.2.** Build an arithmetic sequence when provided a recursive rule with decreasing terms, decimals, or fractions. Ex. Starting at 100, subtract five each time to build a sequence. Ex. Starting at $5.50, add/subtract $0.50 each time to build a sequence. **Level III AA Students will:** **EEF-FB.2.** Build an arithmetic sequence when provided a recursive rule with whole numbers. Ex. Starting at four, add four each time to build a sequence (e.g., If one dog has four legs, how many will two dogs have, three dogs, etc.). Ex. Starting at five, add seven each time to build a sequence (e.g., If I have $5 and I earn $7 each hour – how much money will I have in four hours?).

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		Level II AA Students will: **EEF-BF.2.** Identify a term in a sequence. Ex. Given a clear sequence (2, 4, 6, 8, . . .), identify the next number in the set. Ex. Given the sequence 4, 2, 5, 1, 3, N, identify what is the value of N. **Level I AA Students will:** **EEF-BF.2.** Recognize a sequence. Ex. Given two lists of numbers or a set of manipulatives, identify the sequence in 5, 4, 3, 2, 1. Ex. Given two lists of numbers or a set of manipulatives, identify the sequence in 2, 4, 6, 8. Ex. Given a sequence, a picture of a ball, and a fraction, student can select the sequence.
Build new functions from existing functions. **F-BF.3**. Identify the effect on the graph of replacing *f*(*x*) by *f*(*x*) + *k*, *k f*(*x*), *f*(*kx*), and *f*(*x* + *k*) for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include	**EEF-BF.3-4.** N/A	

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recognizing even and odd functions from their graphs and algebraic expressions for them. **F-BF.4**. Find inverse functions. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. *For example, f(x) =2 x^3 or f(x) = (x+1)/(x–1) for x ≠ 1.*		

High School Mathematics Standards: Functions - Linear, Quadratic, and Exponential Models

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Construct and compare linear, quadratic, and exponential models and solve problems. **F-LE.1.** Distinguish between situations that can be modeled with linear functions and with exponential functions. ▪ Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. ▪ Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. ▪ Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to	**EEF-LE.1.** Model a simple linear function such as y=mx to show functions grow by equal factors over equal intervals.	**Level IV AA Students will:** **EEF-LE.1.** Plot points using pictures in first quadrant on a graph using whole numbers and explain how y increases/decreases as x changes. Ex. If you go to the store where every item is one dollar, students should state y = x (the number of items I buy will tell me the cost). Students will then plot this on the graph. Ex. If I get two apples for every orange I buy, students should state that y = 2x, or for every orange I buy (x), I will get two apples (y), therefore x times two tells me the number of apples each time. Students should then plot this on the graph. **Level III AA Student will:** **EEF-LE.1.** Model a simple linear function such as y = mx to show functions grow by equal factors over equal intervals. Ex. Determine a simple relationship of y to x by looking at the first quadrant of a graph. Ex. Identify the cost per item on a simple graph where every item in the store cost the same amount and state the relationship between x and y. Ex. Look at a graph that shows a constant ratio of boys to girls and state the relationship between x and y. **Level II AA Students will:** **EEF-LE.1.** Identify a specific data point in the first quadrant and explain the meaning behind it. Ex. Given data points in the first quadrant, identify the named point and state the two pieces of information that one dot provides. Ex. When given a simple graph that shows the total cost of items purchased at a store where every item is $1, tell the cost of four items, the

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another. **F-LE.2**. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). **F-LE.3.** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. **F-LE.4**. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where *a*, *c*, and *d* are numbers and the base *b* is 2, 10, or *e*; evaluate the logarithm using		cost of two items, etc. **Level I AA Students will:** **EEF-LE.1.** Interpret major ideas of a graph with linear functions. Ex. When shown two lines on a graph, tell which one is rising faster. Ex. When shown a graph of distance driven and gas left in tank, explain that the further one drives the less gas one has left.

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technology.		
Interpret expressions for functions in terms of the situation they model. **F-LE.5.** Interpret the parameters in a linear or exponential function in terms of a context.	**EEF-LE.5.** N/A	

High School Mathematics Standards: Functions - Trigonometric Functions

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Extend the domain of trigonometric functions using the unit circle. **F-TF.1**. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. **F-TF.2**. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	**EEF-TF.1-2**. N/A	
Model periodic phenomena with trigonometric functions. **F-TF.5.** Choose trigonometric functions to model periodic phenomena with specified	**EEF-TF.5.** N/A	

amplitude, frequency, and midline.		
Prove and apply trigonometric identities. **F-TF.8**. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.	**EEF-TF.8**. N/A	

High School Mathematics Standards: Geometry - Congruence

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Experiment with transformations in the plane. **G.CO.1**. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	**EEG-CO.1.** Know the attributes of perpendicular lines, parallel lines, and line segments, angles, and circles.	**Level IV AA Students will:** **EEG-CO.1.** Compare attributes of perpendicular lines, parallel lines, line segments, angles, and circles. Ex. Draw examples of perpendicular lines, parallel lines, and line segments, angles, and circles. Ex. How are lines and line segments different? Ex. How are lines and circles similar? **Level III AA Students will:** **EEG-CO.1.** Know the attributes of perpendicular lines, parallel lines, and line segments, angles, and circles. Ex. How are parallel and perpendicular lines similar? How are they different? Ex. Given two examples, which of these is a(n) ____? Ex. Which is perpendicular? + || O Ex. Given a grid on a floor with masking tape, identify parallel lines. Ex. Given a map, identify a road that runs somewhat perpendicular to another road. **Level II AA Students will:** **EEG-CO.1.** Know the attributes of lines, circles, and angles with equivalent measure. Ex. When shown the trajectory of movement of an object, predict where the object will go. Ex. Determine line, circle, and angles and describe them – circles are round. Ex. Put two objects next to each other and determine which is longer.

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		Ex. Draw a line, circle, or angle. **Level I AA Students will:** **EEG-CO.1.** Identify a line and a shape (i.e. circle, square, triangle). Ex. Point to a line. Ex. Align two objects side-by-side. Ex. Move an object in a straight line. Ex. Sort shapes into groups by name. Ex. Find objects in the environment that represent/model circles, squares, or triangles.
G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	**EEG-CO.2.** N/A	
G-CO.3. Given a rectangle, parallelogram, trapezoid, or regular polygon,	**EEG-CO.3.** N/A	

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describe the rotations and reflections that carry it onto itself.		
G-CO.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. **G-CO.5.** Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	**EEG-CO.4-5.** Identify rotations, reflections, and slides.	**Level IV AA Students will:** **EEG-CO.4-5.** Demonstrate what happens when a figure is transformed. Ex. Show a rotation using an object. Ex. Using an object, show a slide (translation). Ex. Can form a picture where multiple shapes may need to be rotated to produce the given picture. **Level III AA Students will:** **EEG-CO.4-5.** Identify rotations, reflections, and slides. Ex. Use pattern blocks or other manipulatives to produce or copy a design in which each shape is clearly identifiable. Ex. Given two pictures, determine if an object is rotated (arrow up, arrow right). Ex. Given two pictures, pick correct reflection, slide, or rotation. **Level II AA Students will:** **EE.G-CO.4-5.** Recognize rotation, reflection, or slide (key terms, vocabulary, and movement). Ex. Use body to engage in activity to show rotation or slide (silhouette). Ex. Use objects, rotate, reflect, or slide. **Level I AA Students will:** **EEG-CO.4-5.** Attend to movement demonstrating rotations, reflections, and slides. Ex. Teacher slides an object, follow with eyes.

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		Ex. Teacher rotates an object, follow motion.
Understand congruence in terms of rigid motions. **G-CO.6.** Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. **G-CO.7.** Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. **G-CO.8**. Explain how the criteria for triangle	**EEG-CO.6-8.** Identify corresponding congruent (the same) parts of shapes.	**Level IV AA Students will:** **EEG-CO.6-8.** Demonstrate why shapes are congruent. Ex. Communicate why two given congruent shapes are congruent. Ex. Given two non-congruent shapes, communicate why the shapes are not congruent. **Level III AA Students will:** **EEG-CO.6-8.** Identify corresponding congruent (the same) parts of shapes. Ex. Given two congruent triangles, identify the corresponding sides. Ex. Given two congruent items (stars, squares, etc.), identify the corresponding parts. Ex. Given two shapes that are not congruent but are similar, identify the similar parts. **Level II AA Students will:** **EEG-CO.6-8.** Recognize congruent parts (angles and sides). Ex. Identify the congruent parts of a rectangle. Ex. Identify the congruent angles of an isosceles triangle. **Level I AA Students will:** **EEG-CO.6-8.** Recognize shapes that are congruent. Ex. Given a shape, match a congruent shape. Ex. Given three shapes, pick the two that are congruent.

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congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.		
Prove geometric theorems **G-CO.9.** Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.* **G-CO.10.** Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment*	**EEG-CO.9-11.** N/A	

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joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. **G-CO.11.** Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*		

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Make geometric constructions. **G-CO.12.** Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.* **G-CO.13.** Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	**EEG-CO.12-13.** N/A	

High School Mathematics Standards: Geometry - Similarity, Right Triangles, and Trigonometry

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Understand similarity in terms of similarity transformations. **G-SRT.1.** Verify experimentally the properties of dilations given by a center and a scale factor: ▪ A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. ▪ The dilation of a line segment is longer or shorter in the ratio given by the scale factor. **G-SRT.2.** Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using	**EEG-SRT.1-3.** N/A (See EEG-CO.6-8.)	

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similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. **G-SRT.3.** Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.		
Prove theorems involving similarity. **G-SRT.4.** Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*	**EEG-SRT.4-5.** N/A	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.		
Define trigonometric ratios and solve problems involving right triangles. **G-SRT.6.** Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. **G-SRT.7.** Explain and use the relationship between the sine and cosine of complementary angles. **G-SRT.8.** Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	**EEG-SRT.6-8.** N/A	

High School Mathematics Standards: Geometry - Circles

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Understand and apply theorems about circles. **G-C.1.** Prove that all circles are similar. **G-C.2.** Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.* **G-C.3.** Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	**EEG-C.1-3.** N/A	

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Find arc lengths and areas of sectors of circles. **G-C.5**. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	**EEG-C.5.** N/A	

High School Mathematics Standards: Geometry - Expressing Geometric Properties with Equations

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Translate between the geometric description and the equation for a conic section. **G-GPE.1.** Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	**EEG-GPE.1.** N/A	
G-GPE.2. Derive the equation of a parabola given a focus and directrix.	**EEG-GPE.2-4.** N/A	
Use coordinates to prove simple geometric theorems algebraically. **G-GPE.4.** Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate*	**EEG-GPE.4.** N/A (See EEG-GPE)	

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plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).		
G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). **G-GPE.6.** Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	**EEG-GPE.5-6.** N/A (See EEG.CO.1)	

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G-GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	**EEG-GPE.7.** Find perimeter and area of squares and rectangles to solve real-world problems.	**Level IV AA Students will:** **EEG-GPE.7.** Use formulas to find perimeter and area of squares and rectangles to solve real-world problems. Ex. Find the perimeter using p = side + side + side + side. Ex. Find the area of the classroom floor using A = length x width. **Level III AA Students will:** **EEG-GPE.7.** Find perimeter and area of squares and rectangles to solve real-world problems. Ex. Find the perimeter by adding the length of the sides to determine how much fence you will need to go around your garden. Ex. Find the area of a room on a grid to decide how many tiles (one grid each) you will need to cover the area of your room. Ex. Determine the number of one foot squared sections needed to make a tabletop garden that is four feet by four feet square. **Level II AA Students will:** **EEG-GPE.7.** Find perimeter or area by counting on a grid. Ex. Find the perimeter of a small room on a grid. Ex. Draw a shape on a grid and find the perimeter. **Level I AA Students will:** **EEG-CPE.7.** Identify inside, around, and outside of a closed figure. Ex. Identify position of a dog as inside or outside the fenced yard. Ex. Choose the term (inside, around, or outside) to describe position.

High School Mathematics Standards: Geometry - Geometric Measurement and Dimension

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Explain volume formulas and use them to solve problems. **G-GMD.1.** Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.* **G-GMD.3.** Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	**EEG-GMD.1-3.** Make a prediction based on knowledge of volume to identify volume of common containers (cups, pints, gallons, etc.).	**Level IV AA Students will:** **EEG-GMD.1-3.** Apply knowledge of volume to make appropriate volumetric estimates. Ex. Select appropriate tool to fill a pitcher and estimate the number of proportions needed to fill a five-gallon bucket (teaspoon, cup, bucket). Ex. Select appropriate tool to measure flour for a cake – cup or bucket. Ex. Convert – how many cups in a pint – given cups and a pint container filled with water. **Level III AA Students will:** **EEG-GMD.1-3.** Make a prediction based on knowledge of volume to identify volume of common containers (cups, pints, gallons, etc.). Ex. Which will hold more than three cups, a gallon or a pint? (Objects: cup, teaspoon, gallon) Ex. Which is a gallon? (Objects: teaspoon, cup, gallon) Ex. If I wanted to carry a gallon of water, would I use a bucket or a cup? **Level II AA Students will:** **EEG-GMD.1-3.** Which is more or less? Ex. Which shaped peg can fit inside each sculpted hole? Ex. Which container has more marbles in it? Ex. Which container has less marbles in it? **Level I AA Students will:** **EEG-GMD.1-3.** Experience volume. Ex. Point to the empty cup. Ex. Point to the full container. Ex. Indicate which container will hold more water (e.g., bucket or cup).

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Visualize relationships between two-dimensional and three-dimensional objects. **G-GMD.4**. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	**EEG-GMD.4.** Distinguish between two-dimensional and three-dimensional objects to solve real-world problems.	**Level IV AA Students will:** **EEG-GMD.4.** Use the properties of two-dimensional and three-dimensional objects to solve real-world problems. Ex. Determine how much cereal a container can hold using standard measurement. Ex. Using the dimensions of a shelf to determine how many boxes would fit. **Level III AA Students will:** **EEG-GMD.4.** Distinguish between two-dimensional and three-dimensional objects to solve real-world problems. Ex. Build a floor and walls of a building using technology or blocks. Ex. Describe the differences between a map of the school and the model of the school. Ex. Identify height as a dimension of three-dimensional objects. Ex. Show use of spatial relationships by stacking boxes to specified dimensions (length, width, height). **Level II AA Students will:** **EEG-GMD.4.** Distinguish between two-dimensional and three-dimensional Ex. Classify two-dimensional and three-dimensional objects by their use (e.g., Which of these can you use as a container, a box, or a square?). Ex. Given two examples, which is a cube and which is square? Ex. Given a picture of a silo, a square building, and a box, determine which three-dimensional object corresponds to a circle. Ex. Which can hold cereal: a square or a box? **Level I AA Students will:** **EEG-GMD.4.** Identify two-dimensional shapes.

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		Ex. Identify squares from non-squares. Ex. Choose polygons from line segments and angles.

High School Mathematics Standards: Geometry - Modeling with Geometry

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Apply geometric concepts in modeling situations. **G-MG.1**. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). **G-MG.2.** Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). **G-MG.3.** Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).	**EEG-MG.1-3**. Use properties of geometric shapes to describe real-life objects.	**Level IV AA Students will:** **G-MG.1-3**. Apply geometric methods to solve design problems. Ex. Identify the two-dimensional shapes that create the three-dimensional figure (e.g., I can see four triangles in a pyramid; I can see six squares on the outside of a cube). Ex. Determine the least number of tiles needed to cover the outside of a cubed figure- glue tiles onto a box. Ex. How many cups of water will this cylinder hold? Ex. Determine the amount of materials needed to wrap a present. **Level III AA Students will:** **EEG-MG.1-3**. Use properties of geometric shapes to describe real-life objects. Ex. Name everyday objects in terms of geometric shapes (can of soda is a cylinder, box of cereal is a rectangular prism). Ex. Describe the sides of a box of tissues (ends are squares, sides are rectangles). Ex. How many small square boxes (cubes)can I fit into a large cube? Ex. How many boxes (cubes) will fit on this shelf? Ex. Determine the dimensions of a classroom (length, width, and height.) **Level II AA Students will:** **EEG-MG.1-3**. **Identify geometric shapes.** Ex. Find real-life objects that have similar characteristics to a sphere. Ex. Given a cube, determine what real-life object has similar characteristics to a cube.

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		Level I AA Students will: **EEG-MG.1-3.** Compare the capacity of three-dimensional objects. Ex. Which has the greatest capacity, a house or a school? Ex. Determine, which holds more, a cup or a barrel?

High School Mathematics Standards: Statistics and Probability - Interpreting Categorical and Quantitative Data

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Summarize, represent, and interpret data on a single count or measurement variable. **S-ID.1.** Represent data with plots on the real number line (dot plots, histograms, and box plots). **S-ID.2.** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	**EES-ID.1-2**. Given data, construct a simple graph (table, line, pie, bar, or picture) and answer questions about the data.	**Level IV AA Students will:** **EES-ID.1-2.** Collect and organize data in simple graphs and use findings to draw conclusions from the data. Ex. Ask 10 people how many hours of TV they watch a day. Put the findings into a graph and tell which person watches the most and least TV. Ex. Collect data on a given topic and tell what conclusions they draw from the data, such as most common weather in two cities, cheapest price of jeans, etc. **Level III AA Students will:** **EES-ID.1-2.** Given data, construct a simple graph (table, line, pie, bar, or picture) and answer questions about the data. Ex. Given data about the cost of jeans at three stores, place the information on a graph (table, line, pie, bar, or picture) and answer questions about the graph. Ex. Read data from a given graph showing the weather for one week and determine how many days it was rainy. Ex. Given data from student surveys (e.g. favorite sport, subject, book) presented on a bar or pie graph and answer questions about the findings (most/least). Ex. Interpret weather data (e.g. temperature changes over time) presented in a line graph. **Level II AA Students will:** **EES-ID.1-2.** Given a graph, answer simple questions. Ex. Identify the highest and lowest points on a graph (costs the most). Ex. Tell what the simple graph represents (graph about the weather, cell phone plans, or gas prices).

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Read data from a given graph showing the weather for one week to tell how many days was it rainy. **Level I AA Students will:** **EES-ID.1-2.** Identify any part of a simple graph. Ex. Point to and identify part of simple graph, (such as the bar, line, title, labels on the graph). Ex. Point or indicate to answer, “Which is the tallest/highest bar?”
S-ID.3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	**EES-ID.3.** Indicate general trends on a graph or chart.	**Level IV AA Students will:** **EES-ID.3.** Extend a graph or chart to make a prediction. Ex. If the weatherman says there is a 60% chance of rain, should you wear a rain coat? Ex. Show a graph, predict which direction the line will continue and answer predictive questions. Ex. Using a graph, estimate a future point when the trend of the line is not extremely clear. **Level III AA Students will:** **EES-ID.3.** Indicate general trends on a graph or chart. Ex. Which chart shows an increase? A chart with an upward slope or a chart with a downward slope. Ex. Which chart shows a decrease? A chart with an upward slope or a chart with a downward slope. Ex. Using a graph, estimate a future point when the trend of the line is clear. **Level II AA Students will:** **EES-ID.3.** Demonstrate increase and decrease over time.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Is this point more or less than this point? Ex. Is this line (slope) increasing or decreasing? Ex. Collect data that has a trend possibility (e.g., growing plant, collecting money). Ex. Ordinate piles of money, items to show increase/decrease. Ex. When shown two graphs, determine which shows increase and which shows decrease. **Level I AA Students will:** **EES-ID.3.** Determine categories needed on a graph. Ex. We are charting plant growth. Should I put the length of the monkey's tail on the graph? Ex. Describe sample space – Are we looking at oranges or apples? Ex. We are counting apples. Do shoes belong on this graph?
S-ID.4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	**EES-ID.4.** Calculate the mean of a given data set (limit data points to less than five).	**Level IV AA Students will:** **EES-ID.4.** Calculate the mean of a given data set (more than five data points). Ex. Calculate the mean of price lists for a video in six different stores. Ex. Calculate the mean number of hours students spend watching TV over a week. **Level III AA Students will:** **EES-ID.4.** Calculate the mean of a given data set (limit data points to less than five). Ex. Given rainfall amounts for four days, determine the average rainfall. Ex. Given the price of each pair, determine the average price of four pairs of shoes.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Level II AA Students will: **EES-ID.4** Identify the average between two consecutive numbers. Ex. Given two consecutive numbers on a number line, determine the mean value. (Determine the mean value of 2 and 3.) **Level I AA Students will:** **EES-ID.4.** Identify the missing number between two data points. Ex. Given two consecutive even numbers or two consecutive odd numbers, determine the number in the middle.
Summarize, represent, and interpret data on two categorical and quantitative variables. **S-ID.5.** Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. **S-ID.6.** Represent data on two quantitative variables	**EES-ID.5.** N/A (See EEF-IF.1. and EEA-REI.6-7)	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.		
Interpret linear models. **S-ID.7.** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	**EES-ID.7.** N/A (See EEF.IF.4-6)	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
S-ID.8. Compute (using technology) and interpret the correlation coefficient of a linear fit. **S-ID.9.** Distinguish between correlation and causation.	**EES-ID.8-9.** N/A	

High School Mathematics Standards: Statistics and Probability - Making Inferences and Justifying Conclusions

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Understand and evaluate random processes underlying statistical experiments. **S-IC.1.** Understand statistics as a process for making inferences about population parameters based on a random sample from that population. **S-IC.2.** Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?*	**EES-IC.1-2.** Determine the likelihood of an event occurring when the outcomes are equally likely to occur.	**Level IV AA Students will:** **EES-IC.1-2.** Determine the likelihood of an event occurring when the outcomes are not equally likely to occur. Ex. You have a bag of marbles with five red, four blue, six white, and five yellow marbles. What is the probability of choosing a white marble? Ex. Your drawer contains seven pairs of white socks and three pairs of black socks. What is the probability of choosing a white pair? **Level III AA Students will:** **EES-IC.1-2.** Determine the likelihood of an event occurring when the outcomes are equally likely to occur. Ex. A spinner contains four colors: blue, red, green, and yellow. What is the probability of landing on red? Ex. A die is rolled. What is the probability of landing on a four? Ex. You have three blue candies, seven green candies, and four red candies in a bag. Which color are you most likely to draw out of the bag? **Level II AA Students will:** **EES-IC.1-2.** Determine the possible outcomes of an event occurring. Ex. A spinner contains four colors (blue, red, green, and yellow). List all of the possible outcomes. Ex. What are the possible outcomes of rolling a die? Ex. What are the possible outcomes when flipping a coin? **Level I AA Students will:** **EES-IC.1-2.** Identify one event or outcome of an event occurring. Ex. Given a spinner with four colors, identify one color as a possible outcome.

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
		Ex. Given a die, identify five as a possible outcome.
Make inferences and justify conclusions from sample surveys, experiments, and observational studies. **S-IC.3.** Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. **S-IC.4.** Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. **S-IC.5.** Use data from a randomized experiment to compare two treatments; use simulations to decide if	**EES-IC.3-6.** N/A (See EES-ID.1-2)	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
differences between parameters are significant. **S-IC.6.** Evaluate reports based on data.		

High School Mathematics Standards: Statistics and Probability - Conditional Probability and the Rules of Probability

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
Understand independence and conditional probability and use them to interpret data. **S-CP.1.** Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not"). **S-CP.2.** Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent. **S-CP.3.** Understand the conditional probability of *A*	**EES-CP.1-4.** Identify when events are independent or dependent.	**Level IV AA Students will:** **EES-CP.1-4.** Find the probability of an event after another event has occurred. Ex. Find the probability of the next coin flip after a succession of coin flips (e.g., If Joe flipped a coin four times in row and got heads each time, what is the probability of getting heads on the next flip?). Ex. Find the probability of drawing a particular color after a succession of draws (e.g., If Sam had three die in a bag - one red, one blue, and one green, what is the probability of drawing and rolling a blue?). Ex. Find the probability of drawing a particular color after the color has been withdrawn (e.g., A bag contains four blue, three red, two yellow, and one black balls. Wes randomly selected the black ball. What is the probability he will select a yellow ball next if the black ball is not replaced in the bag?). **Level III AA Students will:** **EES-CP.1-4.** Identify when events are independent or dependent. Ex. When asked if winning the lottery depends on the weather, reply no. Ex. When asked if the basketball game is likely to be canceled if it rains, reply no. Ex. When asked if the baseball game is likely to will be canceled if it rains, indicate likely. Ex. When asked whether catching the bus depends upon whether you get up on time, reply yes. **Level II AA Students will:** **EES-CP.1-4.** Identify the outcomes of an event. Ex. What happens when an egg falls off the table?

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*. **S-CP.4.** Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly*		Ex. Two red and two blue balls are in a bag, two balls are taken out, what colors (two red, two blue, or red and blue) could the balls be? **Level I AA Students will:** **EES-CP.1-4.** Determine which event occurs first in a sequence. Ex. Which is put on first - socks or shoes? Ex. Using a daily schedule, what activity would come next?

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results. **S-CP.5.** Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*		
Use the rules of probability to compute probabilities of compound events in a uniform probability model. **S-CP.6.** Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong	**EES-CP.6-7.** N/A (See EES-IC.1-2)	

CCSS Grade-Level Clusters	Common Core Essential Elements	Instructional Achievement Level Descriptor
to *A*, and interpret the answer in terms of the model. **S-CP.7.** Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.		

GLOSSARY AND EXAMPLES OF MATHEMATICS TERMS

Acute triangle. A triangle with all acute angles (acute means measuring less than 90°). See http://www.mathsisfun.com/definitions/acute-triangle.html

Angles. A shape formed by two lines or rays that diverge from a common point or vertex.

Area. The size of a region enclosed by the figure. Area is measured in square units (e.g., the area of this rectangle is six square units).

Associative property for addition. The sum of three or more numbers which are always the same when added together, no matter what order they are in. This is illustrated by $a + (b + c) = (a + b) + c$; $2 + (3 + 4) = (2 + 3) + 4$.

Associative property for multiplication. The product of three or more numbers which are always the same when multiplied together, regardless of their grouping. This is illustrated by $a(bc) = (ab)c$; $2(3\times4) = (2\times3)4$.

Attributes. For math purposes, "attributes" refer to characteristics of an object or geometric shape. These include qualities of shape, color, size, side, length, etc.

Base ten blocks. Blocks used to learn place value, addition, subtraction, multiplication, and division. Base ten blocks consist of cubes (ones place), rods (tens place), flats (hundreds place), and blocks (thousands place).

Categorical data. Types of data, which may be divided into groups such as race, sex, age group, and educational level when categorized into a small number of groups.

Commutative property of addition. The sum of numbers are always the same when added together, no matter if the order of the addends are changed. This is illustrated by $a + b = b + a$ ($2 + 1 = 1 + 2$).

Commutative property of multiplication. The product of numbers are always the same when multiplied together, even if the order of factors are changed (i.e., if a and b are two real numbers, then $a \times b = b \times a$.)

Compose numbers. To combine parts/components to form a number (adding parts to obtain a number).

Congruent figures. Figures that have the same size and shape.

Congruent/congruence. The same.

Decompose numbers. The process of separating numbers into their components (to divide a number into smaller parts). *Example:* 456 can be decomposed as 456 = 400 + 50 + 6.

Denominator. The "bottom" number of a fraction; the number that represents the total number of parts into which one whole is divided (e.g., in 3/4, the 4 is the denominator and indicates that one whole is divided into 4 parts).

Dividend. The number that is being divided (e.g., In the problem, there are 550 pencils; each pack has 10 pencils; how many packs are there? 550 ÷ 10 = 55, *550* is the dividend because it tells how many pencils there are in all to be divided.).

Divisor. A number by which another number is divided (e.g., In the problem, there are 550 pencils; each pack has 10 pencils; how many packs are there? 550 ÷ 10 = 55, *10* is the divisor because it tells how many times 550 is to be divided.

Edge. The line segment where two faces of a solid figure meet (i.e., a cube has 12 edges).

ELA. English Language Arts

Equation. A mathematical sentence of equality between two expressions; equations have an equal sign (e.g., n + 50 = 75 or 75 = n + 50 means that n + 50 must have the same value as 75).

Equilateral triangle. A triangle with all three sides of equal length, corresponding to what could also be known as a "regular" triangle – an equilateral triangle is therefore a special case of an isosceles triangle having not just two but all three sides equal. An equilateral triangle also has three equal angles. See http://www.mathsisfun.com/definitions/equilateral-triangle.html

Expression. An operation between numbers that represents a single numeric quantity; expressions do not have an equal sign (e.g., *4r, x+2, y-1*).

Face. A plane surface of a three-dimensional figure.

Fact families. Sets of related math facts. For example:

Addition fact family: 3 + 5 = 8; 8 - 3 = 5; 5 + 3 = 8; and 8 - 5 = 3
Multiplication fact family: 5 x 4 = 20; 20 ÷ 5 = 4; 4 x 5=20; and 20 ÷ 4 = 5

Fair share. In division meaning splitting into equal parts or groups with nothing left over.

Frequency table. A table that lists items and uses tally marks to record and show the number of times they occur.

Functions. A special kind of relation where each x-value has one and only one y-value.

Function table. A table that lists pairs of numbers that show a function.

Inequality. A mathematical sentence in which the value of the expressions on either side of the relationship symbol are unequal; relation symbols used in inequalities include > (greater than) and < (less than) symbols (e.g., $7 > 3$, $x < y$).

Input/output table. A table that lists pairs of numbers that show a function.

Integers. Positive and negative whole numbers.

Interlocking cubes. Manipulatives that help students learn number and math concepts - cubes represent "units" and link in one direction. Interlocking cubes are used for patterning, grouping, sorting, counting, numbers, addition, subtraction, multiplication, division, and measurement.

Intersecting lines. Lines that cross.

Inverse operations. Opposite/reverse operations (e.g., subtraction is the inverse operation of addition, which is why 4 + 5 = 9 and 9 – 5 = 4; division is the inverse operation of multiplication, which is why 4 x 5 = 20 and 20 ÷ 5 = 4).

Linear equation. An equation that is made up of two expressions set equal to each other (e.g., $y = 2x + 5$) - A linear equation has only one or two variables and graph as a straight line. See http://www.eduplace.com/math/mathsteps/7/d/index.html

Line graph. A graphical representation using points connected by line segments to show how something changes over time.

Lines of symmetry. Any imaginary line along which a figure could be folded so that both halves match exactly.

Manipulatives. Objects that are used to explore mathematical ideas and solve mathematical problems (e.g., tools, models, blocks, tiles cubes, geoboards, colored rods, M&M's).

Mathematical structures.

Addition – compare-total unknown
Ex. If Anita has 10 sheets of paper and you have 10 more sheets than Anita. How many sheets do you have?

Addition – start unknown
Ex. Sam gave away 10 apples and has five apples left. How many apples did he start have before he gave 10 apples?

Addition join-part/part – whole
Ex. Jessie had 20 cakes and bought five more. How many does he have now?

Subtraction – classic take away
Ex. If Judy had $50 and spent $10, how much does she have left?

Subtraction – difference unknown
Ex. Sandi has 10 cats and 20 dogs. Which does she have more of, cats or dogs? How many more?

Subtraction – deficit missing amount
Ex. Sandy wants to collect 35 cards and she already has 15. How many more cards does she need?

Multiplication – repeated addition
Ex. James got paid $5 each day for five days. How much money did he have at the end of the five days?

Multiplication – array
Ex. Carlos wanted to cover his rectangular paper with one-inch tiles. If his paper is five inches long and four inches wide, how many tiles will it take to cover the paper?

Multiplication – fundamental counting principle
Ex. Julie packed four shirts and four jeans for her trip. How many outfits can she make?

Division – repeated subtraction
Ex. James pays $5 each day to ride the bus. How many days can he ride for $20?

Division – factor/area – side length
Ex. Tim wants to know the width of a rectangular surface covered in 20 one-inch tiles. He knows the length is five inches, but what is the width?

Division – partitive/fair share
Ex. Julie has 20 different outfits. She has five shirts – how many pair of jeans does she have to make 20 different outfits?

Mean. The "average" – To find the mean, add up all the numbers and then divide by the number of numbers.

Median. The "middle" value in the list of numbers - To find the median, your numbers have to be listed in numerical order, so you may have to rewrite your list.

Minuend. The number one is subtracting from (e.g., 9 in 9 – 2 = __).

Mode. The value that occurs most often - If no number is repeated, then there is no mode for the list. See http://www.purplemath.com/modules/meanmode.htm

Models. Pictorial or tactile aids used explore mathematical ideas and solve mathematical problems – Manipulatives can be used to model situations.

Non-numeric patterns. Using symbols, shapes, designs, and pictures to make patterns (e.g., ΔΔ◊◊ ΔΔ◊◊).

Non-standard units of measure. Measurements that are neither metric nor English (e.g., number of footsteps used to measure distance or using a piece of yarn used to measure length).

Number line. A diagram that represents numbers as points on a line; a number line must have the arrows at the end.

Number sentence. An equation or inequality using numbers and symbols that is written horizontally (e.g., 5 < 7 or 5 +7+12).

Numerals. 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

Numeric patterns. A pattern that uses skip counting, often starting with the number 1 or 2 – Counting by tens and twos may also be presented to students beginning with different numbers such as 7 or 23; this is more difficult for students but indicates a deeper understanding of skip counting (e.g., 7, 17, 27, 37, 47, . . . or 7, 9, 11, 13, 15, 17).

Numerical expression. A mathematical phrase that involves only numbers and one or more operational symbols.

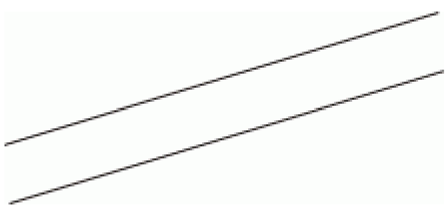
Obtuse triangle. A triangle that has one obtuse angle (obtuse means measuring more than 90°). See http://www.mathsisfun.com/definitions/obtuse-triangle.html

Operations. Addition, subtraction, multiplication, and division.

Ordered pair. In the ordered pair (1, 3), the first number is called the x-coordinate; the second number is called the y-coordinate; this ordered pair represents the coordinates of point A.

- The x-coordinate tells the distance right (positive) or left (negative).
- The y-coordinate tells the distance up (positive) or down (negative).

Parallel Lines. Lines that are the same distance apart and that never intersect – Lines that have the same slope are parallel.



Pattern. Patterns with a minimum of three terms

- using numbers by repeatedly adding or subtracting (i.e., 2, 4, 6, 8, 10, 12; 0, 3, 6, 9, 12, 15; or 50, 45, 40, 35, 30, 25).
- using objects, figures, colors, sound, etc. - a repeated pattern needs to be at least six terms.

  Extend a pattern - When a student is asked to continue a pattern, the pattern is presented, and the student is asked, "What comes next?" before a student can extend or describe a pattern, the given pattern must be comprised of a minimum of three terms so that the student can see the regularities of the situation and extend or describe the pattern based on those regularities.

Percent. A way of expressing a fraction as "out of 100" (e.g., 50% means 50 out of 100 or 50/100).

Perpendicular lines. Lines that intersect, forming right angles.

Polygon. A closed plane figure made by line segments.

Prediction. A guess based on available information.

Quadrilateral. A four-sided polygon.

Rational numbers. Any number that can be expressed as a/b ($b \neq 0$) where a and b are integers; also, in decimal form, any terminating or ultimately repeating decimal.

Ratios. A comparison between two things. For instance, someone can look at a group of people and refer to the "ratio of boys to girls" in the class. Suppose there are 35 students, 15 of whom are boys; the ratio of boys to girls is 15 to 20. See http://www.purplemath.com/modules/ratio.htm

Real-life situations. Ways in which mathematical concepts are used in real life.

Real numbers. All numbers on a number line, including negative and positive integers, fractions, and irrational numbers.

Real-world applications. Ways in which mathematical concepts are used in real-life situations.

Rectangle. A four-sided polygon (a flat shape with straight sides) where every angle is a right angle (90°); opposite sides are parallel and of equal length.

Right triangle. A triangle that has one right angle (a right angle measures exactly 90°) – Only a single angle in a triangle can be a right angle or it would not be a triangle. A small square is used to mark which angle in the figure is the right angle.

Sets. A group or collection of things that go together (e.g., a group of four stars).

Side. In most general terms, a line segment that is part of the figure - it is connected at either end to another line segment, which, in turn, may or may not be connected to still other line segments.

Similar figures. Figures that have the same shape but different sizes.

Similar shapes. Objects of the same shape but different sizes in which the corresponding angles are the same.

Slope. The steepness/incline/grade of a line.

> ***Positive slope*** – the condition in which a line inclines from left to right.
> ***Negative slope*** – the condition in which a line declines from left to right.

Square. A four-sided polygon (a flat shape with straight sides) where all sides have equal length and every angle is a right angle (90°).

Square root. A value that can be multiplied by itself to give the original number (e.g., the square root of 25 is 5 because 5 x 5 = 25).

Square root notation. Numbers written using a radical √.

Subitize. To judge the number of objects in a group accurately without counting.

Three-dimensional geometric figures. The study of solid figures in three-dimensional space: cube, rectangular prism, sphere, cone, cylinder, and pyramid.

Two-dimensional figures. The study of two-dimensional figures in a plane; drawings of square, rectangle, circle, triangle, pentagon, hexagon, and octagon.

Unknown fixed quantities. A constant that is a quantity; a value that does not change.

Variable. A symbol for an unknown number to be solved; it is usually a letter like x or y (e.g., in $x + 3 = 7$, x is the variable).

Venn diagram. Made up of two or more overlapping circles. It is often used in mathematics to show relationships between sets. A Venn diagram enables students to organize similarities and differences visually.

Vertex (vertices, pl.). The point(s) where two or more edges meet (corners).

Volume. The amount of three-dimensional space an object occupies; capacity.

GLOSSARY OF SPECIAL EDUCATION TERMS

Accommodations. Changes in the administration of an assessment, such as setting, scheduling, timing, presentation format, response mode, or others, including any combination of these that does not change the construct intended to be measured by the assessment or the meaning of the resulting scores. Accommodations are used for equity, not advantage, and serve to level the playing field. To be appropriate, assessment accommodations must be identified in the student's Individualized Education Plan (IEP) or Section 504 plan and used regularly during instruction and classroom assessment.

Achievement descriptors. Narrative descriptions of performance levels that convey student performance at each achievement level and further defines content standards by connecting them to information that describes how well students are doing in learning the knowledge and skills contained in the content standards. (See also "performance descriptors.")

Achievement levels. A measurement that distinguishes an adequate performance from a Level I or expert performance. Achievement levels provide a determination of the extent to which a student has met the content standards. (See also Performance levels.)

Achievement standard .A system that includes performance levels (e.g., unsatisfactory, Level III, advanced), descriptions of student performance for each level, examples of student work representing the entire range of performance for each level, and cut scores. A system of performance standards operationalizes and further defines content standards by connecting them to information that describes how well students are doing in learning the knowledge and skills contained in the content standards. (See also "performance standards.")

Achievement test. An instrument designed to efficiently measure the amount of academic knowledge and/or skill a student has acquired from instruction. Such tests provide information that can be compared to either a norm group or a measure of performance, such as a standard.

Age appropriate. The characteristics of the skills taught, the activities and materials selected, and the language level employed that reflect the chronological age of the student.

Alignment. The similarity or match between or among content standards, achievement (performance) standards, curriculum, instruction, and assessments in terms of equal breadth, depth, and complexity of knowledge and skill expectations.

Alternate assessment. An instrument used in gathering information on the standards-based performance and progress of students whose disabilities preclude their valid and reliable participation in general assessments. Alternate assessments measure the performance of a relatively small population of students who are unable to participate in the general assessment system, even with accommodations, as determined by the IEP team.

Assessment. The process of collecting information about individuals, groups, or systems that relies upon a number of instruments, one of which may be a test. Therefore, assessment is a more comprehensive term than *test*.

Assessment literacy. The knowledge of the basic principles of sound assessment practice including terminology, development, administration, analysis, and standards of quality.

Assistance (vs. support). The degree to which the teacher provides aid to the student's performance that provides direct assistance in the content or skill being demonstrated by the student. That is, the assistance involves the teacher performing the cognitive work required. Assistance results in an invalidation of the item or score. (See also "support.")

Assistive technology. A device, piece of equipment, product system, or service that is used to increase, maintain, or improve the functional capabilities of a student with a disability. (See 34 CFR §300.5 and 300.6.)

Cues. Assistance, words, or actions provided to a student to increase the likelihood that the student will give the desired response.

Curriculum. A document that describes what teachers do in order to convey grade-level knowledge and skills to a student.

Depth. The level of cognitive processing (e.g., recognition, recall, problem solving, analysis, synthesis, and evaluation) required for success relative to the performance standards.

Disaggregation. The collection and reporting of student achievement results by particular subgroups (e.g., students with disabilities, limited English Level III students) to ascertain the subgroup's academic progress. Disaggregation makes it possible to compare subgroups or cohorts.

Essence of the standard. That which conveys the same ideas, skills, and content of the standard, expressed in simpler terms.

Essential Elements (EEs or CCEEs). The Common Core Essential Elements are specific statements of the content and skills that are linked to the Common Core State Standards (CCSS) grade level specific expectations for students with significant cognitive disabilities.

Grade Band Essential Element. A statement of essential precursor content and skills linked to the Common Core State Standards (CCSS) grade level clusters and indicators that maintain the essence of that standard, thereby identifying the grade-level expectations for students with significant cognitive disabilities to access and make progress in the general curriculum.

Grade level. The grade in which a student is enrolled.

Instructional Achievement Level Descriptors (IALDs). Describes student achievement and illustrates student performance. IALDs operationalize and further define Essential Elements by connecting them to information that describes how well students are doing in learning the knowledge and skills contained in the Essential Elements.

Individualized Education Program (IEP). An IEP is a written plan, developed by a team of regular and special educators, parents, related service personnel, and the student, as appropriate, describing the specially designed instruction needed for an eligible exceptional student to progress in the content standards and objectives and to meet other educational needs.

Linked. A relationship between a grade level indicator for Common Core State Standards (CCSS) and Common Core Essential Elements (EEs or CCEEs) that reflects similar content and skills but does not match the breadth, depth, and complexity of the standards.

Multiple measures. Measurement of student or school performance through more than one form or test.

- For students, these might include teacher observations, performance assessments or portfolios.
- For schools, these might include dropout rates, absenteeism, college attendance or documented behavior problems

Natural cue. Assistance given to a student that provides a flow among the expectations presented by the educator, opportunities to learn, and the desired outcome exhibited by the student.

Opportunity to learn. The provision of learning conditions, including suitable adjustments, to maximize a student's chances of attaining the desired learning outcomes, such as the mastery of content standards.

Readability. The formatting of presented material that considers the organization of text; syntactic complexity of sentences; use of abstractions; density of concepts; sequence and organization of ideas; page format; sentence length; paragraph length; variety of punctuation; student background knowledge or interest; and use of illustrations or graphics in determining the appropriate level of difficulty of instructional or assessment materials.

Real-world application. The opportunity for a student to exhibit a behavior or complete a task that he or she would normally be expected to perform outside of the school environment.

Response requirements. The type, kind, or method of action required of a student to answer a question or testing item. The response may include, but is not limited to, reading, writing, speaking, creating, and drawing.

Stakeholders. A group of individuals perceived to be vested in a particular decision (e.g., a policy decision).

Standardized. An established procedure that assures that a test is administered with the same directions, and under the same conditions and is scored in the same manner for all students to ensure the comparability of scores. Standardization allows reliable and valid comparison to be made among students taking the test. The two major types of standardized tests are norm-referenced and criterion-referenced.

Standards. There are two types of standards, content and achievement (performance).

- **Content standards.** Statements of the subject-specific knowledge and skills that schools are expected to teach students, indicating what students should know and be able to do.

- **Achievement (Performance) standards.** Indices of qualities that specify how adept or competent a student demonstration must be and consist of the following four components:
  - levels that provide descriptive labels or narratives for student performance (i.e., advanced, Level III, etc.);
  - descriptions of what students at each particular level must demonstrate relative to the task;
  - examples of student work at each level illustrating the range of performance within each level; and
  - cut scores clearly separating each performance level.

Standards-based assessments. Assessments constructed to measure how well students have mastered specific content standards or skills.

Test. A measuring device or procedure. Educational tests are typically composed of questions or tasks designed to elicit predetermined behavioral responses or to measure specific academic content standards.

Test presentation. The method, manner, or structure in which test items or assessments are administered to the student.

Universal design of assessment. A method for developing an assessment to ensure accessibility by all students regardless of ability or disability. Universal design of assessment is based on principles used in the field of architecture in which user diversity is considered during the conceptual stage of development.

*Adapted from the *Glossary of Assessment Terms and Acronyms Used in Assessing Special Education Students: A Report from the Assessing Special Education Students (ASES) State Collaborative on Assessment and Student Standards (SCASS)*

BIBLIOGRAPHY OF DEVELOPMENT PROCESS

Council of Chief State School Officers (CCSSO). (2003). *Glossary of assessment terms and acronyms used in assessing special education students: A report from the Assessing Special Education Students (ASES) State Collaborative on Assessment and Student Standards (SCASS).* Washington, DC: Author. Retrieved from http://www.ccsso.org/Documents/2006/Assessing_Students_with_Disabilities_Glossary_2006.pdf

Education Commission of the States. (1998). *Designing and implementing standards-based accountability systems.* Denver, CO: Author. Retrieved from http://www.eric.ed.gov/PDFS/ED419275.pdf

Hansche, L. (1998). *Handbook for the development of performance standards: Meeting the requirements of Title I.* Washington, DC: U.S. Department of Education (ED) and CCSSO. Retrieved from http://www.eric.ed.gov/PDFS/ED427027.pdf

Jaeger, R. M., & Tucker, C. G. (1998). *Analyzing, disaggregating, reporting, and interpreting students' achievement test results: A guide to practice for Title I and beyond.* Washington, DC: CCSSO.

Johnstone, C. J. (2003). *Improving validity of large-scale tests: Universal design and student performance* (Technical Report 37). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes (NCEO). Retrieved from http://www.cehd.umn.edu/nceo/onlinepubs/technical37.htm.

Lehr, C.,& Thurlow, M. (2003). *Putting it all together: Including students with disabilities in assessment and accountability systems* (Policy Directions No. 16). Minneapolis, MN: University of Minnesota, NCEO. Retrieved from http://www.cehd.umn.edu/NCEO/onlinepubs/Policy16.htm

Linn, R. L., & Herman, J. L. (1997). *A policymaker's guide to standards-led assessment.* Denver, CO: National Center for Research on Evaluation, Standards, and Student Testing (CRESST) & Education Commission of the States (ECS) Distribution Center. Retrieved from http://www.eric.ed.gov/PDFS/ED408680.pdf

McKean, E. (Ed.). (2005). *The New Oxford American Dictionary* (2nd ed.). New York, NY: Oxford University Press.

Quenemoen, R., Thompson, S., & Thurlow, M. (2003). *Measuring academic achievement of students with significant cognitive disabilities: Building understanding of alternate assessment scoring criteria* (Synthesis Report 50). Minneapolis, MN: University of Minnesota, NCEO. Retrieved from http://www.cehd.umn.edu/NCEO/onlinepubs/Synthesis50.html

Rabinowitz, S., Roeber, E., Schroeder, C., & Sheinker, J. (2006). *Creating aligned standards and assessment systems*. Washington, DC: CCSSO. Retrieved from http://www.ccsso.org/Documents/2006/Creating_Aligned_Standards_2006.pdf

Roeber, E. (2002). *Setting standards on alternate assessments* (Synthesis Report 42). Minneapolis, MN: University of Minnesota, NCEO. Retrieved from http://www.cehd.umn.edu/nceo/OnlinePubs/Synthesis42.html

Sheinker, J. M. (2004, April 26). *Achievement standards for alternate assessments: What is standard setting?* Teleconference presentation for the National Center for Educational Outcomes to 38 State Departments of Education, Minneapolis, MN. Retrieved from http://www.cehd.umn.edu/nceo/teleconferences/tele08/default.html

Sheinker, J. M., & Redfield, D. L. (2001). *Handbook for professional development on assessment literacy.* Washington, DC: CCSSO.

Thompson, S. J., Johnstone, C. J., & Thurlow, M. L. (2002). *Universal design applied to large scale assessments* (Synthesis Report 44). Minneapolis, MN: University of Minnesota, NCEO. Retrieved from http://www.cehd.umn.edu/nceo/onlinepubs/Synthesis44.html

Ysseldyke, J., Krentz, J., Elliott, J., Thurlow, M. L., Erickson, R., & Moore, M. L. (1998). *NCEO framework For educational accountability.* Minneapolis, MN: University of Minnesota, NCEO. Retrieved from http://www.cehd.umn.edu/NCEO/onlinepubs/archive/Framework/FrameworkText.html

BIBLIOGRAPHY FOR MATHEMATICS CONTENT

Blaha, R., & Cooper, H. (2009, February 12-14). Academic learners with deafblindness: Providing access to the general curriculum. Paper presented at the Purpose, Satisfaction, and Joy in the Lives of Students with Deafblindness and the People Who Care Conference, Austin, TX. Retrieved from http://www.tsbvi.edu/attachments/handouts/feb09/BlahaCooperAcademAccessGenEd_handout.doc

Browder, D. M. & Spooner, F. (Eds.). (2006). *Teaching language arts, math, and science to students with significant cognitive disabilities.* Baltimore, MD: Brookes Publishing Co. Retrieved from http://www.brookespublishing.com/store/books/browder-7985/index.htm

Burris, C., Heubert, J., & Levin, H. (2004). Math acceleration for all. *Educational Leadership: Improving Achievement in Math and Science, 61*(5), 68-71. Alexandria, VA: Association for Supervision and Curriculum Development (ASCD). Retrieved from http://www.ascd.org/publications/educational-leadership/feb04/vol61/num05/Math-Acceleration-for-All.aspx

Clements, D. H. (1999, March). Subitizing: What is it? Why teach it? *Teaching Children Mathematics*, *5*(7), 400-405. Reston, VA: National Council of Teachers of Mathematics. Retrieved from http://www.nctm.org/publications/article.aspx?id=20890

Clements, D. H. (1999, January). Teaching length measurement: Research challenges. *School Science and Mathematics*, *99*(1), 5-11. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/ssm.1999.99.issue-1/issuetoc

Clements, D. H., & Sarama, J. (2010). Technology. In V. Washington & J. Andrews (Eds.), *Children of 2020: Creating a better tomorrow* (pp. 119-123). Washington, DC: Council for Professional Recognition/National Association for the Education of Young Children.

Clements, D. H., Sarama, J., & Wolfe, C. B. (2011). *Tools for early assessment in mathematics (TEAM)*. Columbus, OH: McGraw-Hill Education. Retrieved from https://www.mheonline.com/program/view/4/4/335/007TEAM

Cooney, S., & Bottoms, G. (2002). *Middle grades to high school: Mending a weak link* (Research brief). Atlanta, GA: Southern Regional Education Board. Retrieved from http://publications.sreb.org/2002/02V08_Middle_Grades_To_HS.pdf

Daro, P. (2011, February). Unlocking the common core: Common core state standards. Webinar for the Common Core Virtual Conference, sponsored by Pearson Education. Retrieved from http://commoncore.pearsoned.com/index.cfm?locator=PS1324

Fletcher, J. M., Lyon, G. R., Fuchs, L. S., & Barnes, M. A. (2006). *Learning disabilities: From identification to intervention*. New York, NY: Guilford Press.

Ford, R. (2006, January). *High school profiles of mathematically unprepared college freshmen*. Paper presented at the fourth annual International Conference on Education, Honolulu, HI.

Fuchs, L. S., Compton, D. L., Fuchs, D., Paulsen, K., Bryant, J. D., & Hamlett, C. L. (2005). The prevention, identification, and cognitive determinants of math difficult. *Journal of Educational Psychology*, *97*(3), 493-513.

Fuchs, L. S., Fuchs, D., Compton, D. L., Powell, S. R., Seethaler, P. M., Capizzi, A. M., Schatschneider, C., & Fletcher, J. M. (2006). The cognitive correlates of third-grade skill in arithmetic, algorithmic computation, and arithmetic word problems. *Journal of Educational Psychology, 98*(1), 29-43.

Fuchs, L. S., Fuchs, D., Powell, S. R., Seethaler, P. M., Cirino, P. T., & Fletcher, J. M. (2008). Intensive intervention for students with mathematics disabilities: seven principles of effective practice. *Learning Disability Quarterly*, *31*(2), 79-92. Retrieved from http://www.mendeley.com/research/intensive-intervention-students-mathematics-disabilities-seven-principles-effective-practice-4/

Fuchs, L. S., Powell, S. R., Seethaler, P. M., Fuchs, D., Hamlett, C. L., Cirino, P., & Fletcher, J. M. (2007*). Intensive intervention on number combination and story problem deficits in third graders with math difficulties, with and without concurrent reading difficulties*. Manuscript submitted for publication.

Fuson, K. C., Clements, D. H., & Beckmann, S. (2010). *Focus in Grade 1: Teaching with the curriculum focal points*. Reston, VA: National Council of Teachers of Mathematics. Retrieved from http://www.nctm.org/catalog/product.aspx?id=13628

Ginsburg, A., & Leinwand, S. (2009). Informing Grades 1-6 mathematics standards development: What can be learned from high-performing Hong Kong, Korea, and Singapore? Washington, DC: American Institutes for Research. Retrieved from http://www.air.org/files/MathStandards.pdf

James B. Hunt Jr. Institute for Educational Leadership and Policy. (n.d.). Common core state standards – General brief. Retrieved from http://www.edweek.org/media/fordham_event.pdf

Kroesbergen, E. H., & Van Luit, J.E.H. (2003). *Mathematics interventions for children with special needs: A meta-analysis*. *Remedial and Special Education*, *24*(2), 97-114. Retrieved from http://rse.sagepub.com/content/24/2/97.abstract

Maccini, P., Mulcahy, C. A., & Wilson, M. G. (2007). A follow-up of mathematics interventions for secdonary students with learning disabilities. *Learning Disabilities Research and Practice*, *22*(1), 58-74. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1540-5826.2007.00231.x/abstract

Miller, S. P., & Hudson, P.J. (2007). Using evidence-based practices to build mathematics competence related to conceptual, procedural, and declarative knowledge. *Learning Disabilities Research and Practice*, *22*(1), 47-57. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1540-5826.2007.00230.x/abstract

Montague, M. (2007). Self-regulation and mathematics instruction. *Learning Disabilities Research and Practice*, *22*(1), 75-83. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1540-5826.2007.00232.x/abstract

National Governors Association for Best Practices (NGA Center) & Council of Chief State School Officers (CCSSO). (2011). *The standards: Mathematics.* Retrieved from http://www.corestandards.org/the-standards/mathematics.

NGA Center & CCSSO. (2010). *Common core state standards for mathematics. Appendix A: Designing high school mathematics courses based on the common core state standards.* Retrieved from http://www.corestandards.org/assets/CCSSI_Mathematics_Appendix_A.pdf

Sarama, J., & Clements, D. H. (2010). The mathematical lives of young children. In V. Washington & J. Andrews (Eds.), *Children of 2020: Creating a better tomorrow* (pp. 81-84). Washington, DC: Council for Professional Recognition/National Association for the Education of Young Children.

Sarama, J., & Clements, D. H. (2009). Teaching math in the primary grades: The learning trajectories approach. *Young Children*, *64*(2), 63-65. Retrieved from http://www.naeyc.org/files/yc/file/Primary_Interest_BTJ.pdf

Schmidt, B., Houang, R., & Cogan, L. (2002). A coherent curriculum: The case of mathematics. *American Educator*, *26*(2), 1-18. Retrieved from http://www.aft.org/pdfs/americaneducator/summer2002/curriculum.pdf

Swanson, H. L. (2006). Cross-sectional and incremental changes in working memory and mathematical problem solving. *Journal of Educational Psychology*, *98*, 265-281.

Thompson, S. J., Morse, A. B., Sharpe, M., & Hall, S. (2005). *Accommodations manual: How to select, administer and evaluate use of accommodations and assessment for students with disabilities* (2nd ed.). Washington, DC: CCSSO. Retrieved from http://www.ccsso.org/Documents/2005/Accommodations_Manual_How_2005.pdf

Washington Office of the Superintendent of Public Instruction. (2008). *Guidelines for accelerating students into high school mathematics in grade 8.* Olympia, WA: Author. Retrieved from http://www.k12.wa.us/Mathematics/Standards/Compression.pdf

Wiley, A., Wyatt, J. & Camara, W. J. (2010). *The development of a multidimensional college readiness index* (Research Report No. 2010-3). New York, NY: The College Board. Retrieved from http://professionals.collegeboard.com/profdownload/pdf/10b_2084_DevMultiDimenRR_WEB_100618.pdf

APPENDIX A

SEA/Stakeholder Demographics

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
Barbara Adams	IA	No response	K-12 Mathematics Curriculum Coordinator	No response	No response	Caucasian	20-25	PhD
Roula AlMouabbi	MI	Secondary Math 6-12; Bilingual Arabic/French 6-12	HS Bilingual Algebra/Geometry. College Algebra	9-11 and College	Arabic, French, African	Caucasian	20-25	MA
Robin Barbour	NC	All Subjects 4-6; 6-9 Math and Science; AIG certification	Secondary Math Consultant for NC Dept. of Public Instruction	7-8 Math; 9th Physical Science; Algebra 1; Integrated Math	General Education with inclusion experience	Caucasian	20-25	MA
Tamara Barrientos	MI	K-5 Elementary; 6-8 Math/Science	Director, Saginaw Valley State University Regional Mathematics and Science Center	6-8 Math	N/A	Hispanic	11-15	MA
DiRae Boyd	KS	Core Content Mesh K-6; Elementary K-9; LD K-9; MR K-9; SPED ELA K-9; SPED History and Government K-9; SPED Math K-9; SPED Science K-9	Functional 6-8 inter-related teacher	Special Education 6-8; Summer School to K-12 Special Education	MR; S/P; Autism; ED; DB; MD: HI; OHI; TBI; LD	Caucasian	16-20	BA
Lynda Brown	UT	ESL/Elem Math/Early Childhood Endorsement	Math Coach K-6 (4 schools, general and special ed.)	2-6 General Education	Special Education and Inclusion	Caucasian	30+	MED

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
Sue Burger	NJ	Elementary/ Teacher of Handicapped	Special Education/ Curriculum Specialist	HS Resource	HS Resource; Autism; OHI; MLD; BD; Preschool Disabled	Caucasian	30+	BA
Jennifer Burns	OK	Special Education – all contents	Assessment Coordinator for Special Education Services for State Dept. of Ed.	Special Education Pre-K and 6-8	S/P; MI/MO	Caucasian	6-10	MED/ MS
John Butz	IA	Math K-8; K-6 Elementary Education	2nd grade teacher	5th grade	Instruction of Special Education in General Education classroom	Caucasian	16-20	BA
Laurel Cakinberk	IA	Special Education Strategist II	Special Education	Middle/HS	MO/S/P	Caucasian	11-15	MA
Sharon Campione	MO	LD 1-8; MH/BD K-9; Spec Ed Admin K-12; Principal K-12	Functional, Life Skills, Self-contained 4-6	Middle School 7-8/Special Education	SSD Coordinator; Teacher Assist severe population	Caucasian	16-20	MS
Wendy Carver	UT	Communication Disorders/Special Education K-12+; Speech Language Pathology, Psychology, Mild/Mod Dis, ELA	Special Education Assessment Specialist	Special Education K-12+	MI/MO/S	Caucasian	30+	MS
Beth Cipoletti	WV	Math 7-12	Assistant Director, Office of	Math 7-12 and college; taught	Inclusion Classes	Caucasian	30+	EdD

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
			Assessment and Accountability	teacher preparation courses (mathematics)				
Emily Combs	MO	Math 5-9/ ELA 5-9	Math 7th grade	General Education Grade 6	Inclusion; special service, IEP	Caucasian	11-15	MS
Sidney Cooley	KS	Math; Special Education	State Mathematics Consultant	General Education 7-12	Integrated Math grades 7-9; State LD consultant	Caucasian	30+	PhD
Shirley Cooper	NJ	Math	State Mathematics Coordinator	General Education	Inclusion	African American	30+	MS
Jeff Crawford	WA	Math	HS Math, 9-12	College Mathematics	Low SES	Caucasian	16-20	MS
Amy Daugherty	OK	Special Education – All contents	Associate State Director for Special Education Services, State Dept. of Ed.	Special Education K-12	S/P; Emotional Disturbed	Caucasian	6-10	BS
John DeBenedetti	WA	Special Education	4-5 Extended Resource	N/A	Special Education teacher	Caucasian	6-10	BS
Thomas Deeter	IA	NA	Lead Consultant (General Education) Assessment, Accountability, Program Evaluation	General Education		Asian-Caucasian	20-25	PhD
Jennie DeFriez	UT	Administrative/ Supervisory Certification; Level	Utah State Office of Education Elementary Math	General Education Grades 4-7; Math/Science	Assistant to State Special Education Assessment	Caucasian	11-15	MED

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
		2 Math endorsement; Level 2 Elementary Education License, middle level education	Assessment Specialist/Assistant Special Education Assessment Specialist		Specialist			
Kirsten Dlugo	WA	6-8 ELA, Math, Reading and Special Education	Special Education Teacher 6-8, Life Skills Classroom	Ungraded classroom for blind ages 12-16	VI; DB; Aut; MD; LD; BD, ID	Caucasian	6-10	MED
Amber Eckes	WI	Elementary Education and LD; Reading Teacher	Special Education Manager Grades 6-8	Reading 6-8; Math 6-8 and summer classes K-3	Special Education manager/teacher	Caucasian	6-10	BS
John Eisenberg	VA	Special Education	Virginia Department of Education Director of Instructional Support and Related Services	Special Education	ASD; SD; ID	Caucasian	11-15	MS
Lin Everett	MO	K-5 Administrator/Principal; 4-8 SS; K-8 General Education: Lifetime Certificate; 4-8 Middle School Admin/Principal; Superintendent's certification, K-12	MO Dept. of Education Assistant Director of Assessment/Office of CCR	Self-contained 1-4; ELA Middle; Principal K-8, Methods for pre-service teachers/University	Special Ed Coordinator	Caucasian	30+	EdS
Dagny Fidler	IA	Director of Special	Vice-	Special Education K-	Focus on students	Caucasian	30+	PhD

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
		Education; PK-12 Principal; PK-12 Special Education Supervisor	Principal/Special Education Supervisor (focus on students with SCD)	12, College instruction	with significant disabilities			
Kim Fratto	UT	Under review	District Level Teacher Specialist for Students w/Significant Cognitive Disabilities	K-6 Special Education	K-6 Resource Teacher; Inclusion Specialist; Special Education Coordinator; Teacher specialist K-12+, Teacher Specialist, students with SCD	Caucasian	11-15	MS
Rosemary Gardner	WI	Elementary Education 1-8; SSLD PreK-12; Principal; Director of Special Education; Pupil Services	Special Education; Educational Programmer	General Education 1 & 2, and Special Education intermediate and middle school	Special Education Teacher/Support Admin	Caucasian	26-30	MS
Melissa Gholson	WV	Multi-Subjects K-8; Mental Impairments, Autism, Behavior Disorders, Specific LD K-21; Principal and Superintendent	WV Dept. of Education, Office of Assessment and Accountability, Alternate Assessment and Accommodations	Elementary (general and special education), Middle School (special education); High School (general and special education), , College (teacher	Supervisor of Special Education; Special education teaching experience with autism, mild, moderate, severe and profound, mental	Caucasian	16-20	MA

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
				preparation courses)	impairments, behavior disorders, gifted and learning disabilities			
Debra Hawkins	WA	ESEA School Psychology	Director Classroom Assessment Integration	General Education Post-Secondary Level	Profoundly Mentally Handicapped	Caucasian	20-25	EdD
Linda Howley	MI	State Education Assessment Representative	State Education Assessment Representative			Caucasian	11-15	MS
Angelita Jagla	WA	Elementary K-8; Teacher of English as a Second Language; Reading and Math M.S. Ed; NBCT	General Education– 4th grade		Special Education, low SES, ELL	Mexican-American	6-10	MS
Brian Johnson	WI	Special Education	Special Education		CD; Autism; EBD	Caucasian	6-10	MS
MaryAnn Joseph	NJ	NBCT; Middle Childhood Generalist; Special Education K-12	Special Education Consultant NJDOE/OSEP	Special Education Severe/Profound, Middle School; 5-6 In Class Resource Planning (special ed), self-contained classroom ages 7-11; General and Special Education Pre-K-1	Severe/Profound; Learning Disabled K-8	Caucasian	30+	MED

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
Sara King	MO	No response	Special Education ages 18-20	Special Education ages 14-20	Special Education	Caucasian	6-10	MA
Teresa Kraft	KS	Education of the Deaf	Curriculum and Assessment Coordinator, KS School for the Deaf		Deaf/HOH/Multi-handicapped; Visual Impairments	Caucasian	30+	MED
Tracey Lank	NJ	Special Education	Special Education 3-5 grades	Special Education 1, 2, and 6th grades	Multiple Disabilities	Caucasian	1-5	
Ronda Layman	NC	Speech Language; EC Administration	EC Lead Teacher/SLP-Autism and low incidence		Autism; Severe/Profound	Caucasian	20-25	MED
Wesley Lilly	WV	Special Education K-Adult (MI, LD, BD, Autism, Severe Mental Disabilities; Secondary Education; K-12 (Physical Education)	Secondary Special Education MI/Severe/Autism	Special Education K-8 MI/Severe/Autism/ LD/BD	MI/Severe/ Autism/LD/BD; worked with designing alternate assessment	Caucasian	6-10	MA
Diane Lucas	VA	Elementary Reading, Math, Social Studies, and Science	Special Education Classroom Resource Teacher (AT Team Leader)	Early Childhood Special Education	Special Education pre K-12, ID, SD, Autism, LD	Caucasian	30+	MS
Michele Luksa	KS	Severe Disabilities	Special Education Consulting Teacher for Elementary	Special Education Consulting Teacher 5-12	Severe Disabilities; Deaf-Blind, Autism	Caucasian	26-30	MA

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
Deborah Matthews	KS	Students with Significant Cognitive Disabilities and Early Childhood	Kansas State Department of Education	Early childhood-high school	Early Childhood; Students with Significant Cognitive Disabilities	Caucasian	20-25	MS
Melissa Mobley	WV	Autism/Mental Impairment	Supervisor of Special Education – Autism and all levels of mental impairment	Autism K-8	Autism; Mental Impairments PreK-Adult	Caucasian	6-10	MA
Lisa New	WV	Math 7-12; Business Principles 7-12	HS Algebra I, Algebra support teacher	General Education Grades 5-12	Team teacher; inclusion; item writing for alternate assessment	Caucasian Native American	20-25	MS
Karen Pace	MO	Math 7-12	HS Math Teacher	General Education Math 7-9	LD, BD, ELL, low SES	Caucasian	30+	MED
Brain Pianosi	MI	Self-contained Elementary 6-8 Math/Science; K-12 Special Ed.; Cognitive Impairment Administration – certified elementary principal, supervisor and	Director of a Center-based school serving students with Moderate to Severe Cognitive, severe multiple impairments, autism; behavior needs	General Education 3rd grade; Special Education HS Cross Categorical	Deaf son; Daughter with LD; Special Olympics volunteer	Caucasian	20-25	MA

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
		director certifications in special ed.						
Mary Richards	WI	WI Educator Grades 1-8	Math Coach PK-8	General Education K-6; Title I Math 1-4; Gifted and Talented Grades 1-5	Inclusion	Caucasian	30+	MS
Laura Scearce	VA	Math Specialist K-8	Math Coach K-5	Inclusion Grades 3 and 5	Inclusion; Gifted and Talented	Caucasian	11-15	MED
Lisa Seipert	UT	MI/MOD/Severe Special Education	ID/SID self-contained Grades 7-9	LD/CD Self-contained Grades 7-9	LD/ID/SID	Caucasian	11-15	BS
Katie Slane	NJ	Math and LA	7th Grade Special Education, self-contained and inclusive	Special Education 2-5 self-contained	LD and Autism	Caucasian	1-5	BA
Janet Sockwell	NC	Severe/Profound K-12; Mentally handicapped K-12; B/E Handicapped K-12; LD K-12; Birth - Kindergarten	Special Education Preschool Coordinator and Support for ID-Mod/Severe	Special Education K-12 moderate to profound	Moderate/severe/profound, behavior-emotional disturbed, pre-school	Caucasian	21-25	BS

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
Christie Stephenson	OK	MI/Mod; Severe/Profound	Elementary Special Education Supervisor	K-12	LD. ID. MD Autism, OHI	Caucasian	6-10	BS
Deena Swain	WV	Multi-subjects K-8; BD; autism/admin	RESA Director of Special Education	General Education K-8; Math and Science at Alt. School/Juvenile Detention Center Grades 7-9; Autism K-12	Experience teaching students with ASD, Trainer of teachers and administrators on SE issues	Caucasian	16-20	MA
Emily Thatcher	IA	K-12 Strat I MD; K-12 Strat II MD. Multi-cat 6-12; BD K-6; Severe and Profound K-12; Special Education Consultant	Iowa Dept. of Ed., Bureau of Student and Family Support Services (SPED), Instructional Content Resource and Alternate Assessment Consultant	Special Education and Art K-12	22 years varied experience	Caucasian	21-25	MED
Larry Timm	MI	Special Education CI; Industrial Education	Middle School CI Math 6-8	General Education 6-8 Tech Ed.	Mod to Mild C.I.	Caucasian	16-20	MA
Mona Tjaden	KS	Elementary K-9; EMR and TMR Special Education K-9; Special Education Supervisor K-12; Library Media K-12	Special Education Program Coordinator	Special Education Program Coordinator	Special Education Teacher and Coordinator	Caucasian	30+	MS

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
Janice Tornow	WA	General and Special Education K-12	WA Office of Superintendent of Public Instruction	Special Education K-12	Special Education Teacher and Administrator	Caucasian	30+	MED
Jane VanDeZande	MO	ELA and Special Education (Handicapped Learner)	Director of Assessment	5-8 Speech and Language and LD; ELA and Social Studies 9-12	Chapter I Director Math and Reading, Special Education	Irish American	16-20	Other Degree
Joyce Viscomi	VA	Elementary K-5 (reading, math, social studies, science)	Special Education Intellectually Impaired, Multiple Handicapped and OHI	Special Education – preK-12	Special Education Intellectually Impaired, Multiple Handicapped, Severe and Profound, OHI	Caucasian	20-25	BS
Nicole Warren	UT	Early Childhood Education; Elementary Math Endorsement; ESL Endorsement, Admin. Certification	Elementary Math Coach; General and Special Education, facilitate elementary endorsement classes	General Education Kindergarten. Coached all grades K-6.	Assisted Special Education Teachers in Math Curriculum, Instruction, and Assessment	Caucasian	11-15	MED
Roslynn Webb	VA	History/ELA	Math 6-8		Multi/Intellectual Disabilities	Black	6-10	MS
Deborah Wickham	VA	Postgraduate Professional License Admin PreK – 12; Early Education NK-4, Division Superintendent	Math Specialist K-5	General Education K-5 and college (per-service and graduate)	Worked with special needs students	Caucasian	26-30	PhD

Name	State	Area of Certification	Current Assignment	Other Grades Taught	Special Population Experience	Ethnicity	Years of Experience	Highest Degree
		License						
Joanne Winkelman	MI	Elementary and Special Education	State Agency	General Education 6-12	Special Education experience	Caucasian	21-25	PhD
Jeff Ziegler	WI	Math 9-12	HS Math Resource Teacher		Inclusion	Caucasian	16-20	MS

SECTION 4

Wisconsin's Approach to Literacy in All Subjects

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What is Disciplinary Literacy?

Literacy, the ability to read, write, listen, speak, think critically and perform in different ways and for different purposes, begins to develop early and becomes increasingly important as students pursue specialized fields of study in high school and beyond. The Common Core State Standards (CCSS) for Literacy in Science, Social Studies, History, and the Technical Subjects are connected to College and Career Readiness Standards that guide educators as they strive to help students meet the literacy challenges within each particular field of study. This national effort is referred to as disciplinary literacy.

In Wisconsin, disciplinary literacy is defined as the confluence of content knowledge, experiences, and skills merged with the ability to read, write, listen, speak, think critically and perform in a way that is meaningful within the context of a given field.

These abilities are important in ALL courses and subjects. While the Common Core State Standards (CCSS) for Literacy in Science, Social Studies, History, and the Technical Subjects provide standards for cross-discipline reading and writing in grades 6-12, Wisconsin recognizes the need to broaden this effort and include **all disciplines and every educator in every grade level K-12.** This literacy focus must begin as soon as children have access to formal education and continue intentionally as college and career readiness goals advance for all children in Wisconsin.

To address this expanded definition and approach to disciplinary literacy, excerpts from the K-5 Common Core State Standards for English Language Arts are included in this document. Elementary classroom teachers build the foundational literacy skills necessary for students to access all learning. Additionally, they develop content specific to deep literary study, oratory tradition and linguistic analysis; skills specific to English language arts. Literacy reaches beyond this knowledge in one content area to include reading, writing, listening, speaking and thinking critically in each discipline beginning at an early age. The applicable K-5 standards help educators in Wisconsin build a ladder of skills and dispositions that lead to accelerated achievement across disciplines and will be included in every content-specific standards document into the future.

Why is disciplinary literacy important?

The modern global society, of which our students are a part, requires postsecondary learning. An analysis of workforce trends by Georgetown University economist Anthony Carnevale and his colleagues found that nearly 60 percent of all job openings in 2007 required some postsecondary education; postsecondary success depends on students' ability to comprehend and produce the kinds of complex texts found in all disciplines. Therefore, the economic future of our state, as well as our students and their success as productive citizens and critical thinkers link to disciplinary literacy.

Textbooks, articles, manuals and historical primary source documents create specialized challenges for learners. These texts often include abstracts, figures, tables, diagrams and specialized vocabulary. The ideas are complex and build across a number of paragraphs requiring focus and strategic processing. To comprehend and produce this type of text, students must be immersed in the language and thinking processes of that discipline and they must be supported by an expert guide, their teacher (Carnegie Report, 2010).

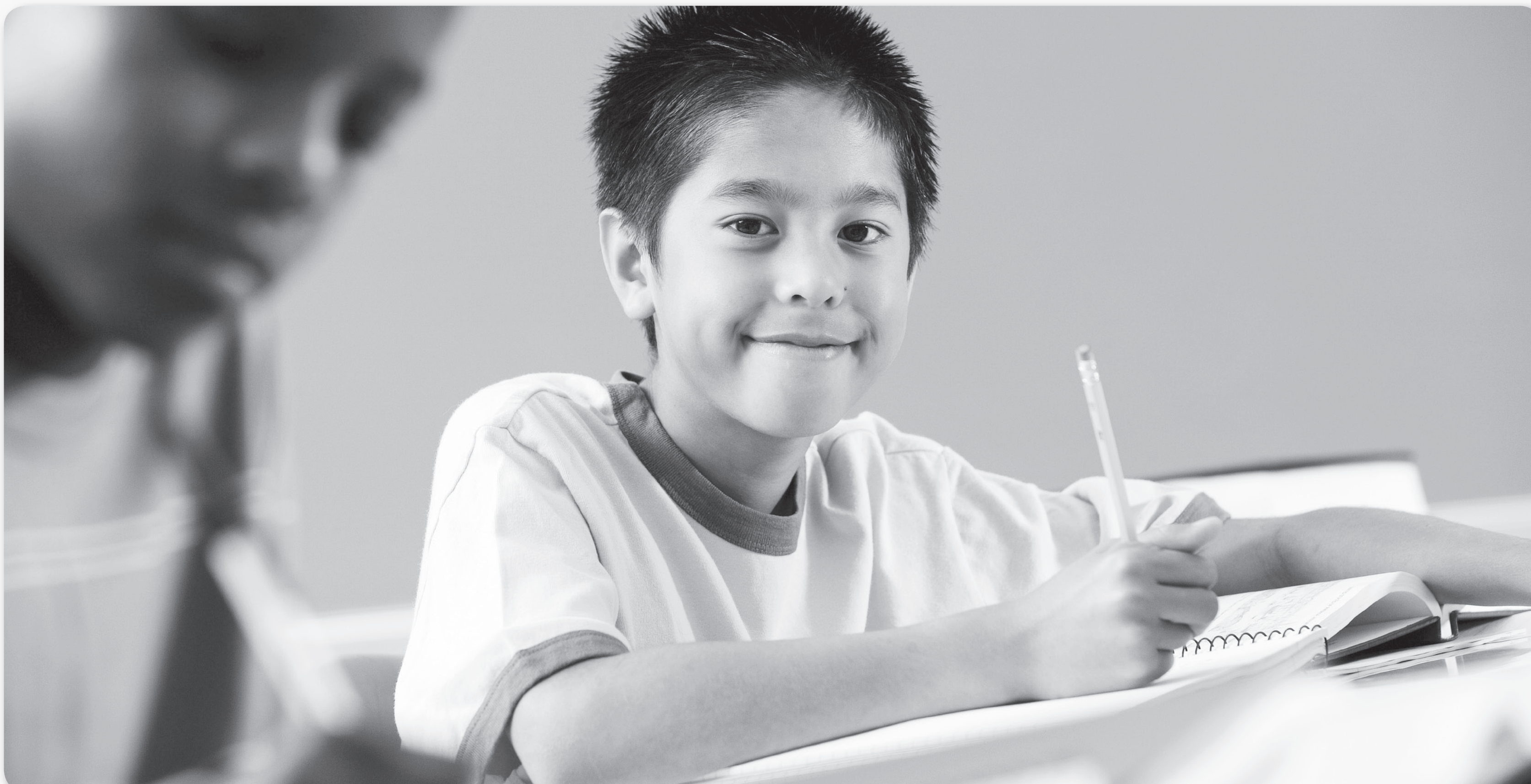
A focus at the elementary level on foundational reading, when expanded to include engaging experiences connected to informational texts, vocabulary, and writing for content-specific purposes builds background knowledge and skills in each discipline. This increases opportunities for success as students approach more rigorous content in those disciplines (Alliance for Excellent Education, 2011).

Reading, writing, speaking, listening and critical thinking must be integrated into each discipline across all grades so that all students gradually build knowledge and skills toward college and career readiness. Collaboration among institutes of higher education, CESA Statewide Network, districts, schools, teachers and family and community will guide the implementation of the Common Core State Standards in Wisconsin.

The message is that literacy is integral to attainment of content knowledge and content is essential background knowledge for literacy development.

This interdependent relationship exists in all disciplines.

The Common Core State Standards require educators to support literacy in each classroom across the state. Since the impact of this effort is significant, it is essential that resources and supports be accessible to all educators. To build consistent understanding, DPI convened a statewide Disciplinary Literacy Leadership Team in 2011 comprised of educators from many content areas and educational backgrounds. This team was charged with examining the CCSS for Disciplinary Literacy, identifying the needs in the field for support, and gathering materials and resources to address those needs. Resources are available at:
www.dpi.wi.gov/standards

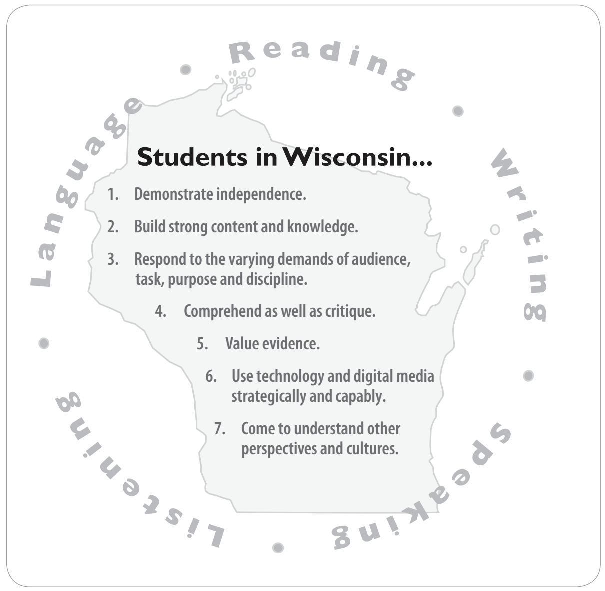


Wisconsin Foundations for Disciplinary Literacy

To guide understanding and professional learning, a set of foundations, developed in concert with Wisconsin's *Guiding Principles for Teaching and Learning,* directs Wisconsin's approach to disciplinary literacy.

Academic learning begins in early childhood and develops across all disciplines.

Each discipline has its own specific vocabulary, text types, and ways of communicating. Children begin learning these context- and content-specific differences early in life and continue through high school and beyond. While gardening, small children observe and learn the form and function of a root, stem, leaf and soil; or measure, mix and blend while baking a cake. School offers all students opportunities to develop the ability to, for example, think like a scientist, write like a historian, critique like an artist, problem-solve like an auto mechanic, or analyze technological advances like a health care technician. As literacy skills develop, educators gradually shift the responsibility for reading, writing, listening, speaking and critical thinking to students through guided supports in both individual and collaborative learning experiences.



Content knowledge is strengthened when educators integrate discipline-specific literacy into teaching and learning.

Educators help students recognize and understand the nuances of a discipline by using strategies that "make their thinking visible." They promote classroom reading, writing, listening, speaking and critical thinking using authentic materials that support the development of content-specific knowledge. They guide students through these complex texts by using strategies that develop conceptual understanding of language and set expectations for relevant application of skills. These literacy practices deepen students' content knowledge, strategies and skills so that their learning transfers to real world situations.

The literacy skills of reading, writing, listening, speaking and critical thinking improve when content-rich learning experiences motivate and engage students.

Educators who foster disciplinary literacy develop experiences that integrate rigorous content with relevant collaborative and creative literacy processes to motivate and engage students. Setting high expectations, they structure routines and supports that empower students to take charge of their own learning. When students work in teams to research science and mathematics concepts in the development of an invention or a graphic arts design; when they collaboratively build a blog that explains their recent marketing venture, they use specific literacy skills and strategies to solidify learning. Students need these opportunities over time to develop the precise and complex reading, writing, listening, speaking and critical thinking skills demanded in today's careers.

Students demonstrate their content knowledge through reading, writing, listening, and speaking as part of a content-literate community.

Students who are literate in a particular discipline are able to successfully read, write, and speak about that discipline and can listen to and think critically as others communicate in that community. Performance tasks that allow students to present the complexity of a content area in a way that is meaningful to the field become authentic approaches to assessing mastery within a discipline. Such tasks empower students to discover the real world connections across disciplines and to actively participate in communities of discipline-literate peers. As Wisconsin moves to the SMARTER Balanced Assessment System these performance tasks will be integral to assessment of student learning.

What research and resources are available to support educators' use of the Common Core State Standards for Literacy in All Subjects?

The Common Core State Standards for Literacy in All Subjects reflect the importance of literacy in both the oral and written language and in both productive (speaking and writing) and receptive (listening and reading) discourse. Clearly, critical and precise thinking are required to develop all of these specific strategies and skills. The standards also address the learning and functioning of language in a technological, media-driven world because the language that we use is selective depending upon the context of the conversation.

The following section will offer relevant research and resources to support professional learning in reading, writing, speaking, listening and language across disciplines. Collegial conversation and learning, both cross-discipline and within-discipline will help make the Common Core State Standards more applicable to schools and districts, and will address the needs of unique programs within those contexts. A collection of online resources will continue to develop as support materials emerge.

Reading Connections

While early reading focuses on learning that letters make sounds, and that words carry meaning, reading quickly develops to a point where the message taken from text depends on what the reader brings to it. The Carnegie Report, *Reading in the Disciplines* (2010) describes this phenomenon:

"The ability to comprehend written texts is not a static or fixed ability, but rather one that involves a dynamic relationship between the demands of texts and prior knowledge and goals of the reader."

Therefore, a musician reading a journal article that describes concepts in music theory will take more information away from the text than a music novice because of their knowledge and experience in music. As well, an individual who spends a significant amount of time reading automotive manuals will more easily navigate a cell phone manual because of familiarity with that type of text.

A chart excerpted from the Carnegie Report (2010) details a few of the generic and more discipline-specific strategies that support students as they attempt to comprehend complex text. While the generic strategies pertain across content areas, discipline-specific ones must be tailored to match the demands of the content area.

Both generic and discipline focused strategies and knowledge must be applied to the comprehension and evaluation of:

- Textbooks
- Journal and magazine articles
- Historically situated primary documents
- Full Length Books
- Newspaper Articles
- Book Chapters
- Multimedia and Digital Texts

Generic Reading Strategies	Discipline-Specific Reading Strategies
Monitor comprehension	Build prior knowledge
Pre-read	Build specialized vocabulary
Set goals	Learn to deconstruct complex sentences
Think about what one already knows	Use knowledge of text structures and genres to predict main and subordinate ideas
Ask questions	Map graphic (and mathematical) representations against explanations in the text
Make predictions	Pose discipline relevant questions
Test predictions against the text	Compare claims and propositions across texts
Re-read	Use norms for reasoning within the discipline (i.e. what counts as evidence) to evaluate claims
Summarize	

Source: Carnegie Report, (2010)

Additional resources that support reading in specific subjects include *Content Counts! Developing Disciplinary Literacy Skills, K–6* by Jennifer L. Altieri (2011). This guide for discipline-specific literacy at the elementary level offers strategies to balance the demands of literacy while continuing to make content count and help students meet the reading, writing, speaking and listening demands of the content areas as they advance in school.

A resource by Doug Buehl (2011) entitled *Developing Readers in the Academic Disciplines* describes what it means to read, write, and think through a disciplinary lens in the adolescent years. This teacher-friendly guide helps connect literacy with disciplinary understandings to bridge academic knowledge gaps, frontload instruction, and build critical thinking through questioning.

Note on range and content of student reading

To become college and career ready, students must grapple with works of exceptional craft and thought whose range extends across genres, cultures, and centuries. Such works offer profound insights into the human condition and serve as models for students' own thinking and writing. Along with high-quality contemporary works, these texts should be chosen from seminal U.S. documents, the classics of American literature, and the timeless dramas of Shakespeare. Through wide and deep reading of literature and literary nonfiction of steadily increasing sophistication, students gain a reservoir of literary and cultural knowledge, references, and images; the ability to evaluate intricate arguments; and the capacity to surmount the challenges posed by complex texts. (*CCSS p. 35 http://www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf*)

The Common Core State Standards require that all students "be able to comprehend texts of steadily increasing complexity as they progress through school" (Appendix A: Research Supporting Key Elements of the Standards, p. 2). More detailed definitions of complex text and examples of complex texts across disciplines are available in Appendix B of the English Language Arts CCSS at: www.dpi.wi.gov/standards.

Writing Connections

The Common Core State Standards call for emphasis on three types of writing: narrative, informational and logical argument. Writing that presents a logical argument is especially appropriate to discipline-specific work since credible evidence differs across content areas. The ability to consider multiple perspectives, assess the validity of claims and present a point of view is required in argumentative writing. These thinking and communication skills are "critical to college and career readiness" (Appendix A: p. 24).

A 2007 report entitled *Writing Next: Effective Strategies to Improve Writing of Adolescents in Middle and High Schools* detailed research on writing to learn, rather than only for assessment, as having a significant impact on content learning.

The study found writing to learn was equally effective for all content areas in the study (social studies, math and science) and at every grade (4-12).

Note on range and content of student writing

For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college- and career-ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to know how to combine elements of different kinds of writing—for example, to use narrative strategies within an argument and explanation within narrative—to produce complex and nuanced writing. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have flexibility, concentration, and fluency to produce high quality first draft text under a tight deadline as well as the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it. *(CCSS p.41 http://www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf*)

When a social studies teacher guides students in taking on the perspective of a person from a specific historical era, she might ask students to write a first person narrative from that perspective. Research into that era leads students to discover personal beliefs of that historical person. They may dig into the personal experiences, ideas, and events involved in the era to visualize life in that period. They then develop a rich understanding of the era and embed language from that era into the texts that they create. (Samples of discipline-specific writing across grades and content areas are available in Appendix C of the English Language Arts CCSS at: www.dpi.wi.gov/standards.

Speaking, Listening and Language Connections

The ability to share ideas and orally communicate with credibility in a specific academic discourse empowers students and allows access to specialized groups. In *Situated Language and Learning: A Critique of Traditional Schooling*, James Paul Gee (2004) describes the need to prioritize these skills so that students are at ease as they enter situations connected to a specific content area and are more likely to continue their learning in that discipline.

As expertise develops, students feel more and more comfortable applying knowledge and skills while speaking and listening in a specific discipline.

- A media course may teach students appropriate expression, tone and rate of speech when addressing a large audience.
- Listening carefully to questions posed is a specialized skill that debate facilitators develop.
- Scientists learn to listen for bias in the perspectives presented by peers to determine the reliability of scientific outcomes.
- Artists have very specialized and specific ways of speaking about the many aspects of a piece.

A policy brief from the Alliance for Excellent Education called, *Engineering Solutions to the National Crisis in Literacy: How to Make Good on the Promise of the Common Core State Standards* describes "a staircase of literacy demands" and emphasizes the importance of a progressive development of language and literacy over time.

The conceptual understanding of "functions" in mathematics may begin to develop in elementary school in its simplest form. As the concept develops over the years, students will use the word "function" in a meaningful way when speaking and writing to describe the mathematical concept they apply. When educators explicitly connect a mathematical term to its application and repeatedly expose students to the concept connected to the term, a specialized language becomes second nature to the mathematics classroom.

Students must have extensive vocabularies, built through reading and explicit instruction embedded in the context of content learning. This enables them to comprehend complex texts, engage in purposeful writing and communicate effectively within a discipline.

Skills in determining or clarifying the meaning of words and phrases encountered, choosing flexibly from an array of strategies, and seeing an individual word as part of a network of other words that, for example, have similar denotations but different connotations allow students to access information and support their own learning.

Literacy in Multiple Languages

Increasing economic, security, cross-cultural and global demands underscore the value of literacy in more than one language. Students who think, read, write, and communicate in multiple languages are an asset to our own country and can more easily interact and compete in the world at large.

English language learners (ELL) in our classrooms face significant challenges as they add a new language and work to grasp content at the same rate as their English-speaking peers. In a report to the Carnegie Corporation entitled *Double the Work: Challenges and Solutions to Acquiring Academic Literacy for Adolescent English Language Learners (2007)* researchers found that a focus on academic literacy is crucial for ELL's success in school. In their description of academic literacy they include reading, writing and oral discourse that:

- Varies from subject to subject.
- Requires knowledge of multiple genres of text, purposes for text use and text media.
- Is influenced by students' literacies in context outside of school.
- Is influenced by students' personal, social, and cultural experiences.

The needs of our English language learners are addressed when we embed disciplinary literacy strategies into our subject area teaching. These high impact strategies and skills allow English language learners and all students to more readily access content knowledge and connect it to the prior knowledge they bring to the classroom. When educators take the initiative to understand and embed these strategies and skills, they offer additional opportunities for success to all of our students.

Who Should Use the Common Core State Standards for Literacy in All Subjects?

The term "disciplinary literacy" may be new to many Wisconsin teachers. The Common Core State Standards for Literacy in All Subjects as excerpted from the Common Core Standards for English Language Arts, are intended for all K-12 educators. Each standard is written broadly in content-neutral language, breaking down the complex skills that comprise reading, writing, speaking, listening, and language. These standards serve as a complement to the specific content-related standards of each individual discipline. Administrators and communities may also find the disciplinary literacy standards helpful in charting a clear and consistent school or district-wide approach to literacy that moves Wisconsin forward toward the goal of every student career and college ready.

References:

Altieri, Jennifer (2011). *Content Counts! Developing Disciplinary Literacy Skills, K–6*. International Reading Association. ISBN 13: 978-0-87207-838-3

Buehl, Doug. (2011). *Developing Readers in the Academic Disciplines*. International Reading Association. ISBN 13: 978-0-87207-845-1

Carnevale, A. (2010) *Center on Education and the Workforce Forecasts of Education Demand to 2018*

College and Career Readiness Standards; http://www.nc4ea.org/files/appropriate_college-readiness_standards_for_all_students-05-03-06.pdf

Common Core Standards for English Language Arts; www.corestandards.org

Washington, DC: Georgetown Center on Education and the Workforce, 2010, available at: http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/CEW_press_conference_ppt.pdf (accessed June 7, 2011)

Double the work: Challenges and Solutions to Acquiring Academic Literacy for Adolescent English Language Learners. Carnegie Corporation. New York: 2007.

Engineering Solutions to the National Crisis in Literacy: How to Make Good on the Promise of the Common Core State Standards. Alliance for Excellent Education. Washington D.C. 2011

Gee, James Paul (2004) *Situated Language and Learning: A Critique of Traditional Schooling*

Reading in the Disciplines: The Challenges of Adolescent Literacy. Carnegie Corporation. New York: 2010

State Superintendent's Adolescent Literacy Plan (2008) Wisconsin Department of Public Instruction, Madison, WI

Vygotsky, (1978) *Mind in Society: The Development of Higher Psychological Processes* Harvard University Press; 14th edition

Writing Next: Effective Strategies to Improve Writing of Adolescents in Middle and High Schools (2007)

SECTION 6

Wisconsin Research and Resources

Guiding Principles for Teaching and Learning:

Research, Probing Questions, Resources, and References

1. Every student has the right to learn.

It is our collective responsibility as an education community to make certain each child receives a high-quality, challenging education designed to maximize potential; an education that reflects and stretches his or her abilities and interests. This belief in the right of every child to learn forms the basis of equitable teaching and learning. The five principles that follow cannot exist without this commitment guiding our work.

2. Instruction must be rigorous and relevant.

To understand the world in which we live, there are certain things we all must learn. Each school subject is made up of a core of essential knowledge that is deep, rich, and vital. Every student, regardless of age or ability, must be taught this essential knowledge. What students learn is fundamentally connected to how they learn, and successful instruction blends the content of a discipline with processes of an engaging learning environment that changes to meet the dynamic needs of all students.

3. Purposeful assessment drives instruction and affects learning.

Assessment is an integral part of teaching and learning. Purposeful assessment practices help teachers and students understand where they have been, where they are, and where they might go next. No one assessment can provide sufficient information to plan teaching and learning. Using different types of assessments as part of instruction results in useful information about student understanding and progress. Educators should use this information to guide their own practice and in partnership with students and their families to reflect on learning and set future goals.

4. Learning is a collaborative responsibility.

Teaching and learning are both collaborative processes. Collaboration benefits teaching and learning when it occurs on several levels: when students, teachers, family members, and the community collectively prioritize education and engage in activities that support local schools, educators, and students; when educators collaborate with their colleagues to support innovative classroom practices and set high expectations for themselves and their students; and when students are given opportunities to work together toward academic goals in ways that enhance learning.

5. Students bring strengths and experiences to learning.

Every student learns. Although no two students come to school with the same culture, learning strengths, background knowledge, or experiences, and no two students learn in exactly the same way, every student's unique personal history enriches classrooms, schools, and the community. This diversity is our greatest education asset.

6. Responsive environments engage learners.

Meaningful learning happens in environments where creativity, awareness, inquiry, and critical thinking are part of instruction. Responsive learning environments adapt to the individual needs of each student and encourage learning by promoting collaboration rather than isolation of learners. Learning environments, whether classrooms, schools, or other systems, should be structured to promote engaged teaching and learning.

Guiding Principle 1:
Every student has the right to learn.

It is our collective responsibility as an education community to make certain each child receives a high-quality, challenging education designed to maximize potential, an education that reflects and stretches his or her abilities and interests. This belief in the right of every child to learn forms the basis of equitable teaching and learning. The five principles that follow cannot exist without this commitment guiding our work.

Every student's right to learn provides the overarching vision for Wisconsin's Guiding Principles for education. To be successful, education must be committed to serving the learning needs of students from various social, economic, cultural, linguistic, and developmental backgrounds. For all students to have a guaranteed right to learn, schooling must be equitable.

Research Summary

Focusing on Equity

The belief that each student has the right to learn despite differences in educational needs and backgrounds has important implications for ensuring an equitable education for all students. In the education research literature, the term *educational equality* refers to the notion that all students should have access to an education of similar quality—the proxy for which is frequently educational *inputs* such as funding, facilities, resources, and quality teaching and learning. In contrast, the term *educational equity* connotes the requirement that all students receive an education that allows them to achieve at a standard level or attain standard educational *outcomes* (Brighouse & Swift, 2008). Importantly, equality in terms of educational resources or inputs may not guarantee equity in educational outcomes because not all students reach the same level of achievement with the same access to resources (Brighouse & Swift, 2008). To serve students of varying economic, social, developmental, or linguistic backgrounds, achieving equity in education may require more resources to meet the greater educational needs of certain students (Berne & Stiefel, 1994).

The research literature offers several components that provide a framework for understanding what an equitable education for all students looks like at the classroom level. These components include a call for all students to be provided with the following:

- Access to resources and facilities
- Instruction in all areas tailored to their needs
- Curriculum that is rigorous and relevant
- Educators who are culturally sensitive and respectful
- Interactions with staff and other students that are positive and encouraging in an atmosphere of learning
- Assessment that is varied to give each student the opportunity to demonstrate learning (Education Northwest, 2011)

Access

Access to resources and facilities largely refers to various legal mandates that all children have the right to attend school and participate in all school activities. Since the landmark ruling *Brown v. Board of Education of Topeka* (1954), court decisions and federal regulations have mandated equality of access to all educational opportunities for students regardless of race, ethnicity, or gender (Civil Rights Act, 1964), disability (Education for All Handicapped Children Act, 1975), or language (*Lau v. Nichols, 1974*). Equity in the provision of educational resources and funding was improved with the passage of Title I of the Elementary and Secondary Education Act (ESEA; 1965), which provided additional resources for economically disadvantaged students to meet their learning needs. Since Title I, research on equity in education has grown, and with the reauthorization of ESEA in the No Child Left Behind Act in 2001, equity in educational outcomes for all students was emphasized in the law. Access to an equitable education is a legal right for all children, and the quality of that access in classroom instruction is a moral and ethical right.

Instruction

Instruction that is tailored to meet all students' needs goes beyond simply providing equal access to education. High-quality instruction has increasingly been defined in the literature as a key factor in student achievement. High-quality instruction includes differentiated instructional strategies, teaching to students' learning styles, and provision of instructional support for students who are educationally, socially, or linguistically challenged. Differentiated instruction involves utilizing unique instructional strategies for meeting individual student needs as well as modifying curriculum for both high- and low-performing students. Assessing and teaching to student learning styles is one form of differentiation. Research has shown the value of adapting instructional strategies to different student learning styles (Gardner, 1999) and supports the practice of classroom differentiation (Mulroy & Eddinger, 2003; Tomlinson, 2005).

Curriculum

Designing curriculum that is rigorous and relevant provides an important foundation for a high-quality learning environment by helping make standards-based content accessible to all students. A relevant, rigorous curriculum has been found to be important for all students. Although advanced and rigorous curriculum is generally viewed to be an important factor of academic success for high-achieving students, research also indicates that using challenging, interesting, and varied curriculum for students of all achievement levels improves student achievement (Daggett, 2005). Rigorous curriculum can be adapted for low-performing students in a way that challenges them and helps them meet learning standards. For example, the universal design for learning (UDL) offers strategies for making the general curriculum accessible to special education students (Rose, Hasselbring, Stahl, & Zabala, 2009). Similarly, research on lesson scaffolding emphasizes strategies for providing a rigorous content curriculum to student who are culturally or linguistically diverse or who need additional context to understand certain concepts (Gibbons, 2002).

Climate

Interactions with staff and students that are positive and focused on learning are part of an emotionally safe school climate, but the literature also supports the need for a climate of high academic expectations (Haycock, 2001). Schools with large numbers of high-poverty and racially diverse students have shown significant academic growth when teachers and staff members create an environment of high expectations for achievement (Reeves, 2010). In addition, research on school climate has asserted the need for students to feel emotionally safe and respected as well as physically safe in school (Gronna & Chin-Chance, 1999).

A positive, respectful learning environment with high expectations and curricular and instructional supports for all students offers an avenue to genuine educational equity.

Probing Questions

- What are some of the needs and challenges your school faces in moving toward a fully equitable education for all students?
- How could you provide leadership in your school to work to ensure an equitable education for all students?

Resources

A variety of resources are available for teachers and leaders on educational equity for all students. A few websites and links are highlighted below:

The School Improvement Center developed activities to help districts develop an equity framework. These resources can be found at Actualizing Equity: The Equity Framework: http://www.gapsc.com/EducatorPreparation/NoChildLeftBehind/Admin/Files/conference_032010/Actualizing_Equity.pdf.

The Education Equality Project developed a website with useful resources for educators. It can be found at http://www.edequality.org.

The Equity Center has a website with a variety of resources. The resources can be found at http://educationnorthwest.org/project/Equity%20Program/resource/.

The Midwest Equity Assistance Center has a website with many resources. It can be found at http://www.meac.org/Publications.html.

The Office for Civil Rights has a useful website for educators. It can be found at http://www2.ed.gov/about/offices/list/ocr/index.html.

Southern Poverty Law Center, Teaching Tolerance Program. Resources can be found at http://www.splcenter.org/what-we-do/teaching-tolerance.

References

Berne, R., & Stiefel, L. (1994). Measuring educational equity at the school level: The finance perspective. *Educational Evaluation and Policy Analysis*, 16(4), 405–421.

Brighouse, H., & Swift, A. (2008). Putting educational equality in its place. *Education, Finance and Policy*, 3(4), 444–446.

Brown v. Board of Education of Topeka, 347 U.S. 483 (1954).

Civil Rights Act, Title IX, Pub. L. No. 88-352, 78 Stat. 241 (1964).

Daggett, W. R. (2005). *Achieving academic excellence through rigor and relevance* [White paper]. Rexford, NY: International Center for Leadership in Education. Retrieved June 3, 2011, from http://www.leadered.com/pdf/Academic_Excellence.pdf

Education Northwest. (2011). *Key components of educational equity* [Website]. Retrieved June 3, 2011, from http://educationnorthwest.org/equity-program/educational

Education for All Handicapped Children Act, Pub. L. No. 94-142 (1975).

Elementary and Secondary Education Act of 1965, Pub. L. No. 89-10) (1965).

Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York: Basic Books.

Gibbons, P. (2002). *Scaffolding language, scaffolding learning: Teaching second language learners in the mainstream classroom*. Westport, CT: Heinemann.

Gronna, S. S., & Chin-Chance, S. A. (1999, April). *Effects of school safety and school characteristics on grade 8 achievement*. Paper presented at the American Educational Research Association, Montreal, Quebec, Canada. (ERIC Document Reproduction Service No. 430292). Retrieved June 3, 2011, from http://www.eric.ed.gov/PDFS/ED430292.pdf

Haycock, K. (2001). Closing the achievement gap. *Educational Leadership*, 58(6), 6–11.

Lau v. Nichols, 414 U.S. 565 (1974).

Mulroy, H., & Eddinger, K. (2003, March). *Differentiation and literacy.* Paper presented at the Institute on Inclusive Education, Rochester, NY.

No Child Left Behind Act of 2001, Pub. L. No. 107-110, 115 Stat. 1425 (2002). Retrieved June 3, 2011, from http://www.ed.gov/policy/elsec/leg/esea02/107-110.pdf

Reeves, D. B. (2010). The 90/90/90 schools: A case study. In D. B. Reeves, *Accountability in action* (2nd ed., 185–196). Denver, CO: Advanced Learning Press.

Rose, D., Hasselbring, T., Stahl, S., & Zabala, J. (2009). Assistive technology, NIMAS, and UDL: From some students to all students. In D. Gordon, J. Gravel, & L. Schifter (Eds.), *A policy reader in universal design for learning* (pp. 133–154). Cambridge, MA: Harvard Education Press.

Tomlinson, C. A. (2005). Grading and differentiation: Paradox or good practice? *Theory Into Practice,* 44(3) 262–269.

Guiding Principle 2:
Instruction must be rigorous and relevant.

To understand the world in which we live, there are certain things we all must learn. Each school subject is made up of a core of essential knowledge that is deep, rich, and vital. Every student, regardless of age or ability, must be taught this essential knowledge. What students learn is fundamentally connected to how they learn, and successful instruction blends the content of a discipline with processes of an engaging learning environment that changes to meet the dynamic needs of all students.

Research Summary

Instruction should connect directly to students' lives and must deeply engage them with the content in order for students to be better prepared for college and careers. To succeed in postsecondary education and in a 21st century economy, students must be afforded opportunities to practice higher-order thinking skills, such as how to analyze an argument, weigh evidence, recognize bias (their own and others' bias), distinguish fact from opinion, balance competing principles, work collaboratively with others, and be able to communicate clearly what they understand (Wagner, 2006). In order to accomplish these goals, instruction must be rigorous and meaningful.

The definition of *rigor* varies greatly in both research and practice. Bower and Powers (2009) conducted a study to determine the essential components of rigor. They defined *rigor* through their research as "how the standard curriculum is delivered within the classroom to ensure students are not only successful on standardized assessments but also able to apply this knowledge to new situations both within the classroom and in the real world." They also identified higher-order thinking and real-world application as two critical aspects of rigor, suggesting that it is not enough for students to know how to memorize information and perform on multiple-choice and short-answer tests. Students must have deep and rich content knowledge, but rigor also includes the ability to apply that knowledge in authentic ways.

Teaching and learning approaches that involve students collaborating on projects that culminate with a product or presentation are a way to bring rigor into the classroom. Students can take on real problems, use what they know and research to come up with real solutions to real problems. They must engage with their subject and with their peers.

In August 2010, the Institutes of Education Sciences reported the results of a randomized control trial showing that a problem-based curriculum boosted high school students' knowledge of economics. This research suggests that students using this learning system and its variants score similarly on standardized tests as students who follow more traditional classroom practices. The research also suggests that students learning through problem-solving and projects are more adept at applying what they know and are more deeply engaged.

The notion of a meaningful curriculum is not a new one. John Dewey (1990), writing in 1902, called for a curriculum that involves a critical but balanced understanding of the culture and the prior knowledge of each child in order to extend learning. According to Spillane (2000), presenting content in more authentic ways—disciplinary and other real-world contexts—has become a central theme of current reform movements. Schools should be places where "the work students are asked to do [is] work worth doing" (Darling-Hammond, 2006, p. 21). Research collected by the International Center for Leadership in Education shows that "students understand and retain knowledge best when they have applied it in a practical, relevant setting" (Daggett, 2005, p. 2). A skilled 21st century educator helps students master learning targets and standards using purposefully crafted lessons and teaches with appropriate instructional strategies incorporated. The students understand why they are learning particular skills and content and are engaged in learning opportunities that allow them to use their inquiry skills, creativity, and critical thinking to solve problems.

According to Brown, Collins, and Duguid (1989), instruction connected to individual contexts has been found to have a significant impact on learning. Research conducted by Sanbonmatsu, Shavitt, and Sherman (1991) and Petty and Cacioppo (1984) also contends that student learning is directly influenced by how well it is connected to a context. Much of this research began with the analysis of how people learn when they find the ideas significant to their own world. It begins to show the importance of connecting content and instruction to the world of the students. Weaver and Cottrell (1988) point out that how content is presented can affect how students retain it. They state instruction that connects the content to the students' lives and experiences helps students to internalize meaning. Sass (1989) and Keller (1987) suggest that if teachers can make the content familiar to the students and link it to what they are familiar with, students' learning will increase. Shulman and Luechauer (1993) contend that these connections must be done by engaging students with rigorous content in interactive learning environments.

Higher-Order Thinking

Higher-order thinking, according to Newmann (1990), "challenges the student to interpret, analyze, or manipulate information" (p. 45). This definition suggests that instruction must be designed to engage students through multiple levels in order for them to gain a better understanding of the content. An analysis of the research by Lewis and Smith (1993) led to their definition of *higher-order thinking*: "when a person takes new information and information stored in memory and interrelates and/or rearranges and extends this information to achieve a purpose or find possible answers in perplexing situations" (p. 44). This definition emphasizes the level of complexity necessary to help students reach a deeper and higher level of understanding of the content. Shulman (1987) points out teachers will need an in-depth knowledge of their content to be able to fit these types of strategies to their instruction.

Real-World Application

VanOers and Wardekker (1999) indicate that connecting instruction to real-world applications gives meaning to learning, makes it practical, and can help to develop connections with the greater community. Incorporating real-world examples becomes more authentic to students because they will be able to connect the learning to the bigger picture rather than just the classroom. Newmann and Wehlage (1993) describe the three criteria developed by Archbald and Newmann (1988) for this type of authentic learning: "Students construct meaning and produce knowledge, students use disciplined inquiry to construct meaning, and students aim their work toward production of discourse, products, and performances that have value or meaning beyond success in school" (p. 8) These criteria, when reflected upon by teachers, can be a useful tool to ensure that instruction is authentic and engaging for all students.

Authentic Learning

Authentic learning builds on the concept of "learning by doing" to increase a student's engagement. To succeed, this method needs to have meaning or value to the student, embody in-depth learning in the subject and allow the student to use what he or she learned to produce something new and innovative (Lemke & Coughlin, 2009). For example, in project-based learning, students collaborate to create their own projects that demonstrate their knowledge (Bell, 2010). Students start by developing a question that will guide their work. The teacher acts as the supervisor. The goal is greater understanding of the topic, deeper learning, higher-level reading, and increased motivation (Bell, 2010). Research has shown that students who engage in project-based learning outscore their traditionally educated peers in standardized testing (Bell, 2010).

Constructivist learning is also a way to bring authenticity to the classroom. Richard Mayer (2004) defines constructivist learning as an "active process in which learners are active sense makers who seek to build coherent and organized knowledge." Students co-construct their learning, with the teacher serving as a guide or facilitator (oftentimes using technology as a facilitating tool). The teacher doesn't function in a purely didactic manner. Neo and Neo (2009) state that constructivism helps students develop problem-solving skills, critical thinking and creative skills and apply them in meaningful ways. Inquiry-based instruction, a type of constructivist learning, has students identify real world problems and then pose and find answers to their own questions. A study by Minner, Levy and Century (2010) has shown this method can improve student performance. They found inquiry-based instruction has a larger impact (approximately 25-30% higher) on a student's initial understanding and retention of content than any other variable.

Another form of authentic learning involves video simulated learning or gaming. Research has shown that video games can provide a rich learning context by fostering creative thinking. The games can show players how to manage complex problems and how their decisions can affect the outcome (Sharritt, 2008). This form of learning also can engage students in collaboration and interaction with peers.

Multimodal Instruction

Multimodal teaching leverages various presentation formats—such as printed material, videos, PowerPoints, and computers—to appeal to different learning styles (Birch, 2009; Moreno & Mayer, 2007). It accommodates a more diverse curriculum and can provide a more engaging and interactive learning environment (Birch, 2009). According to research, an effective way of learning is by utilizing different modalities within the classroom, which can help students understand difficult concepts—therefore improving how they learn (Moreno & Mayer, 2007).

An example of multimodal learning that incorporates technology is digital storytelling. Digital storytelling is the practice of telling stories by using technology tools (e.g., digital cameras, authoring tools, computers) to create multimedia stories (Sadik, 2008). Researchers have found that using this form of learning facilitates student engagement, deep learning, project-based learning, and effective integration of technology into instruction (Sadik, 2008).

Probing Questions

- Research emphasizes the need for higher-order thinking embedded in instructional practice. How might you learn to incorporate higher-order thinking strategies into your practice?
- The research also suggests the need to connect learning experiences to the real world of the students. How can you use real-world examples in your practice to better engage students in their learning?

Resources

The Rigor/Relevance Framework created by Daggett (2005) is a useful tool to create units, lessons, and assessments that ask students to engage with content at a higher, deeper level. The model and examples are available on the following website: http://www.leadered.com/rrr.html.

Newmann's Authentic Intellectual Work Framework (Newmann, Secada & Wehlage, 1995) gives teachers the tools to analyze instructional practices and student work in regard to indicators of rigor. The research and tools are available at the Center for Authentic Intellectual Work website: http://centerforaiw.com/.

References

Archbald, D., & Newmann, F. M. (1988). *Beyond standardized testing: Assessing authentic academic achievement in the secondary school*. Reston, VA: National Association of Secondary School Principals.

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House*, 83, 39–43.

Birch, D. (2009). PowerPoint with audio: A breeze to enhance the student learning experience. *E-Journal of Business Education & Scholarship of Teaching*, 3(1), 36–42.

Bower, H. A., & Powers, J. D. (2009, Fall). What is rigor? A qualitative analysis of one school's definition. *Academic Leadership Live: The Online Journal*, 7(4). Retrieved June 3, 2011, from http://www.academicleadership.org/article/What_is_Rigor_A_Qualitative_Analysis_of_One_School_s_Definition

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher,* 18(1), 32–42.

Daggett, W. R. (2005). *Achieving academic excellence through rigor and relevance*. Rexford, NY: International Center for Leadership in Education.

Darling-Hammond, L. (2006). Securing the right to learn: Policy and practice for powerful teaching and learning. *Educational Researcher*, 35(7), 13–24.

Dewey, J. (1990). *School and society [and] The child and the curriculum*. Chicago: University of Chicago Press.

Finkelstein, Neal, Thomas Hanson, Chun-Wei Huang, Becca Hirschman, and Min Huang. (2010). Effects of problem based economics on high school economics instruction." *Institute For Education Sciences*. West Ed.

Keller, J. M. (1987). Strategies for stimulating the motivation to learn. *Performance & Instruction*, 26(8), 1–7.

Lemke, C., & Coughlin, E. (2009, September). The change agents: Technology is empowering 21st century students in four key ways. *Educational Leadership*, 67(1), 54–59.

Lewis, A., & Smith, D. (1993). Defining higher order thinking. *Theory Into Practice*, 32(3), 131–137.

Mayer, R.E. (2004). *Should There Be a Three-Strikes Rule Against Pure Discovery Learning? The Case for Guided Methods of Instruction*. American Psychologist, 59(1), 14-19.

Minner, Daphne D., Abigail Jurist Levy, and Jeanne Century. "Inquiry-Based Science Instruction—What Is It and Does It Matter? Results from a Research Synthesis Years 1984 to 2002." *JOURNAL OF RESEARCH IN SCIENCE TEACHING* 47.4 (April 2010): 474-96.

Moreno, R., & Mayer, R. (2007). *Interactive multimodal learning environments* [Special issue on interactive learning environment-contemporary issues and trends]. Educational Psychology Review, 19, 309–326.

Neo, M. & Neo, T.K. (2009). *Engaging students in multimedia-mediated Constructivist learning-Students' perceptions*. Educational Technology & Society, 12(2), 254-266.

Newmann, F. M. (1990). Higher order thinking in teaching social studies: A rationale for the assessment of classroom thoughtfulness. *Journal of Curriculum Studies*, 22(2), 41–56.

Newmann, F. M., Secada, W. G., & Wehlage, G. G. (1995). *A guide to authentic instruction and assessment: Vision, standards, and scoring*. Madison, WI: Wisconsin Center for Education Research.

Newmann, F. M., & Wehlage, G. G. (1993, April). Five standards of authentic instruction. *Educational Leadership*, 50(7), 8–12.

Petty, R. E., & Cacioppo, J. T. (1984). The effects of involvement on responses to argument quality: Central and peripheral routes to persuasion. *Journal of Personality and Social Psychology*, 46(1), 69–81.

Sadik, A. (2008). Digital storytelling: A meaningful technology-integrated approach for engaged student learning. *Educational Technology Research & Development*, 56, 487–506.

Sanbonmatsu, D. M., Shavitt, S., & Sherman, S. J. (1991). The role of personal relevance in the formation of distinctiveness-based illusory correlations. *Personality and Social Psychology Bulletin*, 17(2), 124–132.

Sass, E. J. (1989). Motivation in the college classroom: What students tell us. *Teaching of Psychology*, 16(2), 86–88.

Sharritt, M. J. (2008). Forms of learning in collaborative video game play. *Research and Practice in Technology Enhanced Learning*, 3(2), 97–138.

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1–22.

Shulman, G., & Luechauer, D. (1993). The empowering educator: A CQI approach to classroom leadership. In D. L. Hubbard (Ed.), *Continuous quality improvement: Making the transition to education* (pp. 424–453). Maryville, MO: Prescott.

Spillane, J. P. (2000). A fifth-grade teacher's reconstruction of mathematics and literacy teaching: Exploring interactions among identity, learning, and subject matter. *Elementary School Journal*, 100(4), 307–330.

VanOers, B., & Wardekker, K. (1999). On becoming an authentic learner: Semiotic activity in the early grades. *Journal of Curriculum Studies*, 31(2), 229–249.

Wagner, T. (2006, January 11). Rigor on trial [Commentary]. *Education Week*, 25(18), 28–29. Retrieved June 3, 2011, from http://www.edweek.org/ew/articles/2006/01/11/18wagner.h25.html?tkn=NXVFlUJgch3u9KNoYbF2gM%2BinCPa3hvbbWkj&print=1

Weaver, R. L., & Cottrell, H. W. (1988). Motivating students: Stimulating and sustaining student effort. *College Student Journal*, 22, 22–32.

Wentling, R. M., & Waight, C. L. (2001). Initiative that assist and barriers that hinder the successful transition of minority youth into the workplace in the USA. *Journal of Education and Work*, 14(1), 71–89.

Guiding Principle 3:
Purposeful assessment drives instruction and affects learning.

Assessment is an integral part of teaching and learning. Purposeful assessment practices help teachers and students understand where they have been, where they are, and where they might go next. No one assessment can provide sufficient information to plan teaching and learning. Using different types of assessments as part of instruction results in useful information about student understanding and progress. Educators should use this information to guide their own practice and in partnership with students and their families to reflect on learning and set future goals.

Research Summary

Assessment informs teachers, administrators, parents, and other stakeholders about student achievement. It provides valuable information for designing instruction; acts as an evaluation for students, classrooms, and schools; and informs policy decisions. Instruments of assessment can provide formative or summative data, and they can use traditional or authentic designs. Research on assessment emphasizes that the difference between formative and summative assessment has to do with how the data from the assessment is used.

Dunn and Mulvenon (2009) define summative assessment as assessment "data for the purposes of assessing academic progress at the end of a specified time period (i.e., a unit of material or an entire school year) and for the purposes of establishing a student's academic standing relative to some established criterion" (p. 3).

The Council of Chief State School Officers (CCSSO) (2008) define formative assessment as a process "used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes" (p. 3).

Wisconsin's approach to balanced assessment www.dpi.wi.gov/oea/balanced emphasizes the importance of identifying the purposes for administering an assessment. Identifying the purpose or data needed establishes whether a particular assessment is being used formatively or summatively. There can be multiple purposes for giving a particular assessment, but identifying how the data will be used helps to ensure that the assessment is collecting the data that is needed for educators, students and their families.

Assessments, whether formative or summative, can be designed as traditional or authentic tools. Traditional assessment uses tools such as paper and pencil tests, while authentic assessment focuses on evaluating student learning in a more "real life" situation. The bulk of the research on assessment design focuses on authentic assessment.

Formative Assessment

Using formative assessment as a regular part of instruction has been shown to improve student learning from early childhood to university education. It has been shown to increase learning for both low-performing and high-performing students. Black and Wiliam's (1998) seminal study found that the use of formative assessment produces significant learning gains for low-achieving students. Other researchers have shown similar results for students with special learning needs (McCurdy & Shapiro, 1992; Fuchs & Fuchs, 1986). Research also supports the use of formative assessment in kindergarten classes (Bergan, Sladeczek, Schwarz, & Smith, 1991), and university students (Martinez & Martinez, 1992).

Formative assessment provides students with information on the gaps that exist between their current knowledge and the stated learning goals (Ramaprasad, 1983). By providing feedback on specific errors it helps students understand that their low performance can be improved and is not a result of lack of ability (Vispoel & Austin, 1995). Studies emphasize that formative assessment is most effective when teachers use it to provide specific and timely feedback on errors and suggestions for improvement (Wininger, 2005), when students understand the learning objectives and assessment criteria, and when students have the opportunity to reflect on their work (Ross, 2006; Ruiz-Primo & Furtak, 2006). Recent research supports the use of web-based formative assessment for improving student achievement (Wang, 2007).

A number of studies emphasize the importance of teacher professional development on formative assessment in order to gain maximum student achievement benefits (Atkins, Black & Coffey, 2001; Black & Wiliam, 1998). A 2009 article in *Educational Measurement* asserts that teachers are better at analyzing formative assessment data than at using it to design instruction. Research calls for more professional development on assessment for teachers (Heritage, Kim, Vendlinski, & Herman, 2009).

Authentic Assessment

Generating rich assessment data can be accomplished through the use of an authentic assessment design as well as through traditional tests. Authentic assessments require students to "use prior knowledge, recent learning, and relevant skills to solve realistic, complex problems" (DiMartino & Castaneda, 2007, p. 39). Research on authentic assessment often explores one particular form, such as portfolios (Berryman & Russell, 2001; Tierney et al., 1998); however, several studies examined more than one form of authentic assessment: portfolios, project-based assessment, use of rubrics, teacher observation, and student demonstration (Darling-Hammond, Rustique-Forrester, & Pecheone, 2005; Herman, 1997; Wiggins, 1990). Authentic assessment tools can be used to collect both formative and summative data. These data can provide a more complete picture of student learning.

Balanced Assessment

Wisconsin's Next Generation Assessment Task Force (2009) defines the purpose and characteristics of a balanced assessment system:

Purpose: to provide students, educators, parents, and the public with a range of information about academic achievement and to determine the best practices and policies that will result in improvements to student learning.

Characteristics: includes a continuum of strategies and tools that are designed specifically to meet discrete needs–daily classroom instruction, periodic checkpoints during the year, and annual snapshots of achievement. (p. 6)

A balanced assessment system is an important component of quality teaching and learning. Stiggins (2007) points out that a variety of quality assessments must be available to teachers in order to form a clearer picture of student achievement of the standards. Popham (2008) believes that when an assessment is of high quality, it can accurately detect changes in student achievement and can contribute to continuous improvement of the educational system.

Probing Questions

- How might you use questioning and discussion in your classroom in a way that gives you formative assessment information on all students?
- How can you use assignments and tests as effective formative assessment?
- How could you design and implement a balanced assessment system that includes pre- and post assessments for learning?

Resources

Rick Stiggins, founder and director of the Assessment Training Institute, provides resources on the practice of assessment at http://www.assessmentinst.com/author/rick-stiggins/.

Margaret Heritage's books Formative Assessment for Literacy and Academic Language (2008, coauthored with Alison Bailey) and Formative Assessment: Making It Happen in the Classroom (2010) provide resources and practices. These books are available through bookstores.

ASCD has publications on assessment at http://www.ascd.org/SearchResults.aspx?s=assessment&c=1&n=10&p=0.

The National Middle Schools Association provides assessment information through a search for "assessment" at http://www.nmsa.org/.

Boston (2002) recommends the following resources for assessment:

- A Practical Guide to Alternative Assessment, by J. R. Herman, P. L. Aschbacher, and L. Winters. Available at a variety of booksellers.
- Improving Classroom Assessment: A Toolkit for Professional Developers
  http://educationnorthwest.org/resource/700
- Classroom Assessment and the National Science Education Standards
  http:www.nap.edu/catalog/9847.html

References

Atkins, J. M., Black, P., & Coffey, J. (2001). *Classroom assessment and the National Science Education Standards*. Washington, DC: National Academy Press.

Bergen, J. R., Sladeczek, I. E., Schwarz, R. D., & Smith, A. N. (1991). Effects of a measurement and planning system on kindergartners' cognitive development and educational programming. *American Educational Research Journal*, 28(3), 683–714.

Berryman, L., & Russell, D. R. (2001). Portfolios across the curriculum: Whole school assessment in Kentucky. *English Journal*, 90(6), 76–83.

Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education*, 5(1), 7–74.

Boston, C. (2002). The concept of formative assessment. *Practical Assessment, Research, and Evaluation*, 8(9). Retrieved June 3, 2011, from http://pareonline.net/getvn.asp?v=8&n=9

Council of Chief State School Officers. (2008). *Attributes of effective formative assessment*. Washington, DC: Author. Retrieved June 3, 2011, from http://www.ccsso.org/Documents/2008/Attributes_of_Effective_2008.pdf

Darling-Hammond, L., Rustique-Forrester, E., & Pecheone, R. (2005). *Multiple measure approaches to high school graduation*. Stanford, CA: School Redesign Network at Stanford University.

DiMartino, J., & Castaneda, A. (2007). Assessing applied skills. *Educational Leadership*, 64(7), 38–42.

Dunn, K. E., & Mulvenon, S. W. (2009). A critical review of research on formative assessment: The limited scientific evidence of the impact of formative assessment in education. *Practical Assessment, Research, and Evaluation*, 14(7). Retrieved June 3, 2011, from http://pareonline.net/pdf/v14n7.pdf

Fuchs, L. S., & Fuchs, D. (1986). Effects of systematic formative evaluation: A meta-analysis. *Exceptional Children*, 52(2), 199–208.

Heritage, M., Kim, J., Vendlinski, T., & Herman, J. (2009). From evidence to action: A seamless process in formative assessment? *Educational Measurement: Issues and Practice*, 28(3), 24–31.

Herman, J. (1997). Assessing new assessments: Do they measure up? *Theory Into Practice*, 36(4), 196–204.

Martinez, J. G. R., & Martinez, N. C. (1992). Re-examining repeated testing and teacher effects in a remedial mathematics course. *British Journal of Educational Psychology*, 62(3), 356–363.

McCurdy, B. L., & Shapiro, E. S. (1992). A comparison of teacher monitoring, peer monitoring, and self-monitoring with curriculum-based measurement in reading among student with learning disabilities. *Journal of Special Education*, 26(2), 162–180.

Next Generation Assessment Task Force. (2009). *Crafting a balanced system of assessment in Wisconsin*. Madison: Wisconsin Department of Public Instruction. Retrieved June 3, 2011, from http://www.dpi.state.wi.us/oea/pdf/NGTFbr.pdf

Popham, W. J. (2008). *Transformative assessment*. Alexandria, VA: Association for Supervision and Curriculum Development.

Ramaprasad, A. (1983). On the definition of feedback. *Behavioral Science*, 28(1), 4–13.

Ross, J. A. (2006). The reliability, validity, and utility of self-assessment. *Practical Assessment, Research and Evaluation*, 11(10). Retrieved June 3, 2011, from http://pareonline.net/pdf/v11n10.pdf

Ruiz-Primo, M. A., & Furtak, E. M. (2006). Informal formative assessment and scientific inquiry: Exploring teachers' practices and student learning. *Educational Assessment*, 11(2), 205–235.

Stiggins, R. J. (2007, November–December). Assessment for learning: A key to student motivation and learning. EDge, 2(2), 1–20.

Tierney, R., Clark, C., Fenner, L., Herter, R. J., Simpson, C. S., & Wiser, B. (1998). Portfolios: Assumptions, tensions, and possibilities. *Reading Research Quarterly*, 33(4), 474–486.

Vispoel, W. P., & Austin, J. R. (1995). Success and failure in junior high school: A critical incident approach to understanding students' attributional beliefs. *American Educational Research Journal*, 32(2), 377–412.

Wang, T. H. (2007). What strategies are effective for formative assessment in a e-learning environment? *Journal of Computer Assisted Learning*, 23(1), 171–186.

Wiggins, G. (1990). The case for authentic assessment. *Practical Assessment, Research, and Evaluation*, 2(2). Retrieved June 3, 2011, from http://pareonline.net/getvn.asp?v=2&n=2

Guiding Principle 4:
Learning is a collaborative responsibility.

Teaching and learning are both collaborative processes. Collaboration benefits teaching and learning when it occurs on several levels: when students, teachers, family members, and the community collectively prioritize education and engage in activities that support local schools, educators, and students; when educators collaborate with their colleagues to support innovative classroom practices and set high expectations for themselves and their students; and when students are given opportunities to work together toward academic goals in ways that enhance learning.

Research Summary

Collaborative learning is an approach to teaching and learning that requires learners to work together to deliberate, discuss, and create meaning. Smith and MacGregor (1992) define the term as follows:

"Collaborative learning" is an umbrella term for a variety of educational approaches involving joint intellectual effort by students, or students and teachers together. Usually, students are working in groups of two or more, mutually searching for understanding, solutions, or meanings, or creating a product. Collaborative learning activities vary widely, but most center on students' exploration or application of the course material, not simply the teacher's presentation or explication of it. (p. 1)

Collaborative learning has been practiced and studied since the early 1900s. The principles are based on the theories of John Dewey (2009), Lev Vygotsky (1980), and Benjamin Bloom (1956). Their collective work focusing on how students learn has led educators to develop more student-focused learning environments that put students at the center of instruction. Vygotsky specifically stated that learning is a social act and must not be done in isolation. This principle is the foundation of collaborative learning.

The research of Vygotsky (1980) and Jerome Bruner (1985) indicates that collaborative learning environments are one of the necessities for learning. Slavin's (1989) research also suggests that students and teachers learn more, are more engaged, and feel like they get more out of their classes when working in a collaborative environment. Totten, Sills, Digby, and Russ (1991) found that those involved in collaborative learning understand content at deeper levels and have higher rates of achievement and retention than learners who work alone. They suggest that collaborative learning gives students opportunities to internalize their learning.

A meta-analysis from the Cooperative Learning Center at the University of Minnesota concluded that having students work collaboratively has significantly more impact on learning than having students work alone (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981). An analysis of 122 studies on cooperative learning revealed:

- More students learn more material when they work together—talking through the material with each other and making sure that all group members understand—than when students compete with one another or work alone individualistically.
- More students are motivated to learn the material when they work together than when students compete or work alone individualistically (and the motivation tends to be more intrinsic).
- Students have more positive attitudes when they work together than when they compete or work alone individualistically.
- Students are more positive about the subject being studied, the teacher, and themselves as learners in that class and are more accepting of each other (male or female, handicapped or not, bright or struggling, or from different ethnic backgrounds) when they work together.

Collaboration can be between teachers, between students, and between teacher and student.

Teacher-Teacher Collaboration

It is critical for teachers to have the time to collaborate. Professional learning communities, which provide teachers with established time to collaborate with other teachers, have become a more common practice in recent years. Louis and Kruse (1995) conducted a case study analysis that highlighted some of the positive outcomes associated with professional learning communities, including a reduction in teacher isolation, increases in teacher commitment and sense of shared responsibility, and a better understanding of effective instructional practices. Professional learning communities encourage collaborative problem solving and allow teachers to gain new strategies and skills to improve and energize their teaching and classrooms.

Another example of teacher-to-teacher collaboration is lesson study. This professional development process began in Japan. Lesson study is a collaborative approach to designing and studying classroom lessons and practice. The most critical components of lesson study are observation of the lesson, collection of data about teaching and learning, and a collaborative analysis of the data to further impact instruction (Lewis, 2002; Lewis & Tsuchida, 1998; Wang-Iverson & Yoshida, 2005). Some of these characteristics are similar to other forms of professional development—analyzing student work, cognitive coaching, and action research, to name a few—but the fact that it focuses on teachers observing a live lesson that was collaboratively developed is different than any other form of professional development. Lesson study is a way for teachers to work together, collect data, and analyze data to reflect on teaching and learning (Lewis, 2002).

Student-Student Collaboration

Collaborative learning not only allows students to engage deeply with content but also helps students build the interpersonal skills needed to be successful in college and careers. Johnson, Johnson, and Holubec (1993) state that collaborative learning provides students with the opportunity to develop social skills. They found that many of the outcomes expected as part of a collaborative learning activity corresponded with goals for student content understanding and skill attainment. The strategies associated with collaborative learning—such as role assignments, collaborative problem solving, and task and group processing—all build the social skills that students need to be successful when working with others. Additionally, these skills are important in preparing students for the world of work, where collaborative writing and problem-solving are key elements of many careers.

There is a plethora of instructional and learning strategies that encourage student collaboration, including peer teaching, peer learning, reciprocal learning, team learning, study circles, study groups, and work groups, to name just a few (Johnson & Johnson, 1986). Collaborative inquiry, which combines many of the elements of student collaboration just mentioned, is a research-based strategy in which learners work together through various phases "of planning, reflection, and action as they explore an issue or question of importance to the group" (Goodnough, 2005 88). Collaborative inquiry brings together many perspectives to solve a problem, engaging students in relevant learning around an authentic question. It allows students to work together toward a common purpose to explore, make meaning, and understand the world around them (Lee & Smagorinsky, 2000).

Teacher-Student Collaboration

The purpose for collaboration in an educational setting is to learn and unpack content together to develop a shared understanding. Harding-Smith (1993) points out that collaborative learning approaches are based on the idea that learning must be a social act. It is through interaction that learning occurs. Johnson and Johnson (1986) similarly emphasize that when students and teachers talk and listen to each other, they gain a deeper understanding of the content and can develop the skills necessary to negotiate meaning throughout their lives.

Collaboration requires a shift from teacher-led instruction to instruction and learning that is designed by both teachers and students. Collaboration between student and teacher plays a critical role in helping students reflect and engage in their own learning experiences. The constructivist learning movement is one current example of efforts to increase the amount of collaboration between student and teacher occurring in the classroom. Mayer (2004) defines constructivist learning as an "active process in which learners are active sense makers who seek to build coherent and organized knowledge" (p. 14). Students co-construct their learning, with the teacher serving as a guide or facilitator. The teacher does not function in a purely didactic (i.e., lecturing) role. Neo and Neo (2009) found that constructivism helps students develop problem-solving skills, critical thinking, and creative skills and apply them in meaningful ways.

Probing Questions

- How can you use collaborative learning processes to engage students in their learning?
- How might you create space for teacher-teacher collaboration within your context?

Resources

All Things PLC website provides a number of resources on professional learning communities. Links to these resources can be found at http://www.allthingsplc.info/.

The Wisconsin Center for Education Research hosts a website with many resources for collaborative and small group learning. It can be found at http://www.wcer.wisc.edu/archive/cl1/cl/..

The Texas Collaborative for Teaching Excellence has created a professional development module about collaborative learning, which provides readings, research, and resources. It can be found at http://www.texascollaborative.org/Collaborative_Learning_Module.htm.

A review of research on professional learning communities, presented at the National School Reform Faculty research forum in 2006, contains findings that outline what is known about professional learning communities and how they should be structured. This paper is available at http://www.nsrfharmony.org/research.vescio_ross_adams.pdf.

References

Bloom, B. S. (Ed.) (1956). *Taxonomy of educational objectives. Handbook 1: Cognitive domain*. White Plains, NY: Longman.

Bruner, J. (1985). Vygotsky: An historical and conceptual perspective. In J. V. Wetsch (Ed.), *Culture, communication, and cognition: Vygotskian perspectives* (pp. 21–34). London: Cambridge University Press.

Dewey, J. (2009). *Democracy and education: An introduction to the philosophy of education*. New York: Cosimo Classics.

Goodnough, Karen. (2005). Fostering teacher learning through collaborative inquiry. *The Clearing House* 79(2), 88-92.

Harding-Smith, T. (1993). *Learning together: An introduction to collaborative learning*. New York: HarperCollins.

Johnson, R. T., & Johnson, D. W. (1986). Action research: Cooperative learning in the science classroom. *Science and Children*, 24(2), 31–32.

Johnson, D. W., Johnson, R. T., & Holubec, E. J. (1993). *Circles of learning: Cooperation in the classroom*. Edina, MN: Interaction.

Johnson, D. W., Maruyama, G., Johnson, R. T., Nelson, D., & Skon, L. (1981). Effects of cooperative, competitive, and individualistic goal structures on achievement: A meta-analysis. *Psychological Bulletin*, 89(1), 47–62.

Lee, C. D., & Smagorinsky, P. (Eds.). (2000). *Vygotskian perspectives on literacy research: Constructing meaning through collaborative inquiry*. Cambridge, England: Cambridge University Press.

Lewis, C. (2002). *Lesson study: A handbook of teacher-led instructional change*. Philadelphia: Research for Better Schools.

Lewis, C., & Tsuchida, I. (1998, Winter). A lesson is like a swiftly flowing river: Research lessons and the improvement of Japanese education. *American Educator*, 14–17, 50–52.

Wang-Iverson, P., & Yoshida, M. (2005). Building our understanding of lesson study. Philadelphia: Research for Better Schools.

Louis, K. S., & Kruse, S. D. (1995). *Professionalism and community: Perspectives on reforming urban schools*. Thousand Oaks, CA: Corwin Press.

Mayer, R. E. (2004). Should there be a three strikes rule against pure discovery? The case for guided methods of instruction. *American Psychologist*, 59(1), 14–19.

Neo, M., & Neo, T.-K. (2009). Engaging students in multimedia-mediated constructivist learning: Students' perceptions. *Educational Technology and Society*, 12(2), 254–266.

Slavin, R. E. (1989). Research on cooperative learning: An international perspective. *Scandinavian Journal of Educational Research*, 33(4), 231–243.

Smith, B. L., & MacGregor, J. T. (1992). *What is collaborative learning?* Olympia, WA: Washington Center for Improving the Quality of Undergraduate Education. Retrieved June 3, 2011, from http://learningcommons.evergreen.edu/pdf/collab.pdf

Totten, S., Sills, T., Digby, A., & Russ, P. (1991). *Cooperative learning: A guide to research*. New York: Garland.

Vygotsky, L. (1980). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Guiding Principle 5:
Students bring strengths and experiences to learning.

Every student learns. Although no two students come to school with the same culture, learning strengths, background knowledge, or experiences, and no two students learn in exactly the same way, every student's unique personal history enriches classrooms, schools, and the community. This diversity is our greatest education asset.

Research Summary

The authors of the groundbreaking work *How People Learn: Brain, Mind, Experience, and School* (Bransford, Brown, & Cocking, 2000) found that students' preconceptions may clash with new concepts and information they learn in school. If those preconceptions are not addressed, students may fail to grasp what is being taught or may learn only to pass a test. In other words, a student might enter kindergarten believing the world is flat because he or she has seen a flat map. Despite the presentation of geographic names and principles, the student still maintains the fundamental preconception about the shape of the world. Developing competence—or in this case, a knowledge of the shape of the world—requires that students have a deep foundation of factual knowledge, a context or conceptual framework to place it in, and the opportunity to explore how it connects to the real world. Ultimately, a metacognitive approach—one that pushes students to think about their own thought processes—can help them take control of their own learning.

As educational research on how people learn advances, so does our approach to teaching and learning. Strategies to advance teaching and learning are constantly evolving into new and innovative ways to reach learners. When a teacher uses students' interests, curiosity, and areas of confidence as starting points in planning instruction, learning is more productive. Teachers who are cognizant of these issues—and reflect on how to use them as strengths upon which they can build—ensure that all students have access to the content. Areas to consider are student strengths, gender, background knowledge, and connections to the home environment.

Building on Student Strengths

Teaching to students' strengths can improve student engagement (Sternberg, 2000, Sternberg & Grigorenko, 2000). Many students have strengths that are unrecognized and neglected in traditional schooling. Students in underrepresented minority groups have culturally relevant knowledge that teachers can use to promote learning. Sternberg et al. (2000) found that conventional instruction in school systematically discriminates against students with creative and practical strengths and tends to favor students with strong memory and analytical abilities. This research, combined with Sternberg's earlier (1988) research showing that teaching for diverse styles of learning produces superior results, suggests that capitalizing on the various strengths that all students bring to the classroom can positively affect students' learning. When students are taught in a way that fits *how* they think, they do better in school (Sternberg, 2000; Sternberg & Grigorenko, 2000). Sternberg and O'Hara (2000) found that when students were taught in a way that incorporated analytical thinking, creative thinking (creating, imagining, and inventing) and practical thinking (applying, implementing, and putting into practice)—students achieved at higher levels than when taught using conventional instructional methods.

Gender Considerations

Changing instruction might help alleviate the gender gap in literacy achievement. Research conducted by Sax (2005) reveals that boys fall behind girls in reading and writing early on and never catch up. Sax (2007) found that this dynamic plays a role in higher high school dropout rates for males, particularly black males. The college graduation rate for females approaches twice that of males in Hispanic and black populations. Many classrooms are a better fit for the verbal-emotive, sit-still, take-notes, listen-carefully, multitasking girl (Sax, 2005). The characteristics that boys bring to learning—impulsivity, single-task focus, spatial-kinesthetic learning, and physical aggression—often are viewed as problems.

Researchers such as Blum (1997) have identified more than 100 structural differences between the male and female brains. Altering strategies to accommodate more typically male assets—for example, the use of multimodal teaching (discussed on pages 10-11 of this report); the use of various display formats, such as printed material, videos, presentations, and computers; and an interactive learning environment to appeal to different learning styles—can help bridge the gap between what students are thinking and what they are able to put down on paper. Sadik's (2008) research suggests that using multimodal instructional strategies like digital storytelling—allowing students to incorporate digital cameras, creative and editing tools, computers, and other technology to design multimedia presentations—deepens students' learning.

Background Knowledge

Bransford et al. (2000) note in *How People Learn*, learning depends on how prior knowledge is incorporated into building new knowledge, and thus teachers must take into account students' prior knowledge. Jensen's (2008) research on the brain and learning demonstrates that expertise cannot be developed merely through exposure to information. Students must connect the information to their prior knowledge to internalize and deepen their understanding. Teachers can connect academic learning with real-life experiences. Service learning, project-based learning, school-based enterprises, and student leadership courses are some examples of how schools are trying to make the curriculum relevant. The key to making the curriculum relevant is asking the students to help connect the academics to their lives; this approach gets students actively engaged in their learning, which builds a stronger connection and commitment to school. Bell (2010) suggests that strategies such as project-based approaches to learning can help ensure that content and skills are taught together and connected to prior knowledge, which helps students understand how to develop and apply new skills in various contexts.

Connections to the Home Environment

Cochran-Smith (2004) emphasizes family histories, traditions, and stories as an important part of education. Often, children enter school and find themselves in a place that does not recognize or value the knowledge or experience they bring from their homes or communities. This situation can create a feeling of disconnect for students—a dissonance obliging them to live in and navigate between two different worlds, each preventing them from full participation or success in the other. Districts and schools can alleviate this dissonance by valuing and taking advantage of the unique experiences that each student brings to the classroom. Emphasizing connections to parents and community, recognizing and utilizing student strengths and experiences, and incorporating varied opportunities within the curriculum can help alleviate this dissonance.

Ferguson (2001) points out that it is particularly important to establish connections that not only bring the parents into the school environment but also encourage school understanding and participation within the community. Social distinctions often grow out of differences in attitudes, values, behaviors, and family and community practices (Ferguson, 2001). Students need to feel their unique knowledge and experience is valued by the school, and parents and community members need to feel they are respected and welcome within the school.

Although much attention has been paid to No Child Left Behind (NCLB) requirements for annual achievement tests and high-quality teachers, the law also includes important requirements for schools, districts, and states to organize programs of parental involvement and to communicate with parents and the public about student achievement and the quality of schools. Epstein (2005) offers perspectives on the NCLB requirements for family involvement; provides a few examples from the field; suggests modifications that are needed in the law; and encourages sociologists of education to take new directions in research on school, family, and community partnerships.

Probing Questions

- What are some ways that you currently use students' background knowledge to inform instruction?
- Does your experience teaching boys to read and write concur with the research? What ideas do you have to address the achievement gaps related to gender?
- What are ways you can uncover, acknowledge, and use students' backgrounds and strengths to enhance learning?
- What are some strategies for valuing and taking advantage of the unique experiences that each student brings to the classroom?

Resources

A good resource still valid today is *Making Assessment Work for Everyone: How to Build on Student Strengths*. See the SEDL website to download this resource: http://www.sedl.org/pubs/tl05/.

A short, easy-to-digest article from Carnegie Mellon University is titled *Theory and Research-Based Principles of Learning*. The article and full bibliography are at http://www.cmu.edu/teaching/principles/learning.html.

References

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House*, 83(2), 39–43. Retrieved June 3, 2011, from http://teacherscollegesj.org/resources/publications/PBL%20for%20the%2021%20Century.pdf

Blum, D. (1997). *Sex on the brain: The biological differences between men and women*. New York: Viking.

Bransford, J. D., Brown, A. L. & Cocking, R. R. (Eds.). (2000). How people learn: *Brain, mind, experience, and school* (Expanded ed.). Washington, DC: National Academy Press.

Cochran-Smith, M. (2004). Walking the road: *Race, diversity, and social justice in teacher education*. New York: Teachers College Press.

Epstein, J. (2005). Attainable goals? The spirit and letter of the No Child Left Behind Act on parental involvement. *Sociology of Education*, 78(2), 179–182.

Ferguson, A. A. (2001). *Bad boys: Public schools in the making of black masculinity*. Ann Arbor: University of Michigan Press.

Jensen, E. P. (2008). A fresh look at brain-based education. *Phi Delta Kappan*, 89(6), 408–417.

Sadik, A. (2008). Digital storytelling: A meaningful technology-integrated approach for engaged student learning. *Educational Technology Research and Development*, 56(4), 487–506.

Sax, L. (2005). *Why gender matters: What parents and teachers need to know about the emerging science of sex differences*. New York: Doubleday.

Sax, L. (2007). *Boys adrift: The five factors driving the growing epidemic of unmotivated boys and underachieving young men*. New York: Basic Books.

Sternberg, R. J. (1988). *The triarchic mind: A new theory of human intelligence*. New York: Viking.

Sternberg, R. J. (2000). Wisdom as a form of giftedness. *Gifted Child Quarterly*, 44(4), 252–259.

Sternberg, R. J., & Grigorenko, E. L. (2000). *Teaching for successful intelligence*. Arlington Heights, IL: Skylight Training.

Sternberg, R. J., Grigorenko, E. L., Jarvin, L., Clinkenbeard, P., Ferrari, M., & Torff, B. (2000, Spring). The effectiveness of triarchic teaching and assessment. *NRC/GT Newsletter,* 3–8. Retrieved June, 3, 2011, from http://www.gifted.uconn.edu/nrcgt/newsletter/spring00/spring00.pdf

Sternberg, R. J., & O'Hara, L. A. (2000). Intelligence and creativity. In R. J. Sternberg (Ed.), *Handbook of intelligence* (pp. 611–628). New York: Cambridge University Press.

Vygotsky, L. S. (1980). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Guiding Principle 6:
Responsive environments engage learners.

Meaningful learning happens in environments where creativity, awareness, inquiry, and critical thinking are part of instruction. Responsive learning environments adapt to the individual needs of each student and encourage learning by promoting collaboration rather than isolation of learners. Learning environments, whether classrooms, schools, or other systems, should be structured to promote engaged teaching and learning.

Research Summary

To be effective for all students, classroom learning environments must be responsive to a broad range of needs among a diverse student population. These diverse needs include cultural and linguistic differences as well as developmental levels, academic readiness, and learning styles. A responsive learning environment engages all students by providing a respectful climate where instruction and curriculum are designed to respond to the backgrounds and needs of every student.

Culturally Responsive Teaching

Research on culturally responsive teaching emphasizes the importance of teachers' understanding the cultural characteristics and contributions of various ethnic groups (Smith, 1998) and showing respect toward these students and their culture (Ladson-Billings, 1995; Pewewardy & Cahape, 2003). Culturally responsive teaching is defined by Gay (2002) as "using the cultural characteristics, experiences, and perspectives of ethnically diverse students as conduits for teaching them more effectively" (p. 106).

Research on culturally responsive teaching has found that students both are more engaged in learning and learn more effectively when the knowledge and skills taught are presented within a context of their experience and cultural frames of references (Au & Kawakami, 1994; Gay, 2000; Ladson-Billings, 1995). Areas considered part of creating a culturally responsive learning environments are (1) understanding the cultural lifestyles of their students, such as which ethnic groups give priority to communal living and problem solving; (2) knowing differences in the modes of interaction between children and adults in different ethnic groups; and (3) becoming aware of cultural implications of gender role socialization among different groups (Banks & Banks, 2001). To provide a culturally responsive learning environment teachers need to:

- Communicate high expectations for all students (Gay, 2000; Hollins & Oliver, 1999; Ladson-Billings, 1994, Nieto, 1999).
- Use active teaching methods and act as learning facilitators (Banks & Banks, 2001; Gay, 2000).
- Maintain positive perspectives on families of diverse students (Delgado-Gaitin & Trueba, 1991).
- Gain knowledge of cultures of the students in their classrooms (Banks & Banks, 2001; Nieto, 1999).
- Reshape the curriculum to include culturally diverse topics (Banks & Banks, 2001; Gay, 2000; Hilliard, 1991).
- Use culturally sensitive instruction that includes student-controlled discussion and small-group work (Banks & Banks, 2001; Nieto, 1999).

Further research asserts that culturally responsive teachers help students understand that knowledge is not absolute and neutral but has moral and political elements. This knowledge can help students from diverse groups view learning as empowering (Ladson-Billings, 1995; Tharp & Gallimore, 1988).

Strategies for designing curriculum and instruction for culturally diverse students are similar to the strategies for differentiating curriculum and instruction. In fact, Mulroy and Eddinger (2003) point out that the research on differentiation emerged, in part, because of the demand on schools to serve an increasingly diverse student population. Heacox (2002) asserts that classrooms are diverse in cognitive abilities, learning styles, socioeconomic factors, readiness, learning pace, and gender and cultural influences.

Differentiation

Research on differentiation includes meeting the learning needs of all students through modifying instruction and curriculum to consider developmental level, academic readiness, and socioeconomic backgrounds, as well as cultural and linguistic differences. Tomlinson (2005) defines differentiated instruction as a philosophy of teaching based on the premise that students learn best when their teachers accommodate the difference in their readiness levels, interests, and learning profiles. In a differentiated learning environment, each student is valued for his or her unique strengths while being offered opportunities to learn and demonstrate learning through a variety of strategies (Mulroy & Eddinger, 2003). Hall (2002) states, "To differentiate instruction is to recognize students' varying backgrounds, readiness, language, learning preferences, and interests and to react responsively" (p. 1).

According to Tomlinson (2005), who has written extensively on differentiation, three elements guide differentiated instruction: content, process, and product. *Content* means that all students are given access to the same content but are allowed to master it in different ways. Process refers to the ways in which the content is taught. *Product* refers to how students demonstrate understanding. Corley (2005) provides three questions that drive differentiation: (1) What do you want the student to know? (2) How can each student best learn this? and (3) How can each student most effectively demonstrate learning? Maker (1986) offers a framework through which differentiation can occur in the classroom:

- Create an encouraging and engaging learning environment through student-centered activities, encouraging independent learning, accepting student contributions, using a rich variety of resources, and providing mobility and flexibility in grouping.

- Modify the content according to abstractness and complexity. Provide a variety of content and particularly content focused on people.

- Modify the learning process through use of inquiry, higher-order thinking activities, group interactions, variable pacing, creativity and student risk-taking, and freedom of choice in learning activities.

- Modify the product through facilitating different ways for students to demonstrate learning, such as the use of authentic assessments.

In addition, researchers have found that the use of flexible grouping and tiered instruction for differentiation increases student achievement (Corley, 2005; Tomlinson & Eidson, 2003). Heacox (2002) describes differentiation as follows:

The focus is not on the adjustment of the students, but rather the adjustment of teaching and instructional strategies making it about learning, not teaching. The teacher is the facilitator who…puts students at the center of teaching and learning and lets his or her students' learning needs direct instructional planning (p. 1).

Several studies conducted in elementary and middle school classroom have found that student achievement is increased in differentiated classrooms (Connor, Morrison, & Katch 2004; McAdamis, 2001). Tomlinson and Eidson (2003) emphasize the need to include the components of student readiness, student interest, and student learning profile in differentiating instruction. Students' interests and learning profiles are often tied to their learning styles.

Learning Styles

The body of research on learning styles has coalesced around the work of Howard Gardner, who introduced the theory of multiple intelligences in 1983. Gardner's work suggests that the concept of a pure intelligence that can be measured by a single I.Q. score is flawed, and he has identified nine intelligences that people possess to various degrees. His theory asserts that a person's type of intelligence determines how he or she learns best (Gardner, 1999).

Learning style refers to how a student learns, and the concept takes into account cultural background and social and economic factors as well as multiple intelligences. Beishuizen and Stoutjesdjik (1999) define *learning style* as a consistent mode of acquiring knowledge through study, or experience. Research has shown that the quality of learning at all levels of education (primary, secondary, and higher education) is enhanced when instruction and curriculum take into account individual learning styles (Dunn, Griggs, Olsen, Beasley & Gorman, 1995). Another study found that student learning improved when the learning environment was modified to allow students to construct personally relevant knowledge and to engage in the materials at different levels and from different points of view (Dearing, 1997).

A responsive classroom environment considers the individual learning needs of all students. These learning needs include a variety of factors that influence how students learn: culture, language, developmental level, readiness, social and economic background, and learning style.

Creativity

Creativity is an essential component for creating an engaging and accessible classroom environment. The Wisconsin Task Force on Arts and Creativity in Education (2009) defines *creativity* as a process that combines "imagination, creativity, and innovation to produce something novel that has value" (p. 14). Sir Ken Robinson (2011) and Daniel Pink (2006) both support the need for schools to focus on creating classroom that foster this type of creativity in students. According to Robinson (2011), classrooms that foster creativity and allow students to question assumptions, look at content through various lenses, and create new understandings can help students be more successful in postsecondary education and the workplace.

Probing Questions

- Describe two or three ways you might differentiate the instruction in your classroom. How might you share this with a new teacher?
- How might you implement a simple strategy for assessing your students' learning styles?

Resources

ASCD offers a number of resources on differentiated instruction, including work by Carol Ann Tomlinson, at http://www.ascd.org.

For resources on culturally responsive teaching, the Center for Culturally Responsive Teaching and Learning can be accessed at http://www.culturallyresponsive.org/.

The website of the National Center for Culturally Responsive Education Systems (NCCRESt) can be accessed at http://www.nccrest.org.

For learning styles and resources on multiple intelligences, Thomas Armstrong hosts a website with information on Gardner's Theory of Multiple Intelligences and related teaching resources at http://www.thomasarmstrong.com/multiple_intelligences.php.

Creativity: Its Place in Education is a report that offers suggestions for creative classrooms and teaching. This report can be found at http://www.jpb.com/creative/Creativity_in_Education.pdf.

The report of the Wisconsin Task Force on Arts and Creativity in Education offers recommendations for policy and practice. This report can be found at ftp://doaftp04.doa.state.wi.us/doadocs/taskforce_report_final2009pdf.

References

Au, K. H., & Kawakami, A. J. (1994). Cultural congruence in instruction. In E. R. Hollins, J. E. King, & W. C. Hayman (Eds.), *Teaching diverse populations: Formulating a knowledge base* (p. 5–23). Albany: State University of New York Press.

Banks, J. A., & Banks, C. A. (2001). *Multicultural education: Issues and perspectives* (4th ed.). New York: Wiley.

Beishuizen, J. J., & Stoutjesdjik, E. T. (1999). Study strategies in a computer assisted study environment. *Learning and Instruction*, 9(3), 281–301.

Connor, C. M., Morrison, F. J., & Katch, L. E. (2004). Beyond the reading wars: Exploring the effect of child-instruction interactions on growth in early reading. *Scientific Studies of Reading*, 8(2), 305–336.

Corley, M. (2005). Differentiated instruction: Adjusting to the needs of all learners. *Focus on Basics: Connecting Research and Practice*, 7(C), 13–16.

Dearing, R. (1997). *Higher education in the learning society: Report of the National Committee*. London: HMSO.

Delgado-Gaitan, C., & Trueba, H. (1991). *Crossing cultural borders: Education for immigrant families in America*. London: Falmer.

Dunn, R., Griggs, S., Olsen, J., Beasley, M., & Gorman, B. (1995). A meta-analytic validation of the Dunn and Dunn model of learning-style preferences. *Journal of Educational Research*, 88(6), 353–362.

Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York: Basic Books.

Gay, G. (2000). *Culturally responsive teaching: Theory, research, and practice*. New York: Teachers College Press.

Gay, G. (2002). Preparing for culturally responsive teaching. *Journal of Teacher Education*, 53(2) 106–116.

Heacox, D. (2002). *Differentiating instruction in the regular classroom: How to reach and teach all learners, Grades 3–12*. Minneapolis, MN: Free Spirit.

Hilliard, A. G., III. (1991). Why we must pluralize the curriculum. *Educational Leadership*, 49(4), 12–16.

Hollins, E. R., & Oliver, E. I. (1999). *Pathways to success in school: Culturally responsive teaching*. Mahwah, NJ: Erlbaum.

Ladson-Billings, G. (1994). *The dreamkeepers: Successful teachers of African American children*. San Francisco: Jossey-Bass.

Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. American *Educational Research Journal*, 32(3), 465–491.

Maker, C. J. (1986). *Critical issues in gifted education: Defensible programs for the gifted.* Rockville, MD: Aspen.

McAdamis, S. (2001). Teachers tailor their instruction to meet a variety of student needs. *Journal of Staff Development*, 22(2), 1–5.

Mulroy, H., & Eddinger, K. (2003, June). *Differentiation and literacy*. Paper presented at the Institute on Inclusive Education, Nazareth College of Rochester, Rochester, NY.

Nieto, S. (1999). *The light in their eyes: Creating multicultural learning opportunities*. New York: Teachers College Press.

Pewewardy, C. H., & Cahape, P. (2003). Culturally responsive teaching for American Indian students. *ERIC Digest*. Retrieved June 3, 2011, from http://www.ericdigests.org/2005-1/teaching.htm

Pink, D. H. (2006). *A whole new mind: Why right-brainers will rule the future*. New York: Riverhead.

Robinson, Ken. (2011). *Out of our minds: Learning to be creative*. West Sussex, United Kingdom: Capstone.

Smith, G. P. (1998). *Common sense about common knowledge*: The knowledge bases for diversity. Washington, DC: American Association of Colleges for Teacher Education.

Tharp, R. G., & Gallimore, R. (1988). *Rousing minds to life: Teaching, learning, and schooling in social context*. Cambridge: England: Cambridge University Press.

Tomlinson, C. A. (2005). Grading and differentiation: Paradox or good practice? *Theory Into Practice*, 44(3) 262–269.

Tomlinson, C. A., & Eidson, C. C. (2003). *Differentiation in practice: A resource guide for differentiating curriculum. Grades 5–9*. Alexandria, VA: Association for Supervision and Curriculum Development.

Wisconsin Task Force on Arts and Creativity in Education. (2009). *A plan for action*. Madison: Wisconsin Department of Public Instruction. Retrieved June 3, 2011, from ftp://doaftp04.doa.state.wi.us/doadocs/taskforce_report_final2009.pdf