EVESHAM TOWNSHIP SCHOOL DISTRICT

MATHEMATICS CURRICULUM

GRADES K-8

ADOPTED: December 15, 2016

EVESHAM TOWNSHIP SCHOOL DISTRICT
MISSION STATEMENT

The mission of the Evesham Township School District is to promote excellence in an environment that engages students in meaningful learning experiences. In partnership with students, dedicated staff, families, and community, the district provides a strong educational foundation that will empower our students to:

- Achieve their unique potential
- Embrace self-directed, life-long learning
- Develop the skills necessary for appropriate risk-taking and responsible decision-making
- Respect themselves and others
- Problem-solve individually and collaboratively
- Become contributing members of a diverse, global society

John Scavelli, Jr., Superintendent
Danielle T. Magulick, Director of Curriculum & Instruction

Jennifer Bland, Ed.D., Supervisor, Grades 5-8
Kelly Camm, Supervisor, Grades PreK-4

Mathematics Committee Members

The Mathematics Curriculum Revision Committee included teacher representation from all grade levels and schools within the district, as well as principals and subject area curriculum supervisors. These members are listed below:

Elementary School Teachers:
Krista Alexy
Jaime Angermeier
Lauren Edge
Sandy Francesco
Patty Giroux
Caren Goldberg
Tricia Hafner
Christine Keltos
Carolyn Lance
Kristen Lauver
Christina Marciano
Karen Minerva
Katie Morgan
Robyn Osborne
Carol Parsons
Laura Sangillo
Leigh Seeger
Regina Spitalieri
Barbara Stoner
Debbie VanCuren

Middle School Teachers:
Erin Alexander
Elizabeth Brescia
Stacey Cerasi
Donna Dancsecs
John Hampshire
Beth Mikolajczyk
Rebecca Varner
Diane Zanghi

Administrators:

Jennifer Bland	Curriculum Supervisor
Kelly Camm	Curriculum Supervisor
Julio Feldman	Elementary Principal
Danielle Magulick	Director of Curriculum & Instruction
Gaeton Lucibello	Middle School Vice Principal
Maria Sobel	Elementary Principal

This committee also acknowledges the entire Mathematics department for their input at various phases of the curriculum writing project.

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VISION FOR MATHEMATICS EDUCATION

"No problem can be solved by the same consciousness that created it. We must see the world anew."

Albert Einstein

The Evesham Township School District Mathematics Curriculum is designed to prepare students to develop mathematical literacy in order to be equipped with the knowledge and decision making skills necessary to assume their role as active and deliberate citizens.

A mathematically literate individual is one who is able to "explore, conjecture, and to reason logically as well as use a variety of mathematic methods effectively to solve problems." Students who are mathematically literate must be able to communicate effectively using the language of mathematics as they speak, read, and write mathematics as well as listen to mathematics (p. 20, 2008; *Mathematical Literacy,* Thompson, Kersaint, Richards, Hunsader, Rubenstein).

Although much has changed about the nature of mathematics students' needs and the depth of mathematical thinking required to be successful in a 21st century society, the fundamentals of a balanced mathematics program remain the same. A balanced mathematics program must encompass conceptual understanding (making sense of math), proficiency with mathematical skills, facts, and procedures (doing math), and problem solving (using math). A focus on any one of these areas in isolation will result in inadequate understanding and mathematic proficiency that is superficial and short-lived. By focusing on all three aspects, a balance of conceptual understanding and procedural fluency is developed within a problem solving framework that allows students to apply mathematical concepts beyond the classroom. In addition to these critical components, the connective tissue of a coherent mathematics program mirrors the same critical abilities required in the twenty-first century: mathematical habits of mind, flexible thinking skills, and strong quantitative reasoning (Seeley, 2009).

"Knowing what works is good, but even better is knowing why it works (Hyde, p.13)." Mathematics is the science of patterns and just like reading, math is more than a collection of skills or subskills. Computational proficiency and math facts are part of mathematics, but they do not define it. The goal of mathematics teaching is understanding concepts, not merely memorizing facts and procedures. Therefore, we must use what we know about cognition to build this understanding. It is vital to take advantage of children's natural curiosity and schema for mathematics beginning at an early age. These natural building blocks, or habits of mind, coupled with mathematical logic must be developed to facilitate children's ability to become competent at mathematics. A focus on habits of mind must take precedence over arbitrary rules, formulas, and procedures that do not derive from logic.

To achieve our mission for student learning, our mathematics curriculum actively engages students in meaningful problem solving experiences that are aligned with the New Jersey Student Learning Standards for Mathematics, as well as the Standards for Learning established by the National Council for Teachers of Mathematics (NCTM). Topics within these standards have been prioritized to allow for greater depth of study and mastery of concepts. As we prepare our students to be successful 21st century learners, it is essential for them to be literate in mathematical comprehension and skilled in mathematics. According to the National Council for Teachers of Mathematics

(NCTM), “learning mathematics is enhanced when content is placed in context and is connected to other subject areas and when students are given multiple opportunities to apply mathematics in meaningful ways as part of the learning process.” Comprehension is the vehicle to conceptual understanding and successful learning of mathematics. Students gain conceptual understanding through the use of strategies, which include making connections, questioning, visualizing, inferring, predicting and synthesizing. To this end, we embrace a workshop approach to teach mathematics and to structure lessons. The components of a mathematics workshop include mini-lessons or other whole group lessons, exploration time, guided small-group support or strategy lessons, independent work, conferring, opportunities for collaboration, and reflection.

A comprehensive mathematics program must enable all students to consolidate their mathematical thinking through communication and communicate their mathematical thinking coherently to peers, teachers, and others. Effective communication and meaningful discussions among students include justifying responses, encouraging alternate solutions, and providing constructive feedback ultimately increase student understanding. Students working in various grouping structures have the chance to focus on their reasoning and actively defend or validate their thinking, not simply answer. Misconceptions or gaps are identified when a student explains a solution, even when it is correct.

> *Strategic use of technology in the teaching and learning of mathematics is the use of digital and physical tools by students and teachers in thoughtfully designed ways and at carefully determined times so that the capabilities of the technology enhance how students and educators learn, experience, communicate, and do mathematics. Technology must be used in this way in all classrooms to support all students' learning of mathematical concepts and procedures, including those that students eventually employ without the aid of technology. Strategic uses support effective teaching practices and are consistent with research in teaching and learning.*
>
> -A Position of the National Council of Teachers of Mathematics on Technology (July 2015)

The use of technology and tools in the mathematics classroom allows students to move from skills in isolation to exploration and discovery. Research suggests that the strategic use of technology and mathematical tools not only makes mathematics more engaging and fun, but also facilitates the students' ability to engage in real life applications of mathematics and prepares students for the demands of this century. Mathematically literate students are able to make sound decisions about when to use technological tools to pose or solve problems and to explore and deepen their understanding of concepts.

GOALS FOR STUDENTS

In order to achieve the district vision for Mathematics instruction, students will need to work towards fulfilling the following goals:

- Develop mathematical process skills to promote mathematical discourse and enhance understanding and facilitate application of mathematical content in everyday situations.
- Develop a strong sense of number and its application in real world settings.
- Explore, develop, understand, and apply fundamentals of spatial sense and reasoning and related measurements in everyday context.
- Read, understand, construct, analyze and explain representation of data and probability statistics collected from real experiments or everyday phenomena.
- Use concepts of algebraic reasoning to identify patterns, solve problems and equations, and connect algebra to real life experiences.
- Make sound decisions about when to use technology and mathematical tools to pose or solve problems.
- Develop an understanding and apply the standards for mathematical practices.

GOALS FOR TEACHERS

Strategies and concepts presented by teachers will apply constructivist theory and give equal attention to process and content, so that all students can actualize this vision. Teachers will cultivate an environment where students flourish as independent, inquiry-based learners. Toward that end, teachers will:

- Model mathematical thinking, evidenced-based dialogue, questioning, and reflection.
- Create opportunities for students to use prior knowledge and life experiences to make connections and apply mathematical content/concepts to real life situations.
- Utilize a multitude of strategies to encourage higher level thinking and challenge students to think critically.
- Encourage creativity, communication, collaboration and critical thinking.
- Implement tasks that promote mathematical reasoning, problem solving and allow multiple entry points and varied solution strategies (NCTM).
- Engage students in making connections among mathematical representations to deepen understanding of concepts and procedures (NCTM).
- Facilitate meaning and authentic mathematical discourse among students to build shared understanding of ideas by analyzing and comparing approaches and arguments (NCTM).
- Build procedural fluency from conceptual understanding (NCTM).
- Support productive struggle, individually and collectively, as students grapple with mathematical ideas and relationships (NCTM).
- Elicit and use evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning (NCTM).

Our vision is to develop a community of learners who value mathematics and use it in their everyday lives for purpose, pleasure and enrichment, both for themselves and for the world around them.

Program Description

The mathematics curriculum incorporates developmentally appropriate, inquiry based instruction. Students explore the domains of Counting and Cardinality, Number and Operations in Base Ten, Ratios and Proportional Relationships, Number and Operations Fractions, the Number System, Operations and Algebraic Thinking, Expressions and Equations, Functions, Geometry, Measurement and Data, and Statistics and Probability. Content is presented in various contexts to promote development of Mathematical Practices including making sense of problems and persevering in solving them, reasoning abstractly and quantitatively, constructing viable argument and critiquing the reasoning of others, modeling with mathematics, using appropriate tools strategically, attending to precision, looking for and making sense of structure, and looking for and expressing regularity in repeated reasoning. Hands-on activities and use of manipulatives are essential for developing students' concrete understanding before progressing to more symbolic and abstract representations of math.

Elementary

In the elementary grades (K-5) students explore concepts in a coherent and focused sequence with an emphasis on Number and Operations, Numbers and Algebraic Thinking, as well as Geometry and Measurement. Fewer topics are studied in greater depth in an effort to achieve mastery. Students receive multiple exposures or repeated practice over time, which is proven to deepen mathematical understanding as topics become more complex when revisited in subsequent grades. Curricular materials emphasize concept mastery, the use of manipulatives to support a concrete-pictorial-abstract approach, metacognitive reasoning, and the ability to communicate and collaborate with others. Teachers consider individual learning styles, preferences, and readiness when facilitating problem solving experiences in real-life contexts and developing meaningful activities. To this end, teachers are encouraged to implement a math workshop model to differentiate instruction. Although *Math in Focus* is the primary resource for instruction, other resources are also integral parts of the mathematics curriculum. These additional resources include, but are not limited to: Math Windows, Problem Solving Exemplars and district-developed, grade/program specific Implementation Guides.

Middle

In the middle school grades (6-8), students continue to explore concepts in a coherent and focused sequence with a more sophisticated understanding of the Number System and Geometry, as well as an emphasis on Ratios and Proportional Relationship, Algebraic Expressions, and Statistics and Probability. Fewer topics are studied in greater depth in an effort to achieve mastery. Once a topic has been introduced, the students continue to explore content embedded in real-world, problem-solving contexts. Chapters of study focus on one content area (e.g., Algebra) or "big idea" to afford students an opportunity to explore that particular area more thoroughly before moving on. Curricular materials emphasize the use of multiple strategies and discovery of patterns as students explore problems/investigations, develop theories, make connections, and construct understanding of content. Students continue to use manipulatives and technology as appropriate within a concrete-pictorial-abstract approach and are introduced to the graphing calculator to solve problems and represent data. Teachers consider individual learning styles, preferences, and readiness when facilitating problem solving experiences in real-life contexts and developing meaningful activities. To this end, teachers are encouraged to utilize flexible grouping to

differentiate instruction. Although *Math in Focus* is the primary resource for instruction, other resources are also integral parts of the mathematics curriculum. These additional resources include, but are not limited to: Hands on Equations, Math Windows, Problem Solving Exemplars and district-developed, grade/program specific Implementation Guides

Differentiated Instruction

Differentiated instruction is "responsive teaching" that considers the variance in student readiness, interests, and learning profile rather than "one-size-fits-all." Teachers proactively plan varied approaches to what students need to learn (content), how they will learn it (process), and/or how they can express what they have learned (product) in order to increase the likelihood that each student will learn as much as he or she can as efficiently as possible. In order to meet the needs of all learners, teachers utilize flexible grouping and/or a math workshop model. The various grouping options include cooperative groups, whole class, small group, partners, and individual instruction.

Accelerated Instruction

Beginning in grade 4, accelerated math instruction is offered for identified students. In grades 4 and 5, enrichment is offered where students explore *Math in Focus* concepts and materials at an accelerated pace. These students may be introduced to additional units, investigations, problems, or projects to promote deeper understanding of concepts. Students are recommended for these classes based on specific criteria which reflect academic performance in classroom, district, and state tasks, as well as a student's interest and disposition towards mathematical tasks and math concepts. In some instances, the needs of accelerated math students may be addressed through homogeneous grouping within the heterogeneous class.

In the middle school, learners in level one courses in grades 6 and 7 explore *Math in Focus* and supplemental materials at an accelerated pace. At middle school, curriculum is compacted to include addition units, investigations, problems, and projects. Additionally, students in accelerated classes are afforded opportunities to participate in competitions, contests, and other extensions of the mathematics curriculum. In grade 8, students who have demonstrated successful performance in accelerated math courses, strong academic records, and attainment of established benchmark scores on district and state standardized assessments may be recommended for Algebra 1 instruction at the high school level. This course is aligned with the honors curriculum of Cherokee High School and utilizes its algebra text to explore the principles of algebraic reasoning. Students who successfully complete this course may choose to accept high school credit. In addition to Algebra instruction, a select number of accelerated students will be invited to take Cherokee High School Geometry as an elective course in eighth grade. Invitations are awarded based on exceptional academic and testing performance. This course also utilizes the high school text to present content.

Modifications for Special Populations

As all students are individuals, it will be necessary to differentiate instruction daily to meet the needs of every learner. In all cases, teachers should be consistently gathering and utilizing formative assessment data to drive instruction. At times, this will necessitate additional whole group lessons, flexible, small group instruction, individual conferring, and tiered assignments.

Students who are at risk for failure or are English Language learners should be seen in small groups as much as possible in order to ensure additional opportunities for

differentiation, modeling, and guided practice prior to independent practice with concepts or skills. In addition, teachers may request observations from building specialists (eg. math coaches) or curriculum supervisors regarding feedback and/or recommendations for individuals. Teachers will utilize the I&RS process for students who are not identified for Special Education and who are not making sufficient progress in any subject area.

In certain cases, additional modifications are necessary to meet the needs of all students. Students who are identified through the Special Education process or the Tier III Gifted and Talented process will have additional individualized plans that may include adjusted materials or accommodations in order to access the curriculum and meet the standards. In these cases, teachers will consult IEPs or Tier III action plans for specific guidelines regarding instruction and materials.

Teachers with Special Education students who are not making sufficient progress shall request an observation with the Learning Consultant and Curriculum Supervisor in order to design individualized recommendations regarding additional instructional strategies, specialized programs or placement recommendations.

NEW JERSEY
STUDENT LEARNING STANDARDS

Standards for Mathematical Practice, K-8

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Standards for Mathematical Content, by Grade Level

Domains Addressed, K-5
1. Counting and Cardinality (K)
2. Operations and Algebraic Thinking
3. Number and Operation in Base Ten
4. Measurement and Data
5. Geometry
6. Number and Operation-Fractions (3-5)

Domains Addressed, 6-8
1. Ratios and Proportional Relationships (6-7)
2. The Number System
3. Expressions and Equations
4. Geometry
5. Statistics and Probability
6. Functions (8)

The New Jersey Student Learning Standards can be viewed on line:
http://www.state.nj.us/education/cccs/2016/math/standards.pdf

The Common Core State Standards can be viewed on line:
http://www.corestandards.org/wp-content/uploads/Math_Standards1.pdf

The K-12 Mathematics Crosswalk can be viewed on line:
http://www.state.nj.us/education/cccs/2016/math/crosswalk.pdf

Overview of K-2 New Jersey Student Learning Standards

	K	1	2
Counting and Cardinality	• Know number names and the count sequence • Count to tell the number of objects • Compare numbers		
Operations and Algebraic Thinking	• Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from	• Represent and solve problems involving addition and subtraction • Understand and apply properties of operations and the relationship between addition and subtraction • Add and subtract within 20 • Work with addition and subtraction equations	• Represent and solve problems involving addition and subtraction • Add and subtract within 20 • Work with equal groups of objects to gain foundations for multiplication
Number and Operations in Base Ten	• Work with numbers 11-19 to gain foundations for place value	• Extend the counting sequence • Understand place value • Use place value understanding and properties of operations to add and subtract	• Understand place value • Use place value understanding and properties of operations to add and subtract
Measurement and Data	• Describe and compare measurable attributes • Classify objects and count the number of objects in categories	• Measure lengths indirectly and by iterating length units • Tell and write time • Represent and interpret data	• Measure and estimate lengths in standards units • Relate addition and subtraction to length • Work with time and money • Represent and interpret data
Geometry	• Identify and describe shapes • Analyze, compare, create, and compose shapes	• Reason with shapes and their attributes	• Reason with shapes and their attributes

Overview of 3-5 New Jersey Student Learning Standards

	3	4	5
Operations and Algebraic Thinking	• Represent and solve problems involving multiplication and division • Understand properties of multiplication and the relationship between multiplication and division • Multiply and divide within 100 • Solve problems involving the four operations, and identify and explain patterns in arithmetic	• Use the four operations with whole numbers to solve problems • Gain familiarity with factors and multiples • Generate and analyze patterns	• Write and interpret numerical expressions • Analyze patterns and relationships
Number and Operations in Base Ten	• Use place value understanding and properties of operations to perform multi-digit arithmetic	• Generalize place value understanding for multi-digit whole numbers • Use place value understanding and properties of operations to perform multi-digit arithmetic	• Understand the place value system
Number and Operations – Fractions	• Develop understanding of fractions as numbers	• Extend understanding of fraction equivalence and ordering • Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers • Understand decimal notation for fractions, and compare decimal fractions	• Use equivalent fractions as a strategy to add and subtract fractions • Apply and extend previous understandings of multiplication and division to multiply and divide fractions

	3	4	5
Measurement and Data	• Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects • Represent and interpret data • Geometric measurement: understand concepts of area and relate area to multiplication and to addition • Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures	• Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit • Represent and interpret data • Geometric measurement: understand concepts of angle and measure angles	• Convert like measurement units within a given measurement system • Represent and interpret data • Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition
Geometry	• Reason with shapes and their attributes	• Draw and identify lines and angles, and classify shapes by properties of their lines and angles	• Graph points on the coordinate plane to solve real-world and mathematical problems • Classify two-dimensional figures into categories based on their properties

Overview of 6-8 New Jersey Student Learning Standards

	6	7	8
Ratios and Proportional Relationships	• Understand ratio concepts and use reasoning to solve problems	• Analyze proportional relationships and use them to solve real-world and mathematical problems	• Know that there are numbers that are not rational and approximate them by rational numbers
The Number System	• Apply and extend previous understandings of multiplication and division to divide fractions by fractions • Compute fluently with multi-digit numbers and find common factors and multiples • Apply and extend previous understandings of numbers to the system of rational numbers	• Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers	
Expressions and Equations	• Apply and extend previous understandings of arithmetic to algebraic expressions • Reason about and solve one-variable equations and inequalities • Represent and analyze quantitative relationships between dependent and independent variables	• Use properties of operations to generate equivalent expressions • Solve real-life and mathematical problems using numerical and algebraic expressions and equations	• Work with radicals and integer exponents • Understand the connections between proportional relationships, lines, and linear equations • Analyze and solve linear equations and pairs of simultaneous linear equations
Functions			• Define, evaluate, and compare functions • Use functions to model relationships between quantities

STANDARDS AND EXPECTATIONS, GRADES K-8

Kindergarten
Standards and Expectations

COUNTING AND CARDINALITY		
	K	**Resources**
	Know number names and the count sequence.	
K.CC	1. Count to 100 by ones and by tens.	MiF: 1.1, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 4.2, 4.3, 4.4, 4.5, 4.6, 6.1, 6.2, 6.3, 6.4, 6.5, 8.3, 8.4, 8.5, 8.6, 8.7, 9.1, 9.2, 9.3, 9.4, 12.3, 15.2, 15.3, 17.1, 17.2, 18.1, 18.2, 18.3
K.CC	2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).	MiF: 2.4, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 9.2, 9.3, 9.4, 12.1, 14.1, 14.2
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).	MiF: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 5.1, 6.1, 6.2, 6.3, 6.4, 6.5, 8.1, 8.2, 9.1, 9.2, 9.3, 9.4, 12.1, 14.4, 17.1, 17.2, 18.1, 18.2, 18.3, 19.1
	Count to tell the number of objects.	
K.CC	4. Understand the relationship between numbers and quantities; connect counting to cardinality.	MiF: 17.1, 17.2, 18.1, 18.2
	a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.	MiF: 1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.6, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 6.1, 6.2, 6.3, 6.4, 6.5, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 9.1, 9.2, 9.4, 12.1, 12.2, 12.3, 14.4, 15.2, 15.3
	b. Understand when counting objects that the last number they say is the total number of objects, and that the number of objects being counted remains the same regardless of the arrangement of the objects or the order in which they are counted.	MiF: 1.1,1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 5.1, 6.1, 6.2, 6.3, 6.4, 6.5, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 12.1, 12.2, 12.3, 14.1, 14.2, 14.4, 15.2, 15.3
	c. Understand that the very next number in a sequence of numbers refers to a quantity that is one larger.	MiF: 2.3, 2.4, 4.1, 4.2, 4.3, 4.5, 4.6, 6.2, 6.3, 6.4, 8.4, 8.5, 8.6, 8.7, 12.1, 14.1, 14.2, 14.4, 15.2, 15.3

COUNTING AND CARDINALITY		
	K	**Resources**
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.	MiF: 1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 4.2, 4.3, 4.4, 4.5, 4.6, 5.1, 6.2, 6.3, 6.4, 6.5, 8.1, 8.2, 12.1, 20.2
	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.	MiF: 2.4, 2.5, 2.6, 6.5, 9.1, 9.3, 12.3, 14.1, 14.2, 14.4
K.CC	7. Compare two numbers between 1 and 10 presented as written numerals.	MiF: 2.4, 6.5

OPERATIONS AND ALGEBRAIC THINKING		
	K	**Resources**
	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.	
K.OA	1. Represent addition and subtraction up to 10 with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.	MiF: 4.1, 4.2, 5.1, 6.1, 9.1, 12.1, 12.2, 12.3, 14.1, 14.2, 14.3, 14.4, 15.2, 17.1, 17.2, 18.1, 18.2, 18.3, 20.2
K.OA	2. Understand and solve addition and subtraction word problems, and add and subtract within 10, e.g. by using objects or drawings to represent the problem.	MiF: 4.1, 9.1, 15.2, 17.1, 17.2, 18.1, 18.2, 18.3, 20.2
K.OA	3. Deconstruct numbers less than 10 by breaking the number into a pair of numbers in more than one way, and representing the new way of naming the number with an equation or drawing. For example 5 = 2 + 3.	MiF: 12.1, 12.2, 14.1, 14.2, 14.3, 17.1, 17.2, 18.1, 18.2, 18.3, 20.2
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.	MiF: 6.1, 12.1, 12.2, 14.1, 14.2
K.OA	5. Demonstrate fluency for addition and subtraction within 5.	MiF: 9.1, 17.2, 18.3

NUMBER AND OPERATIONS IN BASE TEN		
	K	**Resources**
	Work with numbers 11–19 to gain foundations for place value.	
K.NBT	1. Construct and deconstruct numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each construction or deconstruction by a drawing or equation (e.g., 18 = 10 + 8); and understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	MiF: 14.3, 14.4

MEASUREMENT AND DATA		
	K	**Resources**
	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.	MiF: 1.3, 1.4, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2, 15.1, 15.2, 15.3, 16.1, 16.2, 19.1, 19.2
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.	MiF: 1.3, 1.4, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2, 11.1, 11.2, 15.1, 15.2, 15.3, 16.1, 16.2, 19.1, 19.2
	Classify objects and count the number of objects in each category.	
K.MD	3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.	MiF: 3.1, 5.1, 5.2, 11.2, 16.2, 19.3

GEOMETRY		
	K	**Resources**
	Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, and spheres/balls).	
K.G	1. Describe objects in the environment using names of shapes.	MiF: 5.3 Calendar
	a. Begin to describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.	
K.G	2. Correctly name shapes regardless of their orientations or overall size.	MiF: 7.1, 7.3, 7.4, 7.5, 13.1, 16.1, 16.2
K.G	3. Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").	MiF: 7.2
	Analyze, compare, create, and compose shapes.	
K.G	4. Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/corners) and other attributes (e.g., having sides of equal length).	MiF: 7.1, 7.3, 7.4, 7.5
K.G	5. Draw shapes and make models of them.	MiF: 7.2, 7.3
K.G	6. Compose simple shapes to form larger shapes. For example, "Can you join these two triangles with full sides touching to make a rectangle?"	MiF: 7.1, 7.4

Grade 1
Standards and Expectations

OPERATIONS AND ALGEBRAIC THINKING		
	1	**Resources**
	Represent and solve problems involving addition and subtraction and explain reasoning used.	
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 unknown in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	MiF: 3.1, 3.3, 4.1, 4.3, 4.4, 8.1, 8.2, 8.3, 13.6, 14.1, 14.2
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.	MiF: 8.3, 13.5, 13.6, 14.2
ETSD	1. Identify penny, nickel, dime, quarter, and dollar and know its value. Show amounts of money with fewest amounts of coins. Make exchanges for coins.	MiF: 19.1, 19.2, 19.3, 19.4 Calendar
	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. *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition) (Students need not use formal terms for these properties)*	MiF:1.1, 2.1, 3.1, 3.2, 8.3, 13.5, 14.1, 14.2

OPERATIONS AND ALGEBRAIC THINKING		
	1	**Resources**
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.*	MiF: 4.1, 4.2, 4.3, 4.4, 8.2, 8.3, 13.3, 13.4, 13.6, 17.3, 17.4
	Add and subtract within 20.	
1.OA.	5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).	MiF: 3.1, 4.1, 12.2, 13.1, 16.1, 16.3
1.OA.	6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on, making a ten, decomposing a number leading to a ten, using the relationship between addition and subtraction; and creating equivalent but easier or known sums.	MiF: 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 8.1, 8.2, 8.3, 13.5, 13.6, 14.1, 14.2
	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*	MiF: 3.1, 3.2, 3.3, 4.1, 4.3, 8.1, 8.2, 8.3, 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 14.1, 14.2, 17.1, 17.2, 17.3, 19.4
1.OA.	8. Determine the unknown whole number in an addition or subtraction equation containing three whole numbers. *For example, correctly fill in the missing addend in the problem 5 + ___ = 8.*	MiF: 3.1, 3.3, 4.3, 8.1, 8.2, 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 14.2, 17.1, 17.2, 17.3, 17.4

NUMBER AND OPERATIONS IN BASE TEN		
	1	**Resources**
	Extend the counting sequence and explain reasoning used.	
1.NBT.	1. Count to 100, starting at any number less than 100. In this range, read and write numerals and represent a number of objects with a written numeral.	MiF: 1.1, 1.2, 1.3, 4.1, 4.4, 7.1, 7.2, 7.4, 12.1, 12.2, 12.3, 16.1, 16.2, 16.3
	Understand place value and explain reasoning used.	
1.NBT.	2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Specifically understand the following:	
	a. 10 can be thought of as a bundle of ten ones — called a "ten."	MiF: 7.1, 7.2, 7.3, 12.1, 12.2, 12.3, 13.1, 13.2, 13.3, 13.4, 16.1, 16.2, 16.3, 17.1, 17.2, 17.3, 17.4
	b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.	MiF: 7.1, 7.2, 7.3, 7.4
	c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).	MiF: 12.1, 12.2, 13.1, 13.3, 16.1, 16.2, 16.3, 17.1, 17.3
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 <.	MiF: 7.3, 12.1, 16.3

NUMBER AND OPERATIONS IN BASE TEN		
	1	**Resources**
	Use place value understanding and properties of operations to add and subtract.	
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 (e.g., base ten blocks) 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.	MiF: 4.1, 4.2, 4.3, 8.1, 8.2, 8.3, 13.1, 13.2, 13.3, 13.4, 13.6, 14.1, 14.2, 17.1, 17.2, 17.3, 17.4
	Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.	
1.NBT.	5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	MiF: 14.1, 14.2
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.	MiF: 13.3, 17.3

MEASUREMENT AND DATA		
	1	**Resources**
	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.	MiF: 9.2, 9.5
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.	MiF: 9.3, 9.5
	a. 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.	
	Tell and write time and explain reasoning used.	
1.MD.	3. Tell and write time in hours and half-hours using analog and digital clocks.	MiF: 15.2, 15.3
	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.	MiF: 11.1, 11.2, 11.3

GEOMETRY		
	1	**Resources**
	Reason with shapes and their attributes and explain reasoning used.	
1.G.	1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.5 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.	MiF: 5.1
1.G.	2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	MiF: 5.1, 5.3
1.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 equal shares of identical wholes need not have the same shape.	MiF: 5.1

Grade 2
Standards and Expectations

OPERATIONS AND ALGEBRAIC THINKING		
	2	**Resources**
	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.	MiF: 4.1, 4.2, 4.4, 10.1, 10.3, 13.5 Math Windows Open Response Practice (Chapter 2, Chapter 4, Chapter 11, Chapter 12)
	Add and subtract within 20.	
2.OA.	2. Fluently add and subtract within 20 using mental strategies. By the end of grade 2, know from memory all sums of two one-digit numbers.	MiF: 10.2, 10.4
	Work with equal groups of objects to gain foundations for multiplication.	
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 2's, write an equation to express an even number as the sum of two equal addends.	MiF: 5.2A Math Windows
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.	MiF: 6.2, 6.4, 6.5, 15.2, 15.4

NUMBER AND OPERATIONS IN BASE TEN		
	2	**Resources**
	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:	MiF: 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, Math Windows
	a. 100 can be thought of as a bundle of ten tens — called a “hundred.”	MiF: 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, Calendar
	b. 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).	MiF: 1.1, 1.2
2.NBT.	2. Count within 1000; skip-count by 5s, 10s, and 100s.	MiF: 1.1, 1.4, 6.1, 6.3, 6.5, 6.6 Open Response Practice (Chapter 7)
2.NBT.	3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	MiF: 1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5
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.	MiF: 1.3
	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.	MiF: 2.1, 3.1, 4.1, 4.2, 4.3, 4.4, 9.3, 10.1, 10.2, 10.3, 10.4, 10.5, 13.5 Open Response Practice (Chapter 6)
2.NBT.	6. Add up to four two-digit numbers using strategies based on place value and properties of operations.	MiF: 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 4.1, 4.2, 4.3, 4.4, 9.3, 10.1, 10.2, 10.3, 10.4, 10.5, 13.5

NUMBER AND OPERATIONS IN BASE TEN		
	2	**Resources**
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.	MiF: 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 4.1, 4.2, 4.2, 4.3, 4.4, 9.3, 10.1, 10.2, 10.3, 10.4, 13.5
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.	MiF: 10.2 10.3, 10.4
2.NBT.	9. Explain why addition and subtraction strategies work, using place value and the properties of operations.	MiF: 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 4.1, 4.2, 4.3, 4.4, 10.1, 10.2, 10.3, 10.4, 10.5, 13.5 Math Windows

MEASUREMENT AND DATA		
	2	**Resources**
	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.	MiF: 7.1, 7.3, 7.4, 13.1, 13.2, 13.3, 13.4 Open Response Practice (Chapter 9)
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.	MiF: 8.3, 13.4a Math Windows
2.MD.	3. Estimate lengths using units of inches, feet, centimeters, and meters.	MiF: 7.1, 7.3, 13.1, 13.3 Open Response Practice (Chapter 9)
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.	MiF: 7.2, 7.4, 13.2, 13.4
	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.	MiF: 4.1, 4.2, 4.3, 4.4, 7.5, 9.3, 13.5, 16.1, 16.2, 16.3 Open Response Practice (Chapter 9)
2.MD.	6. Represent whole numbers as lengths from 0 on a given 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.	MiF: 1.4, 3.5, 4.1, 4.2, 4.3, 4.4, 7.5, 9.3, 10.5, 13.5, 16.1, 16.2, 16.3
	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.	MiF: 14.1, 14.2, 14.3, 14.4 Math Windows

MEASUREMENT AND DATA		
	2	**Resources**
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?*	MiF: 11.1, 11.2, 11.3, 11.3a Math Windows Open Response Practice (Chapter 10)
	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.	MiF: 17.2a
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.	MiF: 17.1, 17.2, 17.3

GEOMETRY		
	2	**Resources**
	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.5 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.	MiF: 18.2, 19.1, 19.1a, 19.2, 19.2a, 19.3 Math Windows Open Response Practice (Chapter 5)
2.G.	2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them (e.g., on geoboard).	MiF: 12.1, 12.2, 12.3 Open Response Practice (Chapter 8)
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 equal shares of identical wholes need not have the same shape.	MiF: 12.1, 12.2, 12.3 Open Response Practice (Chapter 8)

Grade 3
Standards and Expectations

OPERATIONS AND ALGEBRAIC THINKING		
	3	**Resources**
	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 and/or represent a context in which a total number of objects can be expressed as 5 × 7.*	MiF: 6.2, 6.3, 6.4 Morning Meeting/Calendar
3.OA.	2. Interpret whole-number quotients or 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, describe and/or represent a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*	MiF: 6.6, 6.7, 8.2
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 for the unknown number to represent the problem.	MiF: 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 8.2, 8.4, 8.5, 9.1, 9.2, 9.3, 9.4, 12.1, 12.2 Problem Solving Exemplars: Number of Stuffed Animals

OPERATIONS AND ALGEBRAIC THINKING		
	3	**Resources**
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 = ?*	MiF: 6.1, 6.3, 6.4, 6.5, 6.7, 8.2, 8.3, 8.4, 8.5, 9.1, 9.2, 9.3, 9.4, 12.1, 12.2 Problem Solving Exemplars : Number of Stuffed Animals
	Understand properties of multiplication and the relationship between multiplication and division.	
3.OA.	5. Apply properties of operations as strategies to multiply and divide. *Examples: If 6 × 4 = 24 is 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.)*	MiF: 6.1, 6.2, 6.3, 6.4, 6.5, 6.7, 7.1, 7.2, 7.3, 8.1, 8.2, 8.3, 8.4, 8.5, 9.1, 9.2, 9.3, 9.4, 12.1, 12.2 Problem Solving Exemplars: Number of Stuffed Animals, Packages of Pictures, Lion's Score
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.*	MiF: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 7.1, 7.2, 7.3, 8.1, 8.2, 8.3, 8.4, 8.5, 9.1, 9.2, 9.3, 9.4, 12.1, 12.2 Problem Solving Exemplars: Number of Stuffed Animals
	Multiply and divide within 100.	
3.OA.	7. Fluently multiply and divide within 100, using strategies such as the relationship between 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.	MiF; 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 7.1, 7.2, 7.3, 8.1, 8.2, 8.3, 8.4, 8.5, 9.1, 9.2, 9.3, 9.4, 12.1, 12.2 Morning Meeting/Calendar Problem Solving Exemplars: Number of Stuffed Animals, Packages of Pictures, Lion's Score

OPERATIONS AND ALGEBRAIC THINKING		
	3	**Resources**
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.	MiF: 2.4, 5.1, 9.2, 9.4
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 explain why 4 times a number can be decomposed into two equal addends.*	MiF: 1.1, 1.3, 6.1, 6.2, 6.3, 6.5, 7.1, 8.2 Math Windows

NUMBER AND OPERATIONS IN BASE TEN		
	3	**Resources**
	Use place value understanding and properties of operations to perform multi-digit arithmetic.	
3.NBT.	1. Use place value understanding to round whole numbers to the nearest 10 or 100.	MiF: 2.4 Morning Meeting/Calendar
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.	MiF: 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 4.4, 5.1, 10.1, 10.2, 10.3, 12.1, 12.2, 19.4, 19.5 Morning Meeting/Calendar Problem Solving Exemplars: Total Number of Buttons, Packages of Pictures, Lion's Score
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.	MiF: 6.2, 6.3, 6.5, 7.1, 7.3

NUMBER AND OPERATIONS – FRACTIONS		
	3	**Resources**
	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 $^1/_b$.	MiF: 14.1, 14.2, 14.3, 14.6
3.NF.	2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.	
	a. 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 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.	MiF: 14.2, 14.4 Morning Meeting/Calendar
	b. 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.	MiF: 14.2, 14.4 Morning Meeting/Calendar
3.NF.	3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.	
	a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.	MiF: 14.2, 14.3, 14.4 Morning Meeting/Calendar

NUMBER AND OPERATIONS – FRACTIONS		
	3	**Resources**
	b. Recognize and generate simple 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.	MiF: 14.2, 14.3, 14.4 Morning Meeting/Calendar
	c. 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.*	MiF: 14.1, 14.6 Morning Meeting/Calendar
	d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are only valid when the two fractions refer to the same whole. Record the results with the symbols >, =, or <, and justify the conclusions, e.g. by using a visual fraction model.	MiF: 14.4 Morning Meeting/Calendar

MEASUREMENT AND DATA		
	3	**Resources**
	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.	MiF: 16.1, 16.2, 16.3, 16.4, 16.5, 16.7 Morning Meeting Science Curriculum Math Windows
3.MD.	2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). 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.	MiF: 11.3, 11.4, 12.1, 12.2 Math Windows Science Curriculum Problem Solving Exemplars: Packages of Pictures, Lion's Score
	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.*	MiF: 13.1, 13.2, 13.3 Morning Meeting/Calendar Periodicals/Current Events Math Windows Science Curriculum
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.	MiF: 13.3, 14.2, 14.4, 15.1 Math Windows Science Curriculum

MEASUREMENT AND DATA		
	3	**Resources**
	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. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.	MiF: 19.1, 19.2, 19.3, 19.4 Math Windows
	b. 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.	MiF: 19.1, 19.2, 19.3, 19.4 Math Windows Problem Solving Exemplars: Porch Measurements, Carpet & Walkways
3.MD.	6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard units).	MiF: 19.1, 19.2, 19.3, 19.4 Math Windows Problem Solving Exemplars
3.MD.	7. Relate area to the operations of multiplication and addition.	Problem Solving Exemplars: Porch Measurements, Carpet & Walkways
	a. 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.	MiF: 15.1 Math Windows
	b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.	MiF: 15.1 Math Windows

MEASUREMENT AND DATA		
	3	**Resources**
	c. 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 × b and a × c. Use area models to represent the distributive property in mathematical reasoning.	MiF: 15.1 Math Windows
	d. 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, applying this technique to solve real world problems.	MiF: 19.2, 19.3, 19.4 Math Windows
	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.	MiF: 19.4, 19.5 Morning Meeting Math Windows

GEOMETRY		
	3	**Resources**
	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.	17.1, 17.2, 18.1, 18.3, Math Windows
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, 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.* $^1/_2$, $^1/_4$, $^1/_8$, $^1/_{16}$	MiF: 14.1, 14.2, 14.3, 14.4, 14.5, Math Windows

Grade 4
Standards and Expectations

OPERATIONS AND ALGEBRAIC THINKING		
	4	**Resources**
	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 or as repeated addition).	MiF: 3.1, 3.2, 3.5 Math Windows Online Games Problem Solving Exemplars
4.OA.	2. Multiply or divide to solve word problems (e.g., by using drawings and number models with a symbol for the unknown number to represent the problem).	MiF: 3.1, 3.2, 3.5, 6.8, CCFL 3.5.a Problem Solving Exemplars
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 including rounding.	MiF: 2.1, 2.3, 3.5, 5.6, 6.8, 8.3, 11.2, 12.4, CCFL 3.5.a Problem Solving Exemplars
	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 whole number is a multiple of a one-digit number. Determine whether a whole number in the range 1–100 is prime or composite.	MiF: 2.2 Morning Meeting Message
	Generate and analyze patterns.	
4.OA.	5. Generate a number or shape pattern that follows a given rule. Make conclusions about the pattern. *For example, given the rule "Add 3" and the starting number 1, explain why the pattern alternates between odd and even numbers.*	MiF: 1.1, 1.2, 7.3, 13.3, 14.1, 14.2 Math Windows Online Games Problem Solving Exemplars: Buttons

NUMBER AND OPERATIONS IN BASE TEN		
	4	**Resources**
	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.*	MiF: 1.1, 1.2, 2.1, 2.3, 3.1, 3.2, 3.3, 7.1, 7.2, 7.3, 8.1, 8.2 Math Windows Morning Meeting Message Online Games Problem Solving Exemplars: Cost of Clay, Cans of Soup
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.	MiF: 1.1, 1.2, 2.1, 2.3, 3.1, 3.2, 3.3, 7.1, 7.2, 7.3, 8.1, 8.2 Math Windows Online Games Problem Solving Exemplars
4.NBT.	3. Use place value understanding to round multi-digit whole numbers to any place.	MiF: 2.1, 2.3, 3.2, Math Windows Morning Meeting Message Online Games Foss Science Investigations
	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 a standard algorithm.	MiF: 2.1, 2.3, 3.2, 8.1, 8.2, 12.3, CCFL 1.2.a, 1.2.b Math Windows
4.NBT.	5. Multiply a whole number 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.	MiF: 3.1, 3.2, 3.5, 12.1, CCFL 3.0, 3.1.a Math Windows Problem Solving Exemplars: Cost of Clay, Cans of Soup, Box of Pens

NUMBER AND OPERATIONS IN BASE TEN		
	4	**Resources**
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 calculation by using equations, rectangular arrays, and/or area models.	MiF: 3.3, 3.4, 3.5 Math Windows Problem Solving Exemplars: Cost of Clay, Cans of Soup, etc.

NUMBER AND OPERATIONS – FRACTIONS		
	4	**Resources**
	Extend understanding of fraction equivalence and ordering.	
4.NF.	1. Explain why a fraction $^{a}/_{b}$ is equivalent to a fraction ($^{a}/_{b}$ x $^{n}/_{n}$) 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	MiF: 5.5, 5.6, 6.1, 6.3, 6.6, 6.8, 7.5 Online Games Problem Solving Exemplars
4.NF.	2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $^{1}/_{2}$.	
	a. Recognize that comparisons are valid only when the two fractions refer to the same whole.	MiF: CCFL 6.0 Grade 3 lesson 14.4 Online Games
	b. Compare the results with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	Math Literature Picture Books Problem Solving Exemplars
	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 $^{1}/_{b}$.	Problem Solving Exemplars
	a. Understand addition and subtraction of fractions by joining and separating parts of the same whole.	MiF: 6.1, 6.3, 6.4, 6.6, 6.8, 7.5
	b. Break down fractions into a sum of fractions, e.g., $^{3}/_{8} = {}^{1}/_{8} + {}^{1}/_{8} + {}^{1}/_{8}$	MiF: 6.4, 6.5
	c. Add and subtract mixed numbers with like denominators.	MiF: 4.3, 5.1, 6.6

NUMBER AND OPERATIONS – FRACTIONS		
	4	**Resources**
	d. Solve word problems involving addition and subtraction of fractions having like denominators, e.g., by using visual fraction models and equations to represent the problem.	MiF: 6.8
4.NF.	4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.	Problem Solving Exemplars
	a. 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 × ($^{1}/_{4}$).*	MiF: 6.4, 6.5
	b. 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 x ($^{2}/_{5}$) as 6 x ($^{1}/_{5}$), recognizing this product as $^{6}/_{5}$. (In general, n x ($^{a}/_{b}$) = $^{(n \times a)}/_{b}$.)*	MiF: 6.7, 6.8,
	c. 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?*	MiF: 6.7, 6.8, CCFL 6.7.a
	Understand decimal notation for fractions, and compare decimal fractions.	
4.NF.	a. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express $^{3}/_{10}$ as $^{30}/_{100}$, and add $^{3}/_{10}$ + $^{4}/_{100}$ = $^{34}/_{100}$.*	MiF: 7.2, 8.1 Problem Solving Exemplars: Compare Fractions

NUMBER AND OPERATIONS – FRACTIONS		
	4	**Resources**
4.NF.	b. 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.*	MiF: 7.1, 7.2, 7.5 Math Windows
4.NF.	c. Compare two decimals to hundredths by reasoning about their size. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.	MiF: 7.2, 7.3 Math Windows Problem Solving Exemplars: Compare Fractions

MEASUREMENT AND DATA		
	4	**Resources**
	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 including km, m, cm, mm; kg, g; lb, oz.; l, ml; hr, min, sec.	
	a. 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), ...*	MiF: 6.3, 6.8, 7.1, 7.4, 8.3, 11.1, 11.2, 12.1, 12.2, 12.3, 12.4, CCFL 12.0.a, 12.0.b, 12.0.c Math Windows Foss Science Investigations Problem Solving Exemplars
4.MD.	2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money.	MiF: 6.8, 8.3, 11.1, 11.2, 12.1, 12.2, 12.3, 12.4, CCFL 12.0.d Math Windows Problem Solving Exemplars: Identifying Errors
	a. Including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit.	
	b. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	

MEASUREMENT AND DATA		
	4	**Resources**
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.*	MiF: 12.1, 12.2, 12.3, 12.4 Math Windows Problem Solving Exemplars: Identifying Errors
	Represent and interpret data.	
4.MD.	4. Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find the range of head sizes of children in the class.*	MiF: CCFL 6.8.a Grade 3 lesson 13.3
	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 measurement.	
	a. 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.	MiF: 9.1, 9.3, CCFL 9.3.a Math Windows Problem Solving Exemplars: Missing Angle, Angle on Circle
	b. Recognize an angle that turns through $\frac{1}{360}$ of a circle is called a "one-degree angle," and can be used to measure angles.	MiF: 9.3
4.MD.	6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	MiF: 9.1, 9.2, 9.3,

MEASUREMENT AND DATA		
	4	**Resources**
4.MD.	7. Recognize angle measure as part of a 360° circle. a. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems (e.g., calculating reflex angles; using an equation with a symbol for the unknown angle measure).	MiF: 9.2, 11.2, CCFL 9.3.b Problem Solving Exemplars: Angle on a Circle

GEOMETRY		
	4	**Resources**
	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.	MiF: 9.1, 9.2, 9.3, 10.1, 10.2, 10.3 Math Windows Problem Solving Exemplars: Missing Angle, Angles on a Circle
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.	MiF: 10.1, 10.2, 11.1, 11.2 Math Windows
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.	MiF: 13.1, 13.3, Math Windows

Grade 5
Standards and Expectations

OPERATIONS AND ALGEBRAIC THINKING		
	5	**Resources**
	Write and interpret numerical expressions.	
5.OA.	1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	MiF: 2.3, 2.3, 2.4, 2.6, 2.7, 5.1, 5.3, 5.4 CCFL: 2.6a
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.*	MiF: 2.6, 2.7, 5.1 Problem Solving Exemplars
	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.*	MiF: 2.2, 2.4, 11.2, 11.4

NUMBER AND OPERATIONS IN BASE TEN		
	5	**Resources**
	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 $\frac{1}{10}$ of what it represents in the place to its left.	MiF: 1.1, 1.2, 1.3, 2.2, 2.4, 8.1, 8.2, 8.3, 9.1, 9.2, 9.3, 9.4 Problem Solving Exemplars: Numbers in Expanded Form
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.	MiF: 2.2, 2.4, 9.2, 9.4 CCFL: 2.2a, 9.2a
5.NBT.	3. Read, write, and compare decimals to thousandths.	
	a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form [e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × ($\frac{1}{10}$) + 9 × ($\frac{1}{100}$) + 2 × ($\frac{1}{1000}$)].	MiF: 8.1, 8.3
	b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	MiF: 8.2
5.NBT.	4. Use place value understanding to round decimals to any place.	MiF: 8.2, 9.3, 9.5, 9.6 Problem Solving Exemplars

NUMBER AND OPERATIONS IN BASE TEN		
	5	**Resources**
	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.	MiF: 2.1, 2.2, 2.3, 2.6, 2.7, 15.3, 15.5,
5.NBT.	6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-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.	MiF 2.1, 2.4, 2.5, 2.6, 2.7
5.NBT	7. Add, subtract, multiply, and divide decimals to hundredths, 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.	MiF: 1.1, 1.2, 1.4, 2.1, 2.2, 2.3, 2.4, 2.5

NUMBER AND OPERATIONS – FRACTIONS		
	5	**Resources**
	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,* $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. *(In general,* $\frac{a}{b} + \frac{c}{d} = \frac{(ad + bc)}{bd}$.*)*	MiF: 3.1, 3.2, 3.5, 3.6, 3.7 Problem Solving Exemplars
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* $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$, *by observing that* $\frac{3}{7} < \frac{1}{2}$.	MiF: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7 Problem Solving Exemplars
	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 ($\frac{a}{b} = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret* $\frac{3}{4}$ *as the result of dividing 3 by 4, noting that* $\frac{3}{4}$ *multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size* $\frac{3}{4}$*. 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?*	MiF: 3.3, 3.4, 3.7 Problem Solving Exemplars

NUMBER AND OPERATIONS – FRACTIONS		
	5	**Resources**
5.NF.	4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.	
	a. 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.	MiF: 4.1, 4.2, 4.3, 4.4, 4.5, 4.7
	b. 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.	MiF: 4.1, 4.3, CCFL 6.0 Problem Solving Exemplars
5.NF.	5. Interpret multiplication as scaling (resizing), by:	
	a. 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.	4.1, 7.2, 7.5, 7.6, CCFL 4.0
	b. 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 $\frac{a}{b} = \frac{(n \times a)}{(n \times b)}$ to the effect of multiplying $\frac{a}{b}$ by 1.	MiF: 4.1, 4.3, 4.4, 9.1, 9.2

NUMBER AND OPERATIONS – FRACTIONS		
	5	**Resources**
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).	MiF 4.1, 4.2, 4.3, 4.5, 4.7 Problem Solving Exemplars
5.NF.	7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.	Problem Solving Exemplars
	a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for ($\frac{1}{3}$) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that ($\frac{1}{3}$) ÷ 4 = $\frac{1}{12}$ because ($\frac{1}{12}$) × 4 = $\frac{1}{3}$.*	MiF: 4.6, 4.7
	b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ ($\frac{1}{5}$), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ ($\frac{1}{5}$) = 20 because 20 × ($\frac{1}{5}$) = 4.*	CCFL 4.6a
	c. Solve real world problems involving division of unit fractions by non-zero whole numbers and 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 $\frac{1}{2}$ lb of chocolate equally? How many $\frac{1}{3}$-cup servings are in 2 cups of raisins?*	MiF: 4.6, 4.7, CCFL 4.7a

MEASUREMENT AND DATA		
	5	**Resources**
	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.	MiF: 3.3, 7.4, 11.2, 15.5
	Represent and interpret data.	
5.MD.	2. Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). 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.*	MiF: CCFL 11.1a
	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.	Problem Solving Exemplars: Total Volume
	a. 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.	MiF: 15.4, 15.5
	b. 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.	MiF: 15.4, 15.5
5.MD.	4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.	MiF: 15.4, 15.5 Problem Solving Exemplars

MEASUREMENT AND DATA		
	5	**Resources**
5.MD.	5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.	Problem Solving Exemplars
	a. 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).	MiF: 15.4, 15.5, CCFL 15.5a
	b. Apply the formulas V = l × w × h and V = B × h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.	MiF: 15.5
	c. 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.	MiF 15.4, CCFL 15.5b

GEOMETRY		
	5	**Resources**
	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 (e.g., x-axis and x-coordinate, y-axis and y-coordinate).	MiF: 11.2
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.	MiF: 11.2
	Classify two-dimensional figures into categories based on their properties.	
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.*	MiF: 13.1, 13.3, 13.5
5.G.	4. Classify two-dimensional figures in a hierarchy based on properties.	MiF: 13.1, 13.3, 13.5

Grade 6
Standards and Expectations

RATIOS AND PROPORTIONAL RELATIONSHIPS		
	6	**Resources**
	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."*	MiF Chapter 4.1-4.3 MiF Chapter 5.1-5.2 Math Windows
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 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.*	MiF Chapter 5.1-5.2 Math Windows
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.	
	a. 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 coordinate plane. Use tables to compare ratios.	MiF Chapter 4.1-4.3 MiF Chapter 5.1-5.2 MiF Chapter 6.1-6.5 Math Windows - equivalent ratios
	b. 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?*	MiF Chapter 5.1-5.2 MiF Chapter 9.1-9.3

RATIOS AND PROPORTIONAL RELATIONSHIPS		
	6	**Resources**
	c. 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.	MiF Chapter 6.1-6.5
	d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	MiF Chapter 5.1-5.2

THE NUMBER SYSTEM		
	6	**Resources**
	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 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?*	MiF Chapter 3.1-3.4 MiF Chapter 5.1-5.2 Math Windows Problem Solving Exemplars: Explaining False Equations; Sheets of Cardboard
	Compute fluently with multi-digit numbers and find common factors and multiples.	
6.NS	2. Fluently divide multi-digit numbers using the standard algorithm.	MiF Chapter 3.1-3.4 MiF Chapter 5.1-5.2 Math Windows
6.NS	3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	MiF Chapter 3.1-3.4 MiF 11.1-11.3 Math Windows
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 4 (9 + 2).*	MiF Chapter 1.1-1.3 MiF Chapter 8.1-8.4 (Distributive property covered in Math Windows) Problem Solving Exemplars: Distances and Locations

THE NUMBER SYSTEM		
	6	**Resources**
	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.	MiF Chapter 2.1-2.2 Math Windows
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.	Problem Solving Exemplars: Distances and Locations
	a. 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.	MiF Chapter 1.1-1.5 MiF Chapter 2.1-2.2 MiF Chapter 9.1-9.3 Math Windows - opposite signs
	b. 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 signs, the locations of the points are related by reflections across one or both axes.	MiF Chapter 1.1-1.5
	c. 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.	MiF Chapter 1.1-1.5 MiF Chapter 9.1-9.3
6.NS	a. Understand ordering and absolute value of rational numbers.	

THE NUMBER SYSTEM		
	6	**Resources**
	a. 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.*	MiF Chapter 1.1-1.5 MiF Chapter 2.1-2.2 MiF Chapter 9.1-9.3 Math Windows (absolute value is covered in Windows)
	b. 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.*	MiF Chapter 1.1-1.5 Math Windows
	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.*	MiF Chapter 2.1-2.2 MiF Chapter 9.1-9.3 Math Windows
	d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.*	MiF Chapter 2.1-2.2 Math Windows
6.NS	b. 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.	MiF Chapter 9.1-9.3 Math Windows

EXPRESSIONS AND EQUATIONS		
	6	**Resources**
6.EE	1. Write and evaluate numerical expressions involving whole-number exponents.	MiF 11.1-11.3 MiF 12.1-12.4 Math Windows Problem Solving Exemplars
6.EE	2. Write, read, and evaluate expressions in which letters stand for numbers.	
	a. 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.*	MiF Chapter 8.1-8.4 Math Windows
	b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one 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.*	MiF Chapter 7.1-7.5 Math Windows
	c. 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 = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2.*	MiF Chapter 8.1-8.4 MiF Chapter 10.1-10.4 MiF 11.1-11.3 MiF 12.1-12.4 Math Windows

EXPRESSIONS AND EQUATIONS		
	6	**Resources**
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.*	MiF Chapter 7.2-7.4 Problem Solving Exemplars
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 same number regardless of which number y stands for.*	MiF Chapter 7.3-7.4
	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.	MiF Chapter 8.1-8.4 Math Windows
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 number, or, depending on the purpose at hand, any number in a specified set.	MiF Chapter 7.5 MiF Chapter 8.1 Math Windows Problem Solving Exemplars
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.	MiF Chapter 8.1-8.4 Problem Solving Exemplars

EXPRESSIONS AND EQUATIONS		
	6	**Resources**
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.	MiF Chapter 8.1-8.4
	Represent and analyze quantitative relationships between dependent and 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.*	MiF Chapter 8.1-8.4

GEOMETRY		
	6	**Resources**
	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.	MiF Chapter 10.1-10.4 Math Windows
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 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.	MiF 12.1-12.4 Math Windows (volume of cube, prisms)
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.	MiF Chapter 9.1-9.3 MiF Chapter 10.1-10.4 Math Windows
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. Apply these techniques in the context of solving real-world and mathematical problems.	MiF 12.1-12.4 Math Windows Problem Solving Exemplars: Estimating Length and Width

STATISTICS AND PROBABILITY		
	6	**Resources**
	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.*	MiF Chapter 13.1-13.3 Math Windows
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.	MiF Chapter 13.1-13.3 MiF Chapter 14.1-14.4
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.	MiF Chapter 14.1-14.4 Math Windows (on shape of data)
	Summarize and describe distributions.	
6.SP	4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	MiF Chapter 13.1-13.3 MiF Chapter 14.1-14.4
6.SP	5. Summarize numerical data sets in relation to their context, such as by:	
	a. Reporting the number of observations.	MiF Chapter 13.1-13.3 MiF Chapter 14.1-14.4 Math Windows
	b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	MiF Chapter 13.1-13.3 MiF Chapter 14.1-14.4 Math Windows
	c. 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.	MiF Chapter 13.1-13.3 Math Windows cover interquartile range and deviations (standard/absolute)

STATISTICS AND PROBABILITY		
	6	**Resources**
	d. 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.	MiF Chapter 14.1-14.4

Grade 7
Standards and Expectations

RATIOS AND PROPORTIONAL RELATIONSHIPS		
	7	**Resources**
	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.*	MiF Course 2, Book A, Chapter 5, 5.1 RPK MiF Course 2, Book B, Chapter 7.5 Problem Solving Exemplars
7.RP	2. Recognize and represent proportional relationships between quantities.	
	a. Decide whether two quantities are in a proportional 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.	MiF Course 2, Book A, Chapter 5 Problem Solving Exemplars
	b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	MiF Course 2, Book A, Chapter 5.1-2, 5.4 MiF Course 2, Book B, Chapter 7.5
	c. 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.*	MiF Course 2, Book A, Chapter 5
	d. Explain what a point (x, y) on the graph of a 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.	MiF Course 2, Book A, Chapter 5.1-2, 5.4
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.	MiF Course 2, Book A, Chapter 2.6, 3.6-7, 5.3-4 MiF Course 2, Book B, 6.1-2, 7.5, 10.2-3 Problem Solving Exemplars

THE NUMBER SYSTEM		
	7	**Resources**
	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	
7.NS	1. 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.	MiF Course 2, Book A, Chapter 2.1-2, 2.5-6
	a. Describe situations in which opposite quantities combine to make 0. *For example, In the first round of a game, Maria scored 20 points. In the second round of the same game, she lost 20 points. What is her score at the end of the second round?*	MiF Course 2, Book A, Chapter 2.1-2, 2.4
	b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on 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.	MiF Course 2, Book A, Chapter 2.1, 2.5-6
	c. 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.	MiF Course 2, Book A, Chapter 2.2-6
	d. Apply properties of operations as strategies to add and subtract rational numbers.	MiF Course 2, Book A, Chapter 2.1-2, 2.4-5
7.NS	2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	

THE NUMBER SYSTEM		
	7	**Resources**
	a. 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.	MiF Course 2, Book A, Chapter 2.3-5
	b. 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.	MiF Course 2, Book A, Chapter 2.3, 2.5, 4.2
	c. Apply properties of operations as strategies to multiply and divide rational numbers.	MiF Course 2, Book A, Chapter 2
	d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	MiF Course 2, Book A, Chapter 1.2
7.NS	3. Solve real-world and mathematical problems involving the four operations with rational numbers.	MiF Course 2, Book A, Chapter 1.5, 2.1, 2.3, 2.6, 3.7, 4.3, 4.4, 4.5

EXPRESSIONS AND EQUATIONS		
	7	**Resources**
	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.	MiF Course 2, Book A, Chapter 3, 4.1 Problem Solving Exemplars: Earnings for Monday
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."*	MiF Course 2, Book A, Chapter 3.6-7, 4.1, 4.3
	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 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.*	MiF Course 2, Book A, Chapter 1.2-5, Chapter 2, Chapter 3, Chapter 4 Problem Solving Exemplars
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.	MiF Course 2, Book A, Chapter 3.6, Chapter 4 Problem Solving Exemplars

EXPRESSIONS AND EQUATIONS		
	7	**Resources**
	a. 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. 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?*	MiF Course 2, Book A, Chapter 3
	b. 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 need to make, and describe the solutions.*	MiF Course 2, Book A, Chapter 4, Chapter 9.1-5

GEOMETRY		
	7	**Resources**
	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.	MiF Course 2, Book B, Chapter 7.5
7.G	2. Draw (with technology, with ruler and protractor, as well as freehand) 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.	MiF Course 2, Book B, Chapter 7.1-4
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.	MiF Course 2, Book B, Chapter 8.1
	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 and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	MiF Course 2, Book B, Chapter 8.2-3
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.	MiF Course 2, Book B, Chapter 6.1-4
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.	MiF Course 2, Book B, Chapter 7.5, Chapter 8.1-5 Problem Solving Exemplars: Incorrect Square

STATISTICS AND PROBABILITY		
	7	**Resources**
	Use random sampling to draw inferences about a population.	Problem Solving Exemplars: Attendance
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.	MiF Course 2, Book B, Chapter 9.4
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 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.*	MiF Course 2, Book B, Chapter 9.4-5
	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 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.*	MiF Course 2, Book B, Chapter 9.1-3, 9.5

STATISTICS AND PROBABILITY		
	7	**Resources**
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.*	MiF Course 2, Book B, Chapter 9.1-3
	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.	MiF Course 2, Book B, Chapter 10.2
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 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.*	MiF Course 2, Book B, Chapter 10.2-3
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.	MiF Course 2, Book B, Chapter 10.4
	a. 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 the probability that a girl will be selected.*	MiF Course 2, Book B, Chapter 10.4

STATISTICS AND PROBABILITY		
	7	**Resources**
	b. 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?*	MiF Course 2, Book B, Chapter 10.4
7.SP	8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	MiF Course 2, Book B, Chapter 10.1
	a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	MiF Course 2, Book B, Chapter 10.2
	b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.	MiF Course 2, Book B, Chapter 10.2
	c. Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*	MiF Course 2, Book B, Chapter 10.4

Grade 8
Standards and Expectations

THE NUMBER SYSTEM		
	8	**Resources**
	Know that there are numbers that are not rational, and approximate them by rational numbers.	
8.NS	1. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.	MiF 3A Chapter 1 (Recall Prior Knowledge {RPK}) Chapter 3 (RPK) Chapter 3.1
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., π2). *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.*	MiF 3A Chapter 1 RPK Chapter 1.6

EXPRESSIONS AND EQUATIONS		
	8	**Resources**
	Work with radicals and integer exponents.	
8.EE	1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example, 32 × 3–5 = 3–3 = 1/33 = 1/27.*	MiF 3A Chapter 1 {RPK} MiF 3A Chapter 1.1-1.6
8.EE	2. Use square root and cube root symbols to represent solutions to equations of the form $x2 = p$ and $x3 = p$, 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.	MiF 3A Chapter 1 {RPK} MiF 3A Chapter 1.6 MiF 3B Chapter 7.3 MiF 3B Chapter 7.4
8.EE	3. Use numbers expressed in the form of a single digit times an integer power of 10 to 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 × 108 and the population of the world as 7 × 109, and determine that the world population is more than 20 times larger.*	MiF 3A Chapter 2 {RPK} MiF 3A Chapter 2.1 MiF 3A Chapter 2.3
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 that has been generated by technology.	MiF 3A Chapter 2.2 MiF 3A Chapter 2.3
	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.*	MiF 3A Chapter 3 {RPK} MiF 3A Chapter 3.3, 3.4 MiF 3A Chapter 4 {RPK} MiF 3A Chapter 4.1, 4.4, 4.5 MiF 3A Chapter 5 {RPK} Problem Solving Exemplars

EXPRESSIONS AND EQUATIONS		
	8	**Resources**
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 line through the origin and the equation *y* = *mx* + *b* for a line intercepting the vertical axis at *b*.	MiF 3A Chapter 4.1-4.4 Problem Solving Exemplars
	Analyze and solve linear equations and pairs of simultaneous linear equations.	
8.EE	7. Solve linear equations in one variable.	
	a. 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 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).	MiF 3A Chapter 3 {RPK} MiF 3A Chapter 3.1, 3.2
	b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	MiF 3A Chapter 3 {RPK} MiF 3A Chapter 3.1, 3.2 Problem Solving Exemplars
8.EE	8. Analyze and solve pairs of simultaneous linear equations.	
	a. 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 simultaneously.	MiF 3A Chapter 5.1, 5.4
	b. 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.*	MiF 3A Chapter 5.2

EXPRESSIONS AND EQUATIONS		
	8	**Resources**
	c. 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.*	MiF 3A Chapter 5.3

FUNCTIONS		
	8	**Resources**
	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.[1]	MiF 3A Chapter 6.1, 6.2
8.F	2. Compare properties (e.g., rate of change, intercepts, domain and range) 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 algebraic expression, determine which function has the greater rate of change.*	MiF 3A Chapter 6.4
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 = s2 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.*	MiF 3A Chapter 4.2 MiF 3A Chapter 6.3 MiF 3B Chapter 10.2 (line of best fit)
	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 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.	MiF 3A Chapter 6.2 Problem Solving Exemplars: Money Saved Weekly
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.	MiF 3A Chapter 6.3 MiF 3B Chapter 10.2 Problem Solving Exemplars

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

GEOMETRY		
	8	**Resources**
	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 transformed to lines, and line segments to line segments of the same length.	MiF 3B Chapter 8.1-8.3
	b. Angles are transformed to angles of the same measure.	MiF 3B Chapter 8.1-8.3
	c. Parallel lines are transformed to parallel lines.	MiF 3B Chapter 8.1-8.3
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 translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	MiF 3B Chapter 9.1, 9.3
8.G	3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	MiF 3B Chapter 8
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.	MiF 3B Chapter 9.3 Problem Solving Exemplars: Comparing Triangles

GEOMETRY		
	8	**Resources**
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 of transversals why this is so.*	MiF 3B Chapter 9 {RPK} Problem Solving Exemplars: Comparing Triangles
	Understand and apply the Pythagorean Theorem.	
8.G	6. Explain a proof of the Pythagorean Theorem and its converse.	MiF 3B Chapter 7.1
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.	MiF 3B Chapter 7.3, 7.4
8.G	8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	MiF 3B Chapter 7.2
	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.	MiF 3B Chapter 7 {RPK} MiF 3B Chapter 7.3, 7.4

STATISTICS AND PROBABILITY		
	8	**Resources**
	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.	MiF 3B Chapter 10.1
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 (e.g., line of best fit) by judging the closeness of the data points to the line.	MiF 3A Chapter 4.4, 6.2 MiF 3B Chapter 10.2
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.*	MiF 3A Chapter 6.2 MiF 3B Chapter 10.2
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 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?*	MiF 3B Chapter 10.3

INTERDISCIPLINARY CONNECTIONS

INTERDISCIPLINARY CONNECTIONS

Interdisciplinary learning develops real-world, multi-faceted knowledge. Integration identifies logical connections between and among the content and learning experiences in all areas of the curriculum. Integrating and connecting various content areas improves learning outcomes and provides more authentic and relevant experiences for students. Interdisciplinary connections both enrich and extend learning. In Evesham, interdisciplinary connections are studies that cross the boundaries of two or more district disciplines such as mathematics and art or literature and science. By purposefully looking for "essential concepts" and "big ideas," we purposefully design deliberate integration of the various content areas wherever appropriate. This includes, but is not limited to examining how curriculum themes, project-based learning, understanding by design, essential questions, inquiry approaches, curriculum mapping, and the standards merge, while always keeping student best interests at the heart of this work. The following areas are integrated into all areas of the instructional program:

Anchor Standards for Reading

Key Ideas and Details

- NJSLSA.R1 Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- NJSLSA.R2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
- NJSLSA.R3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

- NJSLSA.R4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
- NJSLSA.R5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
- NJSLSA.R6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

- NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- NJSLSA.R8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

- NJSLSA.R9 Analyze and reflect on how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
- NJSLSA.R10 Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.

Anchor Standards for Writing

Text Types and Purposes

- NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
- NJSLSA. W2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
- NJSLSA.W3 Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Production and Distribution of Writing

- NJSLSA.W4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- NJSLSA.W5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
- NJSLSA.W6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

- NJSLSA.W7 Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.
- NJSLSA.W8 Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
- NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

- NJSLSA.W10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Anchor Standards for Speaking and Listening

Comprehension and Collaboration

- NJSLSA.SL1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- NJSLSA.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
- NJSLSA.SL3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

Presentation of Knowledge and Ideas

- NJSLSA.SL4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
- NJSLSA.SL5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
- NJSLSA.SL6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Anchor Standards for Language

Conventions of Standard English

- NJSLSA.L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- NJSLSA.L2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Knowledge of Language

- NJSLSA L3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

Vocabulary Acquisition and Use

- NJSLSA L4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
- NJSLSA L5. Demonstrate understanding of word relationships and nuances in word meanings.
- NJSLSA L6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

Mathematics:

NJSLSMATH.PRACTICE.MP1 Make sense of problems and persevere in solving them.

NJSLS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.

NJSLS.MATH.PRACTICE.MP3 Construct viable arguments and critique the reasoning of others.

NJSLS.MATH.PRACTICE.MP5 Use appropriate tools strategically.

NJSLS.MATH.PRACTICE.MP6 Attend to precision.

NJSLS.MATH.PRACTICE.MP7 Look for and make use of structure.

NJSLS.MATH.PRACTICE.MP8 Look for and express regularity in repeated reasoning.

Science and Engineering Practices:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating and communicating information

Social Studies:

Social Studies Standard 6.3: Active Citizenship in the 21st Century: All students will acquire the skills needed to be active, informed citizens who value diversity and promote cultural understanding by working collaboratively to address the challenges that are inherent in living in an interconnected world.

Technology:

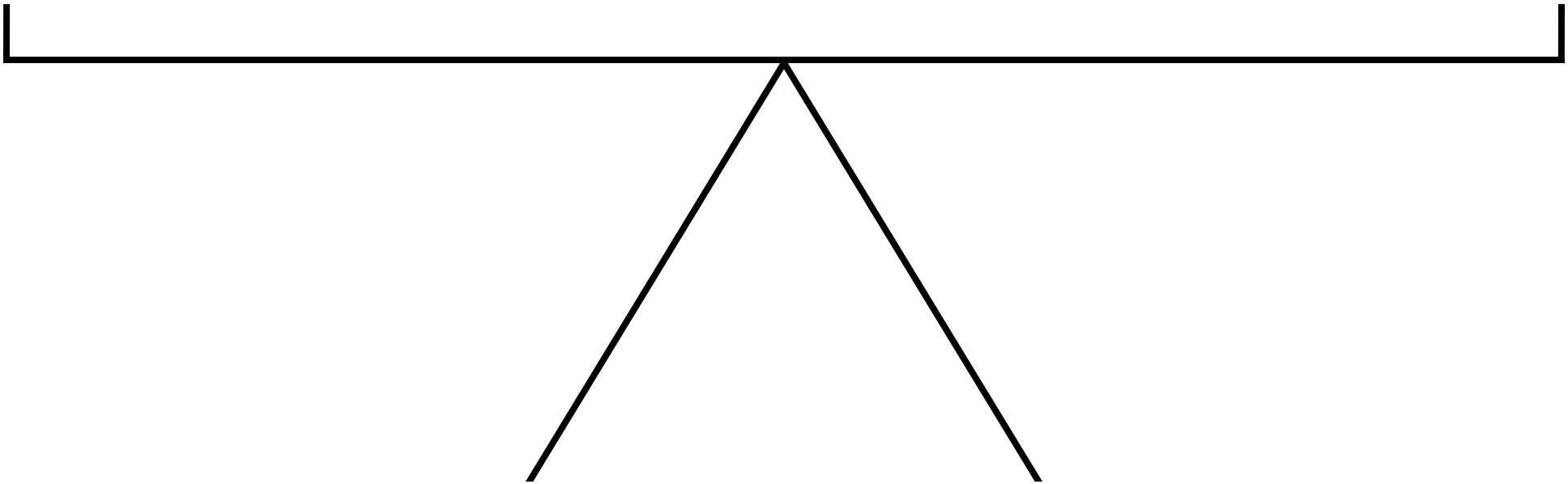
Technology Standard 8.1: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.

Technology Standard 8.2: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world, as they relate to the individual, global society, and the environment.

BALANCED MATH PROGRAM OVERVIEW

Overview of Balanced Mathematics Program

Concepts	+	Computation	+	Problem Solving
-Conceptual understanding (making sense of math)		*-Proficiency with math skills, facts and procedures* (doing math)		(using math)



PACING GUIDES AND OVERVIEW OF MATHEMATICS CHAPTERS

Math Pacing Guide: Grades K-2

	Kindergarten	Grade 1	Grade 2
September	Calendar and Investigations **Chapter 1:** Numbers to 5 *Chapter 11: Calendar Patterns* *Chapter 13: Patterns*	**Chapter 1:** Numbers to 10 **Chapter 2:** Number Bonds *Chapter 15: Calendar and Time*	**Chapter 1:** Numbers to 1,000
October	**Chapter 2:** Numbers to 10 *Chapter 3: Order by Size, Length, or Weight* *Chapter 16: Classifying and Sorting*	**Chapter 3:** Addition Facts to 10 **Chapter 4:** Subtraction Facts to 10	**Chapter 10:** Mental Math and Estimation **Chapter 2:** Addition up to 1,000
November	**Chapter 4:** Counting and Numbers 0 to 10 *Chapter 5: Size and Position*	**Chapter 5:** Shapes and Patterns **Chapter 6:** Ordinal Numbers and Position	**Chapter 3:** Subtraction up to 1,000
December	**Chapter 6:** Numbers 0 to 20 *Chapter 15: Length and Height*	**Chapter 7:** Numbers to 20 **Chapter 8:** Addition and Subtraction Facts to 20	**Chapter 4:** Using Bar Models, Addition and Subtraction **Chapter 5:** Multiplication and Division
January	**Chapter 7:** Solid and Flat Shapes *Chapter 10: Ordinal Numbers*	**Chapter 9:** Length	**Chapter 6:** Multiplication Tables of 2, 5 and 10 **Chapter 7:** Metric Measurements of Length **Chapter 8:** Mass
February	**Chapter 8:** Numbers to 100 **Chapter 9:** Comparing Sets *Chapter 19: Measurement*	**Chapter 11:** Picture Graphs and Bar Graphs **Chapter 12:** Numbers to 40	**Chapter 9:** Volume **Chapter 11:** Money
March	**Chapter 12:** Counting On and Counting Back	**Chapter 12 (cont'd.):** Numbers to 40 **Chapter 13:** Addition and Subtraction to 40	**Chapter 12:** Fractions **Chapter 13:** Customary Measurement of Length **Chapter 14:** Time
April	**Chapter 14:** Number Facts	**Chapter 14:** Mental Math Strategies **Chapter 16:** Numbers to 100	**Chapter 15:** Multiplication Tables of 3 and 4 **Chapter 16:** Using Bar Models: Multiplication and Division
May/June	**Chapter 17:** Addition Stories **Chapter 18:** Subtraction Stories	**Chapter 17:** Addition and Subtraction to 100 **Chapter 18:** Multiplication and Division **Chapter 19:** Money	**Chapter 17:** Picture Graphs **Chapter 18:** Lines and Surfaces **Chapter 19:** Shapes and Patterns

The above timeline is to be used as a guideline to provide a "snapshot" of the year at a glance.

Kindergarten & First only: *Italics = Integrated Chapters*

Overview of Mathematics Chapters: Grades K-2

New Unit Overview – Calendar and Investigations

Grade: Kindergarten	**Amount of Time:** ~September (10 days)
Brief Description of Chapter: In this unit, an active learning environment is established in which students build their mathematical knowledge while working with the teacher and their classmates. Routines are being simultaneously introduced as children are exploring numbers, days of the week, months of the year, seasons, weather, ordinal numbers, patterns, geometry, measurement and money. In addition, the children will investigate various patterns and number amounts as they explore manipulatives: unifix cubes, teddy bear counters, links, jewels, buttons, pattern blocks, etc …	
Essential Questions:	**Enduring Understandings:**
• How does a calendar work? • How does understanding of number sense, measurement, geometry, patterns and money relate to daily routines such as calendar and weather? • How are manipulatives used for counting, sorting, and creating patterns?	• Number fluency includes both the understanding of and the ability to appropriately use numbers. • Patterns and relationships can be represented graphically, symbolically, and verbally. • Various elements are incorporated into a calendar such as days, months, seasons, and ordinal numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• numbers 1-31 • count • ordinal numbers • days of the week • today • tomorrow • yesterday • weekend • weekday • months of the year • seasons • weather • pattern • sort • extend • money (penny) • longer • shorter • length • height • weight • heavier • lighter • size • less • more • same • before • after • next • time • hour • minute hand • hour hand	K.CC.1 K.CC.2 K.CC.3 K.CC.4 K.CC.4a K.CC.4b K.CC.5 K.OA.1 K.OA.2 K.MD.1 K.MD.2 K.MD.3 K.G.1 K-12.MP.1 K-12.MP.2 K-12.MP.4 K-12.MP.5 K-12.MP.6 K-12.MP.7 K-12.MP.8

Chapter 1 Overview – Numbers to 5

Grade: Kindergarten	**Amount of Time:** ~15 days, September through Mid October
Brief Description of Chapter: In this chapter, children investigate how to sort objects using one attribute. They look for sameness and differences with such attributes as size, number, and color. The sorting activities are closely connected to the numerals and quantities 1 through 5. Children also learn to read and write numerals 1 to 5.	
Essential Questions:	**Enduring Understandings:**
• How does understanding 1-to-1 correspondence support counting up to 5 objects? • What is the relationship between the number of objects and their respective numerals? • What attributes of objects are the same and different?	• Count groups of up to 5 objects by using one-to-one correspondence. . • Identify same and different attributes of objects such as color, size, and shape. • Match same size sets up to 5.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• one • two • three • four • five • same • different • not the same • tall • blue • red • green • yellow • black • white • big • small • long • short	K.CC.2 K.CC.3 K.CC.4 K.CC.4a K.CC.4b K.CC.5 K.MD.1 K.MD.2 K-12.MP.2 K-12.MP.4 K-12.MP.5 K-12.MP.6 K-12.MP.7

Chapter 2 Overview – Numbers to 10

Grade: Kindergarten	**Amount of Time:** ~17 days, end of October-November
Brief Description of Chapter: This chapter includes a variety of matching activities in which children find two groups that have the same number of objects. These activities provide practice and reinforcement with counting while developing a visual meaning of number.	
Essential Questions:	**Enduring Understandings:**
• How does understanding one-to-one correspondence support counting 0 to 9 objects? • What is the relationship between the number of objects and their respective numerals? • How do you compare two sets of objects to determine if there is a difference of one more, one less, or the same number of objects?	• Count groups of up to 9 objects by using one-to-one correspondence. . • Match same size sets up to 9. • Compare two sets of objects to determine sets of more, less or the same.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• six • seven • eight • nine • zero • one more • one less • the same number	K.CC.2 K.CC.3 K.CC.4a K.CC.4b K.CC.4c K.CC.5 K.CC.6 K.CC.7 K-12.MP.1 K-12.MP.2 K-12.MP.3 K-12.MP.4 K-12.MP.5 K-12.MP.7

Chapter 3 Overview – Order by Size, Length, or Weight

Grade: Kindergarten	**Amount of Time:** ~ Incorporated into calendar routines
Brief Description of Chapter: In this chapter, children begin using non-standard units to measure, laying the foundation for the use of standard units in later grades. Children begin by touching, examining, and comparing objects to develop awareness of attributes, such as length, size, and weight.	
Essential Questions:	**Enduring Understandings:**
• How are objects compared and ordered? • What type of language is used to describe differences between objects when comparing their size, length, and weight?	• Order objects according to size, length and weight. • Use comparative vocabulary.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• same size • different size • biggest • middle sized • smallest • bigger than • taller than • smaller than • shorter than • longest • shortest • heaviest • lightest • heavier • lighter	K.MD.1 K.MD.2 K.MD.3 K-12.MP.2 K-12.MP.4 K-12.MP.5 K-12.MP.7

Chapter 4 Overview – Counting and Numbers 0 to 10

Grade: Kindergarten	**Amount of Time:** ~16 days, November into December
Brief Description of Chapter: In this chapter, children count up to ten and down from ten. Counting with 1-to-1 correspondence is features throughout. Counting can be used to compare and order numbers and quantities. Basic ideas of addition and subtraction are introduced concretely. Children combine and take away objects, and then count to find the result.	
Essential Questions:	**Enduring Understandings:**
• How are numbers through 5 composed and decomposed? • How are numerals and sets up to 20 compared? • What is the process for combining two sets together?	• Order numbers 0 through 10. • Develop the concept that greater numbers can be broken up into lesser numbers. • Develop the concept that lesser numbers are combined to form a greater number.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• one more • one less • fewer	K.CC.1 K.CC.2 K.CC.3 K.CC.4a K.CC.4b K.CC.4c K.CC.5 K.OA.1 K.OA.3 K-12.MP.1 K-12.MP.2 K-12.MP.4 K-12.MP.5 K-12.MP.6 K-12.MP.7

Chapter 5 Overview – Size and Position

Grade: Kindergarten	**Amount of Time:** ~Incorporated into calendar routines
Brief Description of Chapter: In this chapter, children begin comparing the sizes of objects: smaller, bigger, or the same size. Children also begin identifying objects that are *on top of, under, next to, behind, in front of,* and *inside* other objects.	
Essential Questions:	**Enduring Understandings:**
• How can estimation be used when determining an appropriate size container for a group of objects? • What positional words are used to describe the location of an object? • What kind of vocabulary should be used when ordering events?	• Explore the idea that only a few big objects fit into small spaces and many small objects fit into big spaces. • Identify positions of objects in space. • Use appropriate positional language to describe and compare.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• big • bigger • small • smaller • same size • on top of • under • next to • behind • between • beside • in front of • in back of • inside • outside • before • after	K.CC.1 K.CC.3 K.CC.4a K.CC.5 K.OA.1 K.MD.1 K.MD.2 K.MD.3 K.G.1 K-12.MP.4 K-12.MP.5 K-12.MP.7

Chapter 6 Overview – Numbers 0 to 20

Grade: Kindergarten	**Amount of Time:** ~11 days, January
Brief Description of Chapter: In this chapter, children continue to develop one-to-one correspondence by pointing to each object and saying the number word. Children should understand that each number that they say is one more than the number before it. This leads to an understanding of *one more* and *one less*. In addition, the last number named in a sequence is the total of the group of objects.	
Essential Questions:	**Enduring Understandings:**
• How does understanding one-to-one correspondence support counting to 20? • What are some ways to effectively compare and sequence numbers to 20?	• Build on concept of one more by using ten-frames. • Count, order, and compare groups of up to 20 objects. • Develop an understanding of how to form numbers to 20.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• ten • eleven • twelve • thirteen • fourteen • fifteen • sixteen • seventeen • eighteen • nineteen • twenty • more • fewer • greater than • less than	K.CC.1 K.CC.2 K.CC.4a K.CC.4b K.CC.4c K.CC.5 K.CC.6 K.CC.7 K.OA.1 K.OA.4 K.12.MP.2 K.12.MP.4 K.12.MP.5 K.12.MP.7

Chapter 7 Overview – Solid and Flat Shapes

Grade: Kindergarten	**Amount of Time:** ~10 days, end of January
Brief Description of Chapter: In this chapter, children are taught more precise names for shapes and they learn to describe them. Many concrete examples of flat and solid shapes are provided to help children make real-world connections. They should be able to identify examples and non-examples of different shapes.	
Essential Questions:	**Enduring Understandings:**
• How can the number of faces, corners, and edges support recognition and identification of flat and solid shapes? • How do patterns work?	• Recognize and describe basic solid and flat shapes. • Recognize the relationship between solid shapes and flat shapes. • Identify and extend a shape pattern.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• face • edge • corner • big small • shape pattern • cube • cone • cylinder • sphere • pyramid • circle • triangle • square • rectangle • hexagon	K.12.MP.1 K.12.MP.2 K.12.MP.3 K.12.MP.4 K.12.MP.5 K.G.2 K.G.3 K.G.4 K.G.5 K.G.6

Chapter 8 Overview – Numbers to 100

Grade: Kindergarten	**Amount of Time:** ~Integrated into calendar routine
Brief Description of Chapter: In this chapter, children demonstrate that counting connects numbers and number words with particular quantities and objects. Skip-counting is a shorter way to count objects since the objects are grouped in twos and fives. Teachers can relate skip-counting to the operation of addition. Skip-counting also relates to the algebraic concept of understanding and extending patterns.	
Essential Questions:	**Enduring Understandings:**
• How can patterns be used to count to a designated number? • What number comes next when counting numbers 0 to 100?	• Use pairs to practice counting by 2s to count up to 20 objects. • Use tallies to count by 5s up to 20. • Count by 10s up to 100. • Count by 1's to 100.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• pairs • twos • fives • tally • ten • twenty • thirty • forty • fifty • sixty • seventy • eighty • ninety • hundred • tens •	K.CC.1 K.CC.3 K.CC.4a K.CC.4b K.CC.4c K.CC.5 K.12.MP.4 K.12.MP.8

Chapter 9 Overview – Comparing Sets

Grade: Kindergarten	**Amount of Time:** ~9 days, February
Brief Description of Chapter: In this chapter, children learn to compare sets of up to 20 to find the difference between the two sets. They also learn to compare countable sets using the terms fewer and more, and uncountable sets using the terms less and more.	
Essential Questions:	**Enduring Understandings:**
• How can sets of objects be compared? • What kind of language is used when comparing sets of objects? • What happens when two sets of objects are combined?	• Compare sets of up to 20 objects. • Count the difference through comparing sets using one-to-one correspondence. • Understand fewer, less, and more.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• fewer • less • more • most • fewest	K.CC.1 K.CC.2 K.CC.3 K.CC.4a K.CC.6 K.OA.1 K.OA.2 K.OA.5 K.12.MP.1 K.12.MP.2 K.12.MP.4 K.12.MP.5

Chapter 10 Overview – Ordinal Numbers

Grade: Kindergarten	**Amount of Time:** ~6 days, February
Brief Description of Chapter: In this chapter children will learn to order 3- and 4- step events using the terms *first, next, last, second, and third.* Children will learn to order physical position using ordinal numbers. Children will relate the ordering of objects and events to the terms *before and after.*	
Essential Questions:	**Enduring Understandings:**
• What type of language is needed when sequencing events? • How do the terms 'before' and 'after' support describing the physical position of an object? • How are picture graphs used and interpreted?	• Understand first, second, third and last to sequence events. • Understand before and after in terms of physical position. • Make picture graphs based on preferences. • Rank preferences using first, second, and third.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• first • next • last • second • third • before • after	K.12.MP.7

Chapter 11 Overview – Calendar Patterns

Grade: Kindergarten	**Amount of Time:** ~Integrated into calendar routines
Brief Description of Chapter: In this chapter, children recognize that the seven days of the week and the twelve months of the year always follow the same order and repeat continuously. Children should recognize the names of the days of the week and the months of the year and understand their relationship.	
Essential Questions:	**Enduring Understandings:**
• What patterns can be found in the calendar? • What is the relationship between the various elements found on a calendar?	• Know and order the days of the week and how many days there are in one week. • Understand the concepts of today, tomorrow, and yesterday. • Know and order the months of the year and how many months there are in one year. • Make and interpret pictographs.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• day • week • Sunday • Monday • Tuesday • Wednesday • Thursday • Friday • Saturday • today • tomorrow • yesterday • month • year • January • February • March • April • May • June • July • August • September • October • November • December • warmer • cooler	K.MD.2 K.MD.3 K.12.MP.5 K.12.MP.7

Chapter 12 Overview – Counting On and Counting Back

Grade: Kindergarten	**Amount of Time:** ~7 days, March
Brief Description of Chapter: In this chapter, children will count on and count back. They will learn to find the difference between two sets using various strategies such as finger counting and 1-to-1 correspondence.	
Essential Questions:	**Enduring Understandings:**
• How does counting on and counting back support finding the difference between two numbers? • What other strategies can be used when determining the difference between two numbers?	• Count up and back to find the difference between two sets. • Count back using fingers and other representations.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• ten • eleven • twelve • thirteen • fourtenn • fifteen • sixteen • seventeen • eighteen • nineteen • twenty • more • fewer • greater than • less than	K.CC.1 K.CC.2 K.CC.3 K.CC.4a K.CC.4b K.CC.4c K.CC.5 K.CC.6 K.OA.1 K.OA.3 K.OA.4 K.12.MP.1 K.12.MP.2 K.12.MP.4 K.12.MP.5

Chapter 13 Overview – Patterns

Grade: Kindergarten	**Amount of Time:** ~Integrated into calendar
Brief Description of Chapter: In this chapter, children learn to create and extend repeating patterns by identifying the pattern unit and duplicating it. The simple repeating patterns children create and use in kindergarten provide a basis for increasingly complex patterns.	
Essential Questions:	**Enduring Understandings:**
• How are repeating patterns created and extended?	• Recognize, extend, and create a repeating pattern. • Identify a missing portion of a repeating pattern.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• Repeating pattern • Pattern unit	K.12.MP.1 K.12.MP.3 K.12.MP.4 K.12.MP.5 K.12.MP.7 K.G.2

Chapter 14 Overview – Number Facts

Grade: Kindergarten	**Amount of Time:** ~10 days, Late March/Early April
Brief Description of Chapter: In this chapter, children extend their counting skills through the number 20. They count and combine groups of objects and they count on to find differences. Students will practice composing and decomposing numbers, as well as number bonds, and how they lay the foundation for basic facts, and especially for missing addends.	
Essential Questions:	**Enduring Understandings:**
• How are sets combined and compared? • How are numbers to 20 composed and decomposed?	• Compose numbers to 20 with five-frames and ten-frames. • Decompose numbers to 20 with five-frames and ten-frames. • Count on using a number line.
Key Words/Terminology:	**Math Proficiencies Addressed:**
N/A	K.CC.2 K.CC.3 K.CC.4a K.CC.4b K.CC.4c K.CC.6 K.OA.1 K.OA.3 K.OA.4 K.12.MP.1 K.12.MP.2 K.12.MP.4 K.12.MP.5 K.12.MP.7 K.12.MP.8 NBT.1

Chapter 15 Overview – Length and Height

Grade: Kindergarten	**Amount of Time:** ~Integrated into calendar
Brief Description of Chapter: In this chapter, children learn to compare lengths of objects using the terms long, short, longer, shorter, longest, and shortest. They learn to compare lengths and heights of objects using non-standard units of measurement, such as connecting cubes and paper clips.	
Essential Questions:	**Enduring Understandings:**
• What type of language is used when comparing lengths? • How can the lengths and heights of objects be compared using nonstandard units of measurement? • Are children able to compare lengths and heights of objects using nonstandard units of measurement?	• Use nonstandard units to measure and compare lengths. • Find differences in length using nonstandard units. • Use nonstandard units to measure and compare heights.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• long • short • longer • shorter • longest • shortest	K.CC.1 K.CC.3 K.CC.4a K.CC.4b K.CC.4c K.OA.1 K.OA.2 K.12.MP.1 K.12.MP.4 K.12.MP.7 K.MD.1 K.MD.2

Chapter 16 Overview – Classifying and Sorting

Grade: Kindergarten	**Amount of Time:** ~Integrated into calendar
Brief Description of Chapter: In this chapter, children learn to identify attributes and pick out the "odd one out" in a set of objects. Children learn to sort and classify objects using 1, 2, and 3 attributes.	
Essential Questions:	**Enduring Understandings:**
• How can attributes be used to identify the object in a set of objects that doesn't belong? • How can objects be sorted and classified using attributes?	• Classify objects using attributes. • Identify objects that do not belong in a set. • Sort objects by one or two attributes (color, size, shape, and special features.)
Key Words/Terminology:	**Math Proficiencies Addressed:**
• color • shape • size • pattern • same • different • sort	K.12.MP.1 K.12.MP.4 K.12.MP.5 K.12.MP.7 K.MD.1 K.MD.2 K.MD.3 K.G.2

Chapter 17 Overview – Addition Stories

Grade: Kindergarten	**Amount of Time:** ~5 days, April
Brief Description of Chapter: In this chapter, children learn to deduce addition sentences from addition stories and write them using the symbols + and =. Children will fully familiarize themselves with addition facts to 5.	
Essential Questions:	**Enduring Understandings:**
• How can addition stories be used to formulate addition sentences? • How are addition sentences written? • What are strategies for fluently calculating addition facts to 5?	• Understand addition as the joining of two sets. • Understand symbols + and =, and number sentence. • Use symbols and numerals to write number sentences. • Represent addition stories with addition sentences. • Develop fluency with addition facts to 5.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• plus • is equal to • number sentence	K.CC.1 K.CC.3 K.CC.4 K.OA.1 K.OA.2 K.OA.3 K.OA.5 K.12.MP.1 K.12.MP.2 K.12.MP.4

Chapter 18 Overview – Subtraction Stories

Grade: Kindergarten	**Amount of Time:** ~7 days, April/May
Brief Description of Chapter: In this chapter, children should be able to understand simple take-away and comparison subtraction problems. As the story problems are presented, children use manipulatives and models to make sense of the situations. The problem situations should also be connected to written numerals in number sentences.	
Essential Questions:	**Enduring Understandings:**
• How can subtraction stories be used to formulate subtraction sentences? • How are subtraction sentences written? • How can one-to-one correspondence be used to compare sets?	• Understand the – (minus) symbol. • Understand the = (equal) symbol. • Understand simple subtraction. • Use symbols and numerals to write number sentences. • Represent and write subtraction stories with subtraction sentences. • Compare two sets and show the number sentence to answer how many more.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• minus • left • how many more?	K.CC.1 K.CC.3 K.CC.4 K.CC.6 K.OA.1 K.OA.2 K.OA.3 K.OA.5 K.12.MP.1 K.12.MP.2 K.12.MP.4

Chapter 19 Overview – Measurement

Grade: Kindergarten	**Amount of Time:** ~6 days, May
Brief Description of Chapter: In this chapter, children learn to compare the weights of objects by using a balance scale. They also learn to compare weights using non-standard units. Children learn to compare capacities of containers using the terms *holds more, holds less, and holds the same amount.*	
Essential Questions:	**Enduring Understandings:**
• How can a balance scale or nonstandard units of measurement be used to compare the weights of objects? • What kind of language is used when comparing the capacities of different containers?	• Compare weights using nonstandard units and a balance scale. • Compare containers according to capacities and use comparative language.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• heavy • heavier • light • lighter • holds more • holds less • holds the same amount • more time • less time	K.CC.3 K.CC.2 K.12.MP.1 K.12.MP.2 K.12.MP.4 K.12.MP.5 K.MD.1 K.MD.2

Chapter 20 Overview – Money

Grade: Kindergarten	**Amount of Time:** September
Brief Description of Chapter: In this chapter, children learn to identify coins by appearance and value.	
Essential Questions:	**Enduring Understandings:**
• How can the appearance and value of a coin support identifying it? • How are pennies added?	• Recognize penny, nickel, dime, and quarter. • Know the value of a penny and a dime. • Add pennies up to ten.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• penny • nickel • dime • quarter • cent • change	K.CC.2 K.CC.4 K.CC.5 K.OA.1 K.OA.2 K.OA.3 K.12.MP.4 K.12.MP.5

Chapter 1 Overview – Numbers to 10

Grade: 1

Brief Description of Chapter: In this chapter, children will learn how to count, read and write within 10. Countable items are used to develop the association between the physical representation of the number, the number symbol and the number-word. Children are encouraged to compare and verbally describe the sets using the terms *more* and *less*. They will learn to identify and complete growing and reducing number patterns, where each number in a given sequence is 1 more or 1 less than the number before.

Essential Questions:	**Enduring Understandings:**
• How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • How do operations affect numbers? • What makes a computational strategy both effective and efficient? • How can we use mathematical models to describe physical relationships? • Why is number sense the foundation for all mathematics? • How do mathematical ideas interconnect and build on one another to produce a coherent whole?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers.

Key Words/Terminology:		**Math Proficiencies Addressed:**
• same • more • fewer • greater than • less than • pattern • more than • zero • one	• two • three • four • five • six • seven • eight • nine • ten	1.NBT.1 1.MP.1 1.MP.3 1.MP.5 1.MP.6

Chapter 2 Overview – Number Bonds

Grade: 1

Brief Description of Chapter: Number bonding is closely related to both addition and subtraction. When children understand the concept of number bonds, it will be easier when they do addition and subtraction with regrouping at a later stage. In this chapter, children are led to investigate all possible sets of two numbers that make a given number up to 10. Recognizing the relationships between the parts and the whole will also help children to understand formal number relationships such as the Commutative Property of Addition.

Essential Questions:	**Enduring Understandings:**
• How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • How do operations affect numbers? • What makes a computational strategy both effective and efficient? • How can we use mathematical models to describe physical relationships? • Why is number sense the foundation for all mathematics? • How do mathematical ideas interconnect and build on one another to produce a coherent whole?	• A quantity can be represented in various ways. Problem solving depends on choosing an effective way to represent a quantity. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • The magnitude of numbers affects the outcome of operations on them. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • Mathematical models can be used to describe and quantify physical relationships. • One representation may sometimes be more helpful than another; and multiple representations when used together, give a fuller understanding of a problem.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• part • whole • number bond	1.OA.3 1. MP.1 1. MP.2 1. MP.3 1. MP.5 1. MP.8

Chapter 3 Overview – Addition Facts to 10

Grade: 1

Brief Description of Chapter: Addition is one of the four basic operations that form the foundation of arithmetic and is an essential part of the computation work in elementary school. Children are introduced to the basic strategies of addition such as the part-whole concept involving number bonds, solving real-world addition problems and the Commutative Property of Addition. This property not only makes computation easier, but also lays the foundation for the study of algebra.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can change be best represented mathematically? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • How do operations affect numbers?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• add • plus • equal to • more than • addition sentence • addition story	1.OA.1 1.OA.3 1.OA.5 1.OA.6 1.OA.7 1.OA.8 1. MP.2 1. MP.4 1. MP.5 1. MP.6 1. MP.8

Chapter 4 Overview – Subtraction Facts to 10

Grade: 1

Brief Description of Chapter: In this chapter, children will learn different methods of subtraction, including the most basic method, which is the taking-away strategy. The addition concept is the inverse of subtraction and one of the ways to subtract involves counting back. Other strategies are counting on and using number bonds.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can change be best represented mathematically? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • How do operations affect numbers?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• take away • subtract • minus • subtraction sentence • less than • subtraction story • fact family	1.NBT.4 1.OA.4 1.OA.6 1.OA.7 1.OA.8 1.MP.4 1.MP.8

Chapter 5 Overview – Shapes and Patterns

Grade: 1

Brief Description of Chapter: In this chapter, children will compare shapes and determine how they are alike and different, by describing their geometric attributes and properties. In learning about solid shapes, with the addition of rectangular prisms and pyramids, children are taught to recognize them from different perspectives and orientations. Children will get to compose and decompose plane and solid shapes and make patterns with plane and solid shapes. They will develop a better understanding of part-whole relationships as well as the properties of the original and composite shapes. This will also build a background for learning about measurement and properties of geometry such as congruence and symmetry at higher grades.

Essential Questions:	**Enduring Understandings:**
• How can spatial relationships be described by careful use of geometric language? • What situations can be analyzed using transformations and symmetries? • How do geometric relationships help us solve problems and/or make sense of phenomena? • How can measurements be used to solve problems? • How can attributes be used to classify data/objects?	• Geometric properties can be used to construct geometric figures. • Shape and area can be conserved during mathematical transformations. • Geometric relationships provide a means to make sense of a variety of phenomena. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • Grouping by attributes (classification) can be used to answer mathematical questions.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• plane • shapes • circle • triangle • square • side • corner • rectangle • cylinder • pyramid • stack • cube • sphere • slide • roll • repeating pattern • sort • color • alike • size • different • rectangular prism • cone	1.G.1 1.G.2 1.G.3 1.MP.1 1.MP.3 1.MP.4 1.MP.5 1.MP.6

Chapter 6 Overview – Ordinal Numbers and Position

Grade: 1

Brief Description of Chapter: In this chapter children learn ordering numbers and number positions with ordinal numbers as key number concepts. Children need practice in identifying ordinal positions in their full (first, second, …tenth) and abbreviated forms. Children also integrate their understanding of spatial relationships in the real world and the concept of order and position. Relevant vocabulary that is essential for understanding relative positions in a row includes *left, right, in front of and behind*. These establish the starting point for determining ordinal positions.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • What makes a computational strategy both effective and efficient? • What makes an algebraic algorithm both effective and efficient? • How can counting, measuring, or labeling help to make sense of the world around us? • How do operations affect numbers?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • The magnitude of numbers affects the outcome of operations on them.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• first • second • third • fourth • fifth • sixth • seventh • before • after • between • above • under • below • behind • next to • in front of • up • down • left • right • near • far	1.MP.1 1.MP.2 1.MP.4 1.MP.5

Chapter 7 Overview – Numbers to 20

Grade: 1

Brief Description of Chapter: In this chapter, children will learn how to count, read and write numbers within 20. Children will learn to recognize the numbers 11 to 20 as 1 group of ten and a specific number of ones, as an introduction to the concept of place value. Children's understanding of the number concepts in this chapter will be applied to comparing numbers to build number relationships. At this stage, they compare more than two numbers, using the concepts of *greatest* and *least* and order a set of numbers according to their relative magnitude. Children also learn to recognize and make increasing and decreasing number patterns that involve a difference of 1 or 2 between consecutive steps in the patterns.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can change be best represented mathematically? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • How do operations affect numbers?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• place-value chart • greatest • least • order	1.NBT.1 1.NBT.2 1.MP.5 1.MP.6 1.MP.8

Chapter 8 Overview – Addition and Subtraction Facts to 20

Grade: 1

Brief Description of Chapter: In this chapter, children will learn more strategies for addition and subtraction as they solve problems that include numbers between 10 and 20. They will learn to add or subtract by grouping the two-digit number as a 10 and ones. They will also use the concept of number bonds to help develop new strategies for addition and subtraction. The strategy of using doubles facts and doubles plus 1 is introduced at this stage. Number bonds have the added benefit of displaying fact families. Since addition and subtraction are inverse operations, there are families of facts that relate addition and subtraction facts around two parts and a whole. Such strategies are a foundation for adding and subtracting larger numbers. Children also apply the strategies to solve real-world problems.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can change be best represented mathematically? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • How do operations affect numbers?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• group • same • double facts • doubles plus one	1.NBT.4 1.OA.1 1.OA.4 1.OA.6 1.OA.7 1.OA.8 1.MP.6 1.MP.8

Chapter 9 Overview – Length

Grade: 1

Brief Description of Chapter: As an introduction to measuring length, children compare the lengths of two objects both directly and indirectly and they order several objects according to length. Their spatial awareness is exercised by having them recognize vertical length as height as children learn to compare the length and height of objects in the classroom and the real-world. In this chapter, non-standard units are used to measure length. It requires children to integrate their understanding of number, measurement, and geometry. This prepares children for measuring with standardized units and measurement systems.

Essential Questions:	**Enduring Understandings:**
• How can measurements be used to solve problems? • How can counting, measuring, or labeling help to make sense of the world around us? • How can we compare and contrast numbers? • How can change be best represented mathematically?	• Measurements can be used to describe, compare, and make sense of phenomena. • One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• tall • taller • tallest • short • shorter • shortest • long • longer • longest • start line • about • unit	1.MP.2 1.MP.3 1.MP.5 1.MP.6 1.MD.1

Chapter 11 – Picture Graphs and Bar Graphs

Grade: 1

Brief Description of Chapter: In this chapter children will learn to understand and interpret data from picture graphs and bar graphs. Children's counting skills are utilized in the collection of data. They are led to see how the data collected can be compiled into picture graphs or bar graphs. The strategy of using tally marks is a way to organize data better. This chapter guides children in learning about how data can be represented in a pictorial way, which is particularly engaging for children this age.

Essential Questions:	**Enduring Understandings:**
• How can the collection, organization, interpretation, and display of data be used to answer questions? • How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can change be best represented mathematically? • How can we use mathematical models to describe physical relationships?	• The message conveyed by the data is collected, represented, and summarized. • The results of statistical investigation can be used to support or refute an argument. • Geometric relationships provide a means to make sense of a variety of phenomena. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• data • picture graph • more • fewer • most • fewest • tally mark • tally chart • bar graph	1.MD.4 1.OA.8 1.MP.1 1.MP.2

Chapter 12 – Numbers to 40

Grade: 1

Brief Description of Chapter: Children have learned counting skills as well as basic operations in adding and subtracting numbers to 20. Children understand the strategy of making a ten as well as the purpose of place-value charts. The place-value chart enables children to make comparisons between two or more numbers, when tens are different or when tens are equal. Children apply this knowledge when they order numbers in ascending or descending order. With children familiar with the counting, comparing and ordering of numbers to 40, they are then able to identify the pattern within a number pattern. This builds the foundation that children will rely upon when they learn about numbers to 100 in Chapter 16.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• twenty-one • twenty-two • twenty-three • twenty-four • twenty-five • twenty-six • twenty-seven • twenty-eight • twenty-nine • thirty • forty • counting tape	1.NBT.1 1.NBT.2 1.NBT.3 1.OA.5 1.OA.8 1.MP.1 1.MP.2 1.MP.5 1.MP.7

Chapter 13 – Addition and Subtraction to 40

Grade: 1

Brief Description of Chapter: In this chapter, children are taught vertical form based on place value that can be used to add or subtract numbers with and without regrouping. In teaching children to regroup, they are encouraged to use place-value charts to correctly align the digits and to record the regrouping process. Children develop their addition skills further by learning to apply the Associative Property of Addition and number bonds when adding three 1-digit numbers using the strategy of making a 10. Lastly, the learning of addition and subtraction with and without regrouping is applied to real-world problems.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• count on • place-value chart • regroup • count back	1.NBT.2 1.NBT.4 1.NBT.6 1.OA.1 1.OA.2 1.OA.5 1.OA.6 1.OA.7 1.OA.8 1.MP.1 1.MP.2 1.MP.2 1.MP.3 1.MP.4 1.MP.5 1.MP.8

Chapter 14 – Mental Math Strategies

Grade: 1

Brief Description of Chapter: Children will use mental math strategies as they develop alternate algorithms to solve more complex computational and real-world problems. Mental math strategies will also be used as children estimate to check the validity of their calculations. Children have already learned the addition and subtraction facts, the part-whole concept in number bonds, as well as place values of numbers to 20. These form an important basis for the learning and application of strategies when doing addition and subtraction mentally. At this stage, it is helpful to introduce and then apply from this point forward mental calculation of 2 digit numbers. Various strategies are suggested depending on the numbers, and if 1-or 2-digits are involved in the addition and subtraction sentences. These strategies can subsequently be applied when children gain confidence, thus eliminating the time-consuming need to depend on counting on or counters to derive the answers, especially when dealing with greater numbers in later chapters.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • What makes a computational strategy both effective and efficient? • How can we use mathematical models to describe physical relationships? • What is the best way to solve this? • What counting strategy works best here?	• The results of statistical investigation can be used to support or refute an argument. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algorithms can effectively and efficiently be used to quantify and interpret discrete information.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• mentally • doubles fact	1.NBT.4 1.NBT.5 1.OA.1 1.OA.3 1.OA.6 1.OA.7 1.OA.8 1.MP.1 1.MP.2 1.MP.3 1.MP.5 1.MP.6 1.MP.8

Chapter 16 – Numbers to 100

Grade: 1

Brief Description of Chapter: In this chapter, children are taught to count on from 40 to 120 with the tens fifty, sixty, seventy, eighty, ninety, and one hundred highlighted. In knowing that a 2-digit number is made up of tens and ones, children can count in tens before counting the remaining ones when identifying a 2-digit number. With the emphasis on place value, children are taught to compare 2-digit numbers which have different tens, and numbers which have equal tens by focusing on the ones. In being able to compare numbers, children go on to ordering them accordingly. Once children can order numbers, they observe number patterns and find missing numbers in a pattern. Children are also asked to form their own number patterns, thus encouraging them to think critically. This chapter lays the foundation for children to develop their addition and subtraction skills with larger numbers, a skill they will learn in Chapter 17.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • Algebraic representation can be used to generalize patterns and relationships.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• fifty • sixty • seventy • eighty • ninety • one hundred • estimate • number line	1.NBT.1 1.NBT.2 1.OA.5 1.MP.1 1.MP.2 1.MP.3 1.MP.4 1.MP.5 1.MP.6 1MP.7

Chapter 17 – Addition and Subtraction to 100

Grade: 1

Brief Description of Chapter: In this chapter, children extend the standard vertical form for addition and subtraction numbers to 100. Children are presented with two methods that can be used; counting on/back and using place-value charts. The application of place-value regrouping in addition and subtraction is again revisited so children familiarize themselves with when there is the need for it; that is, when the addition of ones exceeds 9, and when the subtraction of ones cannot be carried out because of insufficient ones. This chapter consolidates what children have learned in Chapter 13: Addition and Subtraction to 40, as well as Chapter 16: Numbers to 120.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • Algebraic representation can be used to generalize patterns and relationships.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• same • groups • each • share • equally	1.MP.1 1.MP.2 1.MP.3 1.MP.5 1.MP.6 1.MP.8 1.G.3

Chapter 18 – Multiplication and Division

Grade: 1

Brief Description of Chapter: In this chapter, the concept of multiplication without using the word 'multiplication' is linked to the part-whole meaning of addition. In earlier chapters, children learned how to join groups (parts) to find a total (whole), how to use doubles facts, and how to use addition properties to add three numbers. These addition concepts form an important basis for understanding multiplication in Grade 2 as repeated addition. Division is the opposite of multiplication. Division can be understood as separating a group (whole) into equal groups (parts). Number-sense concepts such as counting and comparing numbers form the groundwork for division: finding the numbers of equal groups of a given size and finding the size of a given number of groups. At this grade level, it is important to use models. Children may need to depend heavily on manipulatives such as counters to comprehend the two meanings of division.

Essential Questions:	**Enduring Understandings:**
• What makes a computational strategy and/or algorithm both effective and efficient? • How do operations affect numbers? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships?	• Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • The magnitude of numbers affects the outcome of operations on them. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• same • groups • each • share • equally	1.MP.1 1.MP.2 1.MP.3 1.MP.5 1.MP.6 1.MP.8 1.G.3

Chapter 19 – Money

Grade: 1

Brief Description of Chapter: In this chapter, children recall their knowledge of the penny, nickel, dime, and quarter. Children are taught to count the value of different coins by applying the strategies of counting on and skip-counting from the coin of greatest value by first arranging the coins in order. Children learn that the same amount of money can be represented in different combinations of coins. In conjunction with the concept of counting money, children go on to using addition and subtraction in real-world situations that involve money. With the ability to recognize coins and count money in real-world problems, children are able to make simple purchases and find the amount of change in everyday experiences.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • What is the best way to solve this?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing effective ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algorithms can effectively and efficiently be used to quantify and interpret discrete information.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• cents • nickel • value • penny • dime • exchange • quarter • change	1.OA.7 1.MP.1 1.MP.2 1.MP.3 1.MP.5 1.MP.6

Chapter 1 Overview – Numbers to 1, 000

Grade: 2

Brief Description of Chapter: In this unit, the students will be able to identify a number and place it according to the value of its digits in terms of ones, tens, and hundreds. Students also learn to identify numbers in both numerals and words. They are also encouraged to compare and verbally describe more than two numbers in a set using terms least and greatest.

Essential Questions:	**Enduring Understandings:**
• How can counting help to make sense of the world around us? • How can the use of countable objects help to develop the association between the physical representation of the number, the number symbol, and the number word? • How can we compare and contrast numbers? • How can we order three-digit numbers and identify number patterns using place-value charts and number lines?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical patterns. • Place value is based on groups of 10.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• hundred • hundreds • thousand • standard form • word form • expanded form • greater than (>) • less than (<) • greatest • least • more than • less than	2.NBT.1a 2.NBT.1b 2.NBT.2 2.NBT.3 2.NBT.4 2.MD.6 2.SMP.1 2.SMP.2 2.SMP.3 2.SMP.4 2.SMP.5 2.SMP.6 2.SMP.7

Chapter 10 Overview – Mental Math and Estimation

Grade: 2

Brief Description of Chapter: In this unit, students are taught the meaning of sum and difference and practice using mental addition and subtraction with the basic and advanced strategies previously introduced (ones->tens->hundreds or add/subtract 10 first). The concept of number bonds in integral to the above-mentioned strategies related to mental addition and subtraction. An important application of place value and number sense is rounding. Just as number bonds provide a visual for mental math strategies, the number line is used as a visual representation that illustrates the rounding concept. At this level, students learn to round to the nearest ten to decide if their answers in addition and subtraction are reasonable.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we decide when to use an exact answer and when to use an estimate? • How can place value and number- bond strategies help with mental addition and subtraction? • How can estimating help in understanding a reasonable sum and difference?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Context is critical when using estimation. • Mathematical models can be used to describe and quantify physical relationships. • Number sense develops through experience.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• sum • add mentally • difference • subtract mentally • number line • about • round • nearest ten • estimate • reasonable	2.OA.1 2.OA.2 2.NBT.5 2.NBT.5 2.NBT.7 2.NBT.8 2.NBT.9 2.MD.6 SMP.1 SMP.3 SMP.4 SMP.5 SMP.6

Chapter 2 Overview – Addition up to 1,000

Grade: 2

Brief Description of Chapter: Students previously learned the Commutative Property of Addition, Associative Property of Addition, Identity Property in Addition, composing and decomposing numbers through place value and number bonds, and the application of place value in addition. In this unit, the students will apply these same concepts to 3-digit numbers. They are taught multiple regroupings by using base-10 blocks and a place value chart as concrete representations, allowing them to visualize addition with regrouping in the ones and tens place.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can change be best represented mathematically? • What is the best solution for solving a problem? • How can we use math information to choose an operation? • How can the use of regrouping aid in the process of solving addition problems?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • The magnitude of numbers affects the outcome of operations on them. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • Math processes can give students the tools needed to help them become problem solvers. • Different math approaches can yield the same results. • Place value is based on groups of 10.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• add • place-value chart • regroup • base-10 blocks	2.NBT.1a 2.NBT.3 2.NBT.5 2.NBT.6 2.NBT.7 2.NBT.9 SMP.1 SMP.4

Chapter 3 Overview – Subtraction up to 1,000

Grade: 2

Brief Description of Chapter: In this unit, students learn two types of multi-digit subtraction: basic subtraction without regrouping and subtraction with regrouping. Students practice subtraction with regrouping using base-10 blocks and place value charts as concrete representations, aiding children in visualizing the regrouping of tens as ones, hundreds as tens, and hundreds as tens and ones. The relationship between addition and subtraction (inverse operations) is stressed and the students use addition to check subtraction.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can change be best represented mathematically? • What is the best solution for solving a problem? • How can we use math information to choose an operation? • How can the use of regrouping aid in the process of solving subtraction problems?	• Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Place value is based on groups of 10. • One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • Math processes can give students the tools needed to help them become problem solvers. • Different math approaches can yield the same results.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• subtract	2.NBT.1a SMP.1 2.NBT.3 SMP.2 2.NBT.5 SMP.4 2.NBT.6 SMP.5 2.NBT.7 SMP.7 2.NBT.9 SMP.8 2.MD.6

Chapter 4 Overview – Using Bar Models: Addition and Subtraction

Grade: 2

Brief Description of Chapter: Students learn to use bar models as a strategy to solve addition and subtraction problems. They also learn to compare two models to solve more complex addition and subtraction problems. A combination of all these strategies is used in solving two-step real world problems. The part-part-whole concept illustrated in bar models teaches children to represent values on a single bar model by dividing the model into parts. Bar models provide a useful, pictorial representation of sets as parts making up a whole. Students label the bars with words as well as numbers, so they can use bar models to illustrate a problem, indicating on the model the known and unknown parts or the whole.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can change be best represented mathematically? • What is the best solution for solving a part-part-whole problem in addition or subtraction? • How can we use math information to choose an operation? • How can students use bar modeling to add on or take away sets to add or subtract?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • The magnitude of numbers affects the outcome of operations on them. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • Math processes can give students the tools needed to help them become problem solvers. • Different math approaches can yield the same results. • Mathematical models can be used to describe and quantify physical relationships.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• join • set • take away • compare • connecting cubes • paper strips	2.NBT.5 2.NBT.6 2.NBT.7 2.NBT.9 2.MD.5 2.MD.6 2.OA.1 SMP.1 SMP.2 SMP.3 SMP.4 SMP.5 SMP.6 SMP.7 SMP.8

Chapter 5 Overview – Multiplication and Division

Grade: 2

Brief Description of Chapter: In this unit, students move to the pictorial and symbolic phases through the emphasis on equal groups. Multiplication is used to find the number of items in a number of equal groups. Division is used in two ways. First, in sharing a number of items among a number of groups divide to find the number of items in each group. Second, from a number of items that each group receives, to find the number of equal groups that can be formed. The strategy of repeated subtraction is used to explicate the concept of division.

Essential Questions:	**Enduring Understandings:**
• What makes a computational strategy both effective and efficient? • How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How do operations affect numbers? • How do I decide which strategy will work best in a given problem situation? • What are the mathematical properties that govern multiplication and division? How would you use them? • How can pictures with multiples or equal groups be used to write or solve multiplication and division stories and sentences?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • The magnitude of numbers affects the outcome of operations on them. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • Math processes can give students the tools needed to help them become problem solvers. • Different math approaches can yield the same results. • Mathematical models can be used to describe and quantify physical relationships. • The relationships among the operations and their properties promote computational fluency.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• equal • group • multiplication sentence • multiplication story • multiply • repeated addition • times • divide • division sentence • equal groups • repeated subtraction • share	SMP.1 SMP.2 SMP.3 SMP.4 SMP.5 SMP.6

Chapter 6 Overview – Multiplication Tables of 2, 5 and 10

Grade: 2

Brief Description of Chapter: In this unit, students are taught multiplication tables of 2, 5 and 10 using skip counting and dot paper strategies. Pictures and fingers illustrate the skip counting strategy related to computation in multiplication. Dot paper can also be used to represent the group and item concept related to computation in multiplication. Students also learn to use related multiplication facts to divide. Division here is conceptualized as the inverse of multiplication and as the equal sharing of items. A distinction is made between sharing a number of items into a given number of groups and putting an equal number of items into groups. Students will write multiplication and division sentences to solve real world problems.

Essential Questions:	**Enduring Understandings:**
• What makes a computational strategy both effective and efficient? • How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How do operations affect numbers? • How can skip-counting and dot-paper be used as tools to best represent multiplication problems? • How can we use physical models to clarify mathematical relationships? • How do I decide which strategy will work best in a given problem situation? • How can multiples be used to solve problems? • How can children apply the inverse relationship of multiplication and division to write division sentences from related multiplication sentences?	• Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • The magnitude of numbers affects the outcome of operations on them. • Algebraic representation can be used to generalize patterns and relationships. • Physical models can be used to clarify mathematical relationships. • Operations create relationships between numbers. • The relationships among the operations and their properties promote computational fluency.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• skip count • dot paper • related multiplication facts	2.OA.2 2.OA.4 2.NBT.2 SMP.1 SMP.2 SMP.3 SMP.5 SMP.6 SMP.8

Chapter 7 Overview – Metric Measurement of Length

Grade: 2

Brief Description of Chapter: In this unit, students learn to estimate and measure length using the standard metric units of meters (m) and centimeters (cm). The meter stick and the centimeter ruler are used to illustrate length as a concept of measure to determine how long or short an object is. The length of curved lines can be measured by using a piece of string which is place along the curved along the curved line and then measured with a ruler. Students begin to recognize that standard units of measure provide a basis for the comparison of lengths. The students apply addition and subtraction concepts to real world problems involving metric lengths. Bar modeling is used to help them solve these real world problems using length and short distances.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • Why do we measure? • Why is there a need for standardized units of measure? • What are the standard metric units of length? • What are the tools of measurement and how can they be used? • How can measurements be used to solve problems?	• Measurements can be used to describe, compare, and make sense of phenomena. • What we measure effects how we measure it. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • Measurement describes the attributes of objects and events. • Standard units of measure enable people to interpret results or data.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• meter stick • length • meter (m) • unit • width • height • taller, tallest • shorter, shortest • longer, longest • centimeter (cm)	2.MD.1 SMP.1 2.MD.3 SMP.2 2.MD.4 SMP.4 2.MD.5 SMP.5 2.MD.6 SMP.6

Chapter 8 Overview – Mass

Grade: 2

Brief Description of Chapter: In this unit, students learn to estimate and measure the mass of objects using the standard metric units of kilogram (kg) and grams (g). Students read the masses of objects from measuring scales in these units. Another way of finding the mass of objects involves a balance with 1-kilogram and 1-gram masses. Experiments are conducted using the measuring scale to compare the masses of two objects, as well as to determine the masses of objects using addition and subtraction of objects.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How does mass describe how heavy an object is? • What are the metric units of measure for mass? • What are the tools of measurement and how can they be used? • How can measurements be used to solve problems?	• Measurements can be used to describe, compare, and make sense of phenomena. • What we measure effects how we measure it. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • Measurement describes the attributes of objects and events. • Standard units of measure enable people to interpret results or data.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• kilogram (kg) • mass • measuring scale • as heavy as • less than • more than • heavier than • lighter than • heaviest • lightest • gram (g)	2.MD.2 SMP.1 SMP.2 SMP.5 SMP.6 SMP.7

Chapter 9 Overview – Volume

Grade: 2

Brief Description of Chapter: Getting to know volume, its units and properties is the main focus of this unit. The emphasis is on the amount or volume of liquids and not containers. Students learn that the liter (L) is the unit of measure that provides a basis for the comparison of volume. Various hands-on activities are utilized to illustrate the concept that the volume of a liquid remains unchanged when poured into different containers. In addition, the students apply the concepts of addition and subtraction to one and two step real world problems involving volume.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • Why do we measure? • Why is there a need for standardized units of measure? • What are the tools of measurement and how can they be used? • How can measurements be used to solve problems? • What is the metric unit of measure for volume? • How can you compare the volume of liquids in both identical and non-identical containers?	• Measurements can be used to describe, compare, and make sense of phenomena. • What we measure effects how we measure it. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • Measurement describes the attributes of objects and events. • Standard units of measure enable people to interpret results or data.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• volume • more than • less than • as much as • most • least • liter (l) • measuring cup	2.NBT.5 2.NBT.6 2.NBT.7 2.MD.5 2.MD.6 SMP.1 SMP.2 SMP.4 SMP.5 SMP.6 SMP.7

Chapter 11 Overview – Money

Grade: 2

Brief Description of Chapter: In this unit, students are taught to recognize the $1 bill, $5 bill, $10 bill and $20 bill. Using bills and coins, students learn to show and to count money up to $20. Money provides a natural introduction to decimal notation. Students learn to write money amounts as $ (dollars) and cents, as well as compare amounts of money. Tables are used to model grouping given money amounts into dollars and cents. Students practice comparing values from left to right. Bar models are used to solve real-world problems involving the addition and subtraction of money.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • What makes a computational strategy both effective and efficient? • How can money best be represented mathematically? • What are the respective values of coins and dollars? • How does the use of a decimal point separate dollars from cents? • How can different coin/dollar combinations represent or be exchanged for the same value?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • Understand place value and how it relates to dollars and cents • Understand counting coin and dollar amounts and combinations up to twenty dollars. • Even exchanges among coins and dollars do not change the monetary value.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• $1 bill • $5 bill • $10 bill • $20 bill • cent sign • dollar sign $ • decimal point • table	2.MD.8 SMP.1 SMP.3 SMP.4 SMP.6

Chapter 12 Overview – Fractions

Grade: 2

Brief Description of Chapter: Students learn to model and name halves, thirds, and fourths based on the number of equal parts in a whole. Bar model drawings learned earlier can also be used to show fractional parts in different ways. Visual models can be further used to compare fractional parts. Using identical models, children will be able to compare fractions and distinguish a greater fraction from one that is less. They will use models to show that a fraction with a greater bottom number is not necessarily greater in value than a fraction with a bottom number that is less. Students will also learn to apply fraction models to add and subtract fractions with the same bottom number.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can we use physical models to clarify mathematical relationships? • How are fractions used in real life? • How are fractions represented and compared? • How are concrete materials and drawings used to show understanding of fractions? • How can using models aid in adding and subtracting like fractions? • How do you show/identify fractions for halves, thirds and fourths using model drawings?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Physical models can be used to clarify mathematical relationships. • Partition a whole into halves, thirds and fourths. • Equal shares of identical wholes do not need to have the same shape.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• equal • unequal • whole • fraction • one-half • one third • one-fourth • unit fraction • same • greater than • less than • like fractions	SMP.1 SMP.4 SMP.6 SMP.7 2.G.2 2.G.3

Chapter 13 Overview – Customary Measurement of Length

Grade: 2

Brief Description of Chapter: In this unit, students learn to estimate and measure the lengths of objects using a foot ruler. They begin to recognize that a foot/feet is used in measuring length of bigger objects, while inch/inches is used for measuring the lengths of objects that are relatively smaller. Note: every measurement is an estimate. The precision of measurement depends on the size of the unit used to measure an object. The smaller the unit, the more precise the measurement. Students practice drawing lines of specific lengths. They will apply the strategies learned in this chapter, as well as that of addition and subtraction to solving one- and two-step real-world word problems involving length using bar models.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • What makes a computational strategy both effective and efficient? • How do mathematical ideas interconnect and build on one another to produce a coherent whole? • Why do we measure? • Why is there a need for standardized units of measure? • What are the standard U.S. Customary units of length? • What are the tools of measurement and how can they be used? • How can measurements be used to solve problems?	• Measurements can be used to describe, compare, and make sense of phenomena. • What we measure effects how we measure it. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • Measurement describes the attributes of objects and events. • Standard units of measure enable people to interpret results or data.

Key Words/Terminology:		**Math Proficiencies Addressed:**	
• foot/feet (ft) • length • ruler • unit • width • height	• longest • shortest • inch (in)	SMP.1 SMP.4 SMP.5 SMP.6 2.NBT.5 2.NBT.6 2.NBT.7	2.NBT.9 2.MD.1 2.MD.3 2.MD.4 2.MD.5 2.MD.6 2.OA.1

Chapter 14 Overview – Time

Grade: 2

Brief Description of Chapter: In this unit, students will learn how to read time based on the position of the minute hand on the clock, and that the minute hand tells the number of minutes after the hour. Using the skip-counting strategy, students learn to tell how many minutes have passed, and how to read and write time in hours and minutes using numerals and words. The students practice using the terms, A.M. and P.M., to show morning, afternoon, or night. With these terms, children will learn to order events by time. Finally, students will learn to determine how much time has elapsed.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How does the minute hand on the clock relate to skip counting strategy? • How are the hour and minute of a given time both analog and digitally read and written? • How does one differentiate morning, afternoon and night using A.M. and P.M.? • How does time relate to sequencing of events?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • Recognizing analog and digital time notation related to hours and minutes. • Identifying A.M. and P.M. as they relate to morning, afternoon and night. • Placement of minute hand on the clock relates directly to skip counting strategy.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• hour hand • minute hand • minute • hour • o'clock • after • clock face • A.M. • P.M.	SMP.1 SMP.2 SMP.4 SMP.6 2.MD.7

Chapter 15 Overview – Multiplication Tables of 3 and 4

Grade: 2

Brief Description of Chapter: In this unit, students are taught the multiplication facts of 3 and 4 using the skip-counting and dot-paper strategies. Students also practice using related multiplication facts to divide. They are taught that division is the inverse of multiplication and is used when putting things in equal groups. A distinction is made between putting a number of items into a given number of groups and putting an equal number of items into groups. Students apply the Commutative Property of Multiplication, as well as the inverse relationship between multiplication and division, to form related families of facts. Multiplication and division sentences are written to solve real-world problems.

Essential Questions:	**Enduring Understandings:**
• What makes a computational strategy both effective and efficient? • How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How do operations affect numbers? • How can skip-counting and dot-paper be used as tools to best represent multiplication problems? • How can we use physical models to clarify mathematical relationships? • How do I decide which strategy will work best in a given problem situation? • How can multiples be used to solve problems? • How can children apply the inverse relationship of multiplication and division to write division sentences from related multiplication sentences?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • The relationships among the operations and their properties promote computational fluency. • There can be different strategies to solve a problem, but some are more effective and efficient than others. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• skip-count • dot paper • related multiplication facts	SMP.1 SMP.2 SMP.3 SMP.5 SMP.6 SMP.8 2.OA.4

Chapter 16 Overview – Using Bar Models: Multiplication and Division

Grade: 2

Brief Description of Chapter: In this unit, students use bar models in solving real-world multiplication and division problems. Multiplication is conceptualized as finding the total number of items, given the number of groups, while division is conceptualized as sharing or dividing a set of items into equal groups, so that each group has the same number of items. To culminate, students apply the concepts and strategies to solve real-world problems involving multiplication, division, measurement, and money.

Essential Questions:	**Enduring Understandings:**
• What makes a computational strategy both effective and efficient? • How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How do operations affect numbers? • How can skip-counting and dot-paper be used as tools to best represent multiplication problems? • How can we use bar models to clarify mathematical relationships between multiplication and division? • How do I decide which strategy will work best in a given problem situation? • How can multiples be used to solve problems? • How can children apply the inverse relationship of multiplication and division to write division sentences from related multiplication sentences?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • The relationships among the operations and their properties promote computational fluency. • There can be different strategies to solve a problem, but some are more effective and efficient than others. • The message conveyed by the data is collected, represented, and summarized. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Mathematical models can be used to describe and quantify physical relationships. • Different math approaches can yield the same results.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• bar models • groups • items	SMP.1 SMP.6 2.MD.5 2.MD.6

Chapter 17 Overview – Picture Graphs

Grade: 2

Brief Description of Chapter: Students will learn to analyze more complex picture graphs. The reading, analysis, and interpretation of picture graphs involve symbols that may represent more than one item. Students connect their knowledge of multiplication and division with creating and reading picture graphs. Lastly, students practice solving word problems using the data they find in the picture graph. Consequently they encounter questions that assess their ability to read, analyze, and interpret picture graphs.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can the collection, organization, interpretation, and display of data be used to answer questions? • How can counting, measuring, or labeling help to make sense of the world around us? • How can the collection, organization, interpretation, and display of data be used to answer questions? • How does reading and displaying data in pictorial form aid in solving real-world problems?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • There can be different strategies to solve a problem, but some are more effective and efficient than others. • The message conveyed by the data is collected, represented, and summarized. • The results of statistical investigation can be used to support or refute an argument.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• picture graph • key • symbol • record • tally chart	SMP.1 SMP.2 SMP.6 2.MD.10

Chapter 18 Overview – Lines and Surfaces

Grade: 2

Brief Description of Chapter: Students will learn to recognize, identify, and describe parts of lines and curves that make up plane and solid shapes. They will also learn to combine parts of lines and curves to draw plane shapes. Students use their senses of sight and touch to identify, classify, and count flat and curved surfaces of solid shapes. The properties of different surfaces are also explored.

Essential Questions:	**Enduring Understandings:**
• How can a spatial relationship be described by careful use of geometric language? • How do geometric relationships help us solve problems and/or make sense of phenomena? • How can geometry relate to real world connections? • Why is geometry important?	• Geometric properties can be used to construct geometric figures. • Geometric relationships provide a means to make sense of a variety of phenomena. • Points, lines, and planes are the foundation of geometry. • Geometry and spatial sense offer ways to interpret and reflect on our physical environment. • Analyzing geometric relationships develops reasoning and justification skills.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• part of line • curve • flat surface • curved surface • slide • stack • roll	SMP.1 SMP.2 SMP.6 2.G.1

Chapter 19 Overview – Shapes and Patterns

Grade: 2

Brief Description of Chapter: In this unit, students expand their knowledge of plane shapes including how to combine smaller shapes to make larger plane shapes and separate larger shapes to make smaller shapes. The students practice using dot-paper and square grid paper to construct shapes and figures; they also have the opportunity to build models by combining solid shapes. Finally, students identify, describe, extend, and create more complex patterns using different sizes, shapes, colors, and positions (turnings).

Essential Questions:	**Enduring Understandings:**
• How can a spatial relationship be described by careful use of geometric language? • How do geometric relationships help us solve problems and/or make sense of phenomena? • How can geometry relate to real world connections? • Why is geometry important? • How can objects be represented and compared using geometric attributes? • How can combining or separating plane shapes create larger or smaller plane shapes? • How can using different sizes, shapes and positions create more complex patterns?	• Geometric properties can be used to construct geometric figures. • Geometric relationships provide a means to make sense of a variety of phenomena. • Points, lines, and planes are the foundation of geometry. • Geometry and spatial sense offer ways to interpret and reflect on our physical environment. • Analyzing geometric relationships develops reasoning and justification skills.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• plane shape • hexagon • trapezoid • figure • pattern • pattern unit • shape • repeating pattern • size • turning	SMP.1 SMP.2 SMP.6 SMP.8 2.G.1

Math Pacing Guide: Grades 3-5

	Grade 3	Grade 4	Grade 5
September	**Chapter 1:** Numbers to 10,000 **Chapter 3:** Addition up to 10,000	**Chapter 1:** Place Value of Whole Numbers	**Chapter 1:** Whole Numbers
October	**Chapter 3 (con't):** Addition up to 10,000 **Chapter 4:** Subtraction up to 10,000	**Chapter 2:** Estimation and Number Theory **Chapter 3:** Whole Number Multiplication and Division	**Chapter 2:** Whole Number Multiplication and Division **Chapter 3:** Fractions and Mixed Numbers
November	**Chapter 5:** Using Bar Models: Addition and Subtraction **Chapter 6:** Multiplication Tables of 6, 7, 8, and 9	**Chapter 3 (cont'd.):** Whole Number Multiplication and Division **Chapter 4:** Tables and Line Graphs	**Chapter 4:** Multiplying and Dividing Fractions and Mixed Numbers
December	**Chapter 6 (cont'd.):** Multiplication Tables of 6, 7, 8, and 9 **Chapter 7:** Multiplication	**Chapter 4 (cont'd.):** Tables and Line Graphs **Chapter 5:** Data and Probability	**Chapter 5:** Algebra **Chapter 6:** Area of a Triangle
January	**Chapter 11:** Metric Length, Mass, and Volume **Chapter 8:** Division	**Chapter 5 (cont'd.):** Data and Probability **Chapter 6:** Fractions and Mixed Numbers	**Chapter 15:** Surface Area and Volume **Chapter 8:** Decimals
February	**Chapter 9:** Using Bar Models: Multiplication and Division **Chapter 13:** Bar Graphs and Line Plots	**Chapter 7:** Decimals **Chapter 9:** Angles	**Chapter 9:** Multiplying and Dividing Decimals
March	**Chapter 19:** Area and Perimeter **Chapter 14:** Fractions **Chapter 16:** Time and Temperature	**Chapter 10:** Perpendicular and Parallel Line Segments **Chapter 11:** Squares and Rectangles	**Chapter 11:** Graphs and Probability **Chapter 13:** Properties of Triangles and Four-Sided Figures
April	**Chapter 18:** Two-Dimensional Shapes **Chapter 15:** Customary Length, Weight, and Capacity	**Chapter 12:** Area and Perimeter **Chapter 13:** Symmetry	**Chapter 10:** Percent **Chapter 7:** Ratio
May/June	**Chapter 12:** Real-World Problems: Measurements **Chapter 10:** Money **Chapter 17:** Angles and Lines	**Chapter 8:** Adding and Subtracting Decimals **Chapter 14:** Tessellations	**Chapter 14:** Three-Dimensional Shapes **Chapter 12:** Angles **Chapter 15:** Surface Area and Volume

The above timeline is to be used as a guideline to provide a "snapshot" of the year at a glance.

Overview of Mathematics Chapters: Grades 3-5

Chapter 1 Overview – Numbers to 10,000

Grade: 3

Brief Description of Chapter: In this unit students will apply number and place value concepts to count and compare numbers from one to ten-thousand.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • How can change be best represented mathematically? • How are patterns of change related to the behavior of functions?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• word form • standard form • digit • place value chart • place value strip • expanded form • greater than • less than • least • greatest • rule • number line	3.OA.9 SMP.1 SMP.4 SMP.5

Chapter 2 Overview – Mental Math and Estimation

Grade: 3

Brief Description of Chapter: This unit focuses on the use of mental math strategies through the composition and decomposition of numbers (number bonds). Students will use estimation to check the reasonableness of sums and differences.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can we decide when to use an exact answer and when to use an estimate?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • Context is critical when using estimation.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• rounded • estimate • reasonable • over estimate • leading digit • front end estimation	3.NBT.1 3.NBT.2 3.OA.8 SMP.1 SMP.2 SMP.4 SMP.5 SMP.6 SMP.8

Chapter 3 Overview – Addition up to 10,000

Grade: 3

Brief Description of Chapter: This unit focuses on the addition of 4-digit to 4-digit numbers to 10,000 using right-to-left regrouping strategies.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • How can change be best represented mathematically?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• sum • regroup	3.NBT.2 SMP.1 SMP.2 SMP.3 SMP.4 SMP.5 SMP.6 SMP.8

Chapter 4 Overview – Subtraction up to 10,000

Grade: 3

Brief Description of Chapter: This unit focuses on the subtraction of 4-digit from 4-digit numbers up to 10,000 using right-to-left regrouping strategies.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • How can change be best represented mathematically?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• difference • regroup	3.NBT.2 SMP.1 SMP.2 SMP.4 SMP.5 SMP.6 SMP.8

Chapter 5 Overview – Using Bar Models: Addition and Subtraction

Grade: 3	
Brief Description of Chapter: The focus of this unit is to solve real world problems by using bar models and applying addition and subtraction concepts up to 10,000.	
Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can we decide when to use an exact answer and when to use an estimate? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • What makes an algebraic algorithm both effective and efficient? • How can change be best represented mathematically? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • Context is critical when using estimation. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • Reasoning and/or proof can be used to verify or refute conjectures or theorems in algebra. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • Algebraic representation can be used to generalize patterns and relationships.

Chapter 5 Overview – Using Bar Models: Addition and Subtraction (cont'd.)

Key Words/Terminology:	Math Proficiencies Addressed:
• sum • difference • bar model	3.NBT.2 3.OA.8 SMP.1 SMP.2 SMP.3 SMP.4 SMP.6 SMP.8

Chapter 6 Overview – Multiplication Tables of 6, 7, 8, and 9

Grade: 3	
Brief Description of Chapter: In this unit, students will multiply and divide with tables of 6, 7, 8, and 9 using models and known multiplication facts.	
Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can change be best represented mathematically? • How are patterns of change related to the behavior of functions? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • What makes an algebraic algorithm both effective and efficient?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • Reasoning and/or proof can be used to verify or refute conjectures or theorems in algebra.

Chapter 6 Overview – Multiplication Tables of 6, 7, 8, 9 (cont'd.)

Key Words/Terminology:	Math Proficiencies Addressed:
• skip • dot paper • number line • commutative property of multiplication • associative property of multiplication • multiplicative property of one • multiplicative property of zero • array model • area model • equal groups	3.NBT.3 3.OA.1 3.OA.2 3.OA.3 3.OA.4 3.OA.5 3.OA.6 3.OA.7 3.OA.9 SMP.1 SMP.2 SMP.3 SMP.4 SMP.5 SMP.6 SMP.8

Chapter 7 Overview – Multiplication

Grade: 3	
Brief Description of Chapter: In this unit, students will multiply 2 and 3 digit numbers with and without regrouping.	
Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can change be best represented mathematically? • How are patterns of change related to the behavior of functions? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • What makes an algebraic algorithm both effective and efficient?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • Reasoning and/or proof can be used to verify or refute conjectures or theorems in algebra.

Chapter 7 Overview – Multiplication (cont'd.)

Key Words/Terminology:	Math Proficiencies Addressed:
• product	3.NBT.3 3.OA.4 3.OA.5 3.OA.7 3.OA.9 SMP.1 SMP.2 SMP.4 SMP.5 SMP.6 SMP.8

Chapter 8 Overview – Division

Grade: 3	
Brief Description of Chapter: In this unit, students will multiply divide 2 and 3 digit numbers with and without regrouping.	
Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can change be best represented mathematically? • How are patterns of change related to the behavior of functions? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • What makes an algebraic algorithm both effective and efficient?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • Reasoning and/or proof can be used to verify or refute conjectures or theorems in algebra.

Chapter 8 Overview – Division (cont'd.)

Key Words/Terminology:	Math Proficiencies Addressed:
• quotient • remainder • even numbers • odd numbers	3.OA.3 3.OA.4 3.OA.5 3.OA.6 3.OA.7 3.OA.9 SMP.1 SMP.2 SMP.4 SMP.5 SMP.8

Chapter 9 Overview – Using Bar Models: Multiplication and Division

Grade: 3	
Brief Description of Chapter: This unit focuses on solving two-step real world problems involving multiplication and division using bar models.	
Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can change be best represented mathematically? • How are patterns of change related to the behavior of functions? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • What makes an algebraic algorithm both effective and efficient?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • Reasoning and/or proof can be used to verify or refute conjectures or theorems in algebra.

Chapter 9 Overview – Using Bar Models: Multiplication and Division (cont'd.)

Key Words/Terminology:	Math Proficiencies Addressed:
• twice • double	3.OA.3 3.OA.4 3.OA.5 3.OA.6 3.OA.7 3.OA.8 SMP.1 SMP.2 SMP.4 SMP.8

Chapter 10 Overview – Money

Grade: 3	
Brief Description of Chapter: In this unit, students will recognize, read, and write the decimal notation for money. They will add and subtract money with and without regrouping.	
Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can change be best represented mathematically? • How are patterns of change related to the behavior of functions? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • What makes an algebraic algorithm both effective and efficient?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • Reasoning and/or proof can be used to verify or refute conjectures or theorems in algebra.

Chapter 10 Overview – Money (cont'd.)

Key Words/Terminology:	Math Proficiencies Addressed:
• decimal notation	3.NBT.2 SMP.1 SMP.2 SMP.4 SMP.5 SMP.6 SMP.8

Chapter 11 Overview – Metric Length, Mass, and Volume

Grade: 3

Brief Description of Chapter: In this unit, students will measure and convert length, mass, and volume in metric Chapters.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • How can we decide when to use an exact answer and when to use an estimate? • How can be measurements be used to solve problems? • How can measurements be used to solve problems? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • How are patterns of change related to the behavior of functions?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Context is critical when using estimation. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • What we measure affects how we measure it. • Measurements can be used to describe, compare, and make sense of phenomena. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• meter • centimeter • kilometer • distance • kilogram • gram • liter • milliliter • volume • capacity	3.MD.2 SMP.2 SMP.4 SMP.5

Chapter 12 Overview – Real-World Problems: Measurement

Grade: 3

Brief Description of Chapter: This unit focuses on solving two-step real-world problems involving metric units of measurement and the application of the four operations.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can we decide when to use an exact answer and when to use an estimate? • How can be measurements be used to solve problems? • How can measurements be used to solve problems? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • How are patterns of change related to the behavior of functions? • What makes an algebraic algorithm both effective and efficient?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • Context is critical when using estimation. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • What we measure affects how we measure it. • Measurements can be used to describe, compare, and make sense of phenomena. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • Reasoning and/or proof can be used to verify or refute conjectures or theorems in algebra.
Key Words/Terminology:	**Math Proficiencies Addressed:**
n/a	3.NBT.2 3.MD.2 3.OA.3 3.OA.4 3.OA.5 3.OA.6 3.OA.7 SMP.1 SMP.2 SMP.4 SMP.5

Chapter 13 Overview – Bar Graphs and Line Plots

Grade: 3

Brief Description of Chapter: In this unit, students will make bar graphs with scales. They will read and interpret bar graphs to solve real-world problems and use line plots to show how data is grouped, compared and spread.

Essential Questions:	Enduring Understandings:
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can we decide when to use an exact answer and when to use an estimate? • How can be measurements be used to solve problems? • How can change be best represented mathematically? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • How are patterns of change related to the behavior of functions? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • How can the collection, organization, interpretation, and display of data be used to answer questions?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • Context is critical when using estimation. • Measurements can be used to describe, compare, and make sense of phenomena. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • Algebraic representation can be used to generalize patterns and relationships. • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • The message conveyed by the data depends on how the data is collected, represented, and summarized. • The results of statistical investigation can be used to support or refute an argument.

Chapter 13 Overview – Bar Graphs and Line Plots (cont'd.)

Key Words/Terminology:	Math Proficiencies Addressed:
• vertical • horizontal • axis • scale • line plot • survey	3.MD.3 3.MD.4 SMP.1 SMP.2 SMP.3 SMP.5 SMP.6

Chapter 14 Overview – Fractions

Grade: 3

Brief Description of Chapter: In this unit students will develop an understanding of fractions and use them to represent parts of a whole, points or distances on a number line, and parts of a set. Students will find equivalent fractions and add and subtract like fractions.

Essential Questions:	Enduring Understandings:
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How can we decide when to use an exact answer and when to use an estimate? • How can be measurements be used to solve problems? • How can change be best represented mathematically? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • How are patterns of change related to the behavior of functions? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • What makes an algebraic algorithm both effective and efficient?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • Context is critical when using estimation. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • What we measure affects how we measure it. • Measurements can be used to describe, compare, and make sense of phenomena. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • Algebraic representation can be used to generalize patterns and relationships. • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole.

Chapter 14 Overview – Fractions (cont'd.)

Key Words/Terminology:	Math Proficiencies Addressed:
• whole • equal parts • numerator • denominator • equivalent fractions • number line • simplest form • benchmark • like fractions • unlike fractions	3.G.2 3.NF.1 3.NF.2.a 3.NF.2.b 3.NF.3.a 3.NF.3.b 3.NF.3.c 3.NF.3.d 3.MD.4 SMP.1 SMP.2 SMP.3 SMP.4 SMP.5 SMP.6 SMP.7

Chapter 15 Overview – Customary Length, Weight, and Capacity

Grade: 3

Brief Description of Chapter: In this unit, students will measure length, mass, and capacity using customary units and solve real-world problems.

Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • How can we decide when to use an exact answer and when to use an estimate? • How can be measurements be used to solve problems? • How can measurements be used to solve problems? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • How are patterns of change related to the behavior of functions?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Context is critical when using estimation. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • What we measure affects how we measure it. • Measurements can be used to describe, compare, and make sense of phenomena. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally.

Key Words/Terminology:		**Math Proficiencies Addressed:**	
• inch • half inch • foot • yard • mile • ounce	• pound • ton • cup • pint • quart • gallon	3.MD.4 3.MD.7.a 3.MD.7.b 3.MD.7.c	SMP.1 SMP.2 SMP.4 SMP.5 SMP.6

Chapter 16 Overview – Time and Temperature

Grade: 3

Brief Description of Chapter: In this unit, students will tell time to the nearest minute, convert time to hours and minutes, add and subtract time, and find elapsed time. Students will also measure and read temperature and then apply knowledge to real-world problems.

Essential Questions:	Enduring Understandings:
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical representations reflect the needs of society across cultures? • How can we decide when to use an exact answer and when to use an estimate? • How can be measurements be used to solve problems? • How can change be best represented mathematically? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • How are patterns of change related to the behavior of functions? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships?	• One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem. • A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers. • Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The magnitude of numbers affects the outcome of operations on them. • In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures. • Context is critical when using estimation. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • What we measure affects how we measure it. • Measurements can be used to describe, compare, and make sense of phenomena. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • Algebraic representation can be used to generalize patterns and relationships. • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships.

Chapter 16 Overview – Time and Temperature (cont'd.)

Key Words/Terminology:	Math Proficiencies Addressed:
• hour • past • minute • to • elapsed time • time line • temperature • thermometer • degrees • Fahrenheit • cold • cool • warm • hot	3.MD.1 3.MD.4 3.MD.7.a 3.MD.7.b 3.MD.7.c SMP.1 SMP.2 SMP.4 SMP.5 SMP.6

Chapter 17 – Angles and Lines

Grade: 3

Brief Description of Chapter: In this unit, students will recognize angles, perpendicular, and parallel lines. They will explore these elements in plane shapes as well as three-dimensional real life objects.

Essential Questions:	Enduring Understandings:
• How can spatial relationships be described by careful use of geometric language? • How do geometric relationships help us solve problems and/or make sense of phenomena? • How can be measurements be used to solve problems? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships?	• Geometric properties can be used to construct geometric figures. • Geometric relationships provide a means to make sense of a variety of phenomena. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • What we measure affects how we measure it. • Measurements can be used to describe, compare, and make sense of phenomena. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• point • line • end point • line segment • angle • right angle • greater than • less than • perpendicular lines • parallel lines	3.G.1 SMP.1 SMP.2 SMP.3 SMP.5 SMP.6

Chapter 18 – Two-Dimensional Shapes

Grade: 3

Brief Description of Chapter: In this unit, students will learn about lines and angles that lead to the identification of angles and the classification of polygons. Students will determine the congruency and symmetry of figures based on certain properties.

Essential Questions:	**Enduring Understandings:**
• How can spatial relationships be described by careful use of geometric language? • How do geometric relationships help us solve problems and/or make sense of phenomena? • How can be measurements be used to solve problems? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • What situations can be analyzed using transformations and symmetries? • How can attributes be used to classify data/objects?	• Geometric properties can be used to construct geometric figures. • Geometric relationships provide a means to make sense of a variety of phenomena. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • What we measure affects how we measure it. • Measurements can be used to describe, compare, and make sense of phenomena. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Shape and area can be conserved during mathematical transformations. • Grouping by attributes (classification) can be used to answer mathematical questions.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• plane figure • open figure • closed figure • polygon • vertex • quadrilateral • parallel • rhombus • parallelogram • pentagon • octagon • tangram • slide • flip • turn • rotate • congruent • symmetry • line of symmetry	3.G.1 SMP.1 SMP.2 SMP.3 SMP.5 SMP.6

Chapter 19 Overview – Area and Perimeter

Grade: 3

Brief Description of Chapter: In this unit, students will find the area and perimeter of figures in metric and customary units. Concepts of area and perimeter will be used to solve real-world problems.

Essential Questions:	**Enduring Understandings:**
• How can spatial relationships be described by careful use of geometric language? • How can be measurements be used to solve problems? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships? • What makes an algebraic algorithm both effective and efficient? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?	• Geometric properties can be used to construct geometric figures. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • What we measure affects how we measure it. • Measurements can be used to describe, compare, and make sense of phenomena. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • Algebraic representation can be used to generalize patterns and relationships.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• area • square units • square centimeter • square inch • square meter • square foot • perimeter	3.NBT.2 3.MD.5.a 3.MD.5.b 3.MD.6 3.MD.7.d 3.MD.8 SMP.1 SMP.2 SMP.3 SMP.5 SMP.6 SMP.8

Chapter 1 Overview – Place Value of Whole Numbers

Grade: 4

Brief Description of Chapter: Students will extend their learning to 5-digit numbers. Place value chart is a good way to reinforce such place-value concepts. Once students are familiar with place value concepts, they will not have too much difficulty comparing larger numbers up to 100,000, and stating which number is greater and which is less. Students apply this skill of comparing numbers to order a given set of numbers. Students are also encouraged to use thinking skills such as identifying patterns and relationships in number patterns. With these skills, students can find the rule in a number pattern and then continue the pattern.

Essential Questions:	**Enduring Understandings:**
• What are the various ways we can represent numbers? • How can we compare and contrast numbers?	• Understanding place value of whole numbers up to 100,000. • Represent numbers to 100,000 is various ways. • Extend understanding of place value to 6-digit numbers. • Apply understandings of comparing numbers to larger numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• digit • place value • compare • number pattern • place-value chart • ten thousand • hundred thousand • standard form • word form • expanded form greater than (>) • less than (<) • more than • greatest • least • order	4.NBT.1 4.NBT.2 4.NBT.4 4.OA.5 CC.K-12.MP.1 CC.K-12.MP.3 CC.K-12.MP.4 CC.K-12.MP.5 CC.K-12.MP.6 CC.K-12.MP.7

Chapter 2 Overview – Estimation and Number Theory

Grade: 4

Brief Description of Chapter: Chapter 2 focuses on estimating quickly and accurately enabling students to assess the reasonableness of their results. Students will learn various methods of estimating, emphasizing that no one method is "correct". Number theory, the study of whole numbers and their properties, will be introduced including factors, multiples, least common multiples (LCMs) and greatest common factors (GCFs).

Essential Questions:	**Enduring Understandings:**
• How can we use estimations to determine if an answer is reasonable? • How do we determine if estimates or exact answers are necessary when solving real world problems? • How can our understanding of factors and multiples help us estimate products and quotients?	• Finding factors and multiples of numbers and using them to estimate products and quotients. • Using estimation skills to determine if an answer is reasonable. • Determining when to use estimates or exact answers and applying estimation skills to the real world. • Use basic multiplication and division facts to find factors and multiples.

Key Words/Terminology:		**Math Proficiencies Addressed:**
• estimate • reasonable • front-end estimation • rounding • product • quotient • factor • common factor • greatest common factor	• prime number • composite number • whole number • multiple • common multiple • least common multiple • consecutive whole numbers	4.NBT.1 4.NBT.2 4.NBT.3 4.NBT.4 4.OA.3 4.OA.4 CC.K-12.MP.1 CC.K-12.MP.2 CC.K-12.MP.3 CC.K-12.MP.4 CC.K-12.MP.6

Chapter 3 Overview – Whole Number Multiplication and Division

Grade: 4

Brief Description of Chapter: Chapter 3 focuses on multiplication and division. Initially, the place value concept is used to facilitate student understanding of multiplication and division before they are introduced to the vertical form. Students will apply their learning to solve real-world problems.

Essential Questions:	**Enduring Understandings:**
• How can our knowledge of place value help us multiply and divide numbers? • How can we use estimation to determine if an answer is reasonable? • What is the relationship of multiplication and division?	• Using place value to multiply and divide multi-digit numbers. • Extend understanding of place value to multiple and divide numbers. • Discover that division is the inverse of multiplication. • Use estimation to check the reasonableness of an answer.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• round • estimate • product • regroup • quotient • remainder	4.NBT.1 4.NBT.2 4.NBT.3 4.NBT.4 4.NBT.5 4.NBT.6 4.OA.1 4.OA.2 4.OA.3 CC.K-12.MP.1 CC.K-12.MP.2 CC.K-12.MP.3 CC.K-12.MP.4 CC.K-12.MP.5 CC.K-12.MP.6 CC.K-12.MP.7 CC.K-12.MP.8

Chapter 4 Overview – Tables and Line Graphs

Grade: 4

Brief Description of Chapter: In this unit students will construct tables and graphs as visual tools for showing and analyzing data. Students will compare, analyze, and classify data while looking for patterns and trends. Students will be introduced to line graphs to show how data flows continuously from left to right.

Essential Questions:	**Enduring Understandings:**
• How can we use graphs and tables to collect, organize and present data? • How can we use graphs and tables to analyze data?	• Showing and analyzing data in graphs and tables • Collect and organize data and representing data in a form that is easy to read. • Use four operations of whole numbers when analyzing data presented in graphs and table to solve problems.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• data • table • tally chart • row • column • intersection • line graph • horizontal axis • vertical axis	4.NF.3c CC.K-12.MP.1 CC.K-12.MP.2 CC.K-12.MP.3 CC.K-12.MP.4 CC.K-12.MP.5 CC.K-12.MP.6 CC.K-12.MP.7

Chapter 5 Overview – Data and Probability

Grade: 4

Brief Description of Chapter: This unit focuses on how to use different tools to analyze data, such as average, median and probability. By applying their understanding of place value and graphs, students will develop and use stem-and-leaf plots to find mean, median, mode, and range. Students will learn to express the probability of an outcome as a fraction and they will be give opportunities to solve real-world problems to check their understanding and make projections based on the data they are given.

Essential Questions:	**Enduring Understandings:**
• What various tools do we use to analyze data? • How is data used to predict outcomes?	• Use various tools to analyze data. • Apply understanding of place value and graphs to develop and use stem-and leaf plots. • Use data to predict outcomes. • Solve real-world problems and apply understanding of data analysis.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• average • mean • median • mode • range • line plot • stem-and-leaf plot • outlier • outcome • certain • more likely • equally likely • less likely • impossible • favorable outcome • probability	4.NF.1 4.OA.3 CC.K-12.MP.1 CC.K-12.MP.3 CC.K-12.MP.4 CC.K-12.MP.5 CC.K-12.MP.6 CC.K-12.MP.7

Chapter 6 Overview – Fractions and Mixed Numbers

Grade: 4

Brief Description of Chapter: This unit focuses on how to add and subtract like and unlike factions with and without renaming. Fractions of a set and how to apply this knowledge to solve real-world problems will be introduced. Concrete materials (manipulatives) are used to illustrate the addition and subtraction of fractions and used throughout the unit to refer to fractions especially when converting improper fractions to mixed numbers and vice versa.

Essential Questions:	**Enduring Understandings:**
• How does renaming fractions help us to compare, contrast, add, and subtract them? • What is the relationship between a fraction and its whole?	• Naming wholes and parts of a whole using fractions and mixed numbers. • Adding and subtracting fractions and mixed numbers. • Extend knowledge of multiplication an division facts to rename improper fractions and mixed numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• numerator • denominator • equivalent fraction • unlike fraction • mixed number • simplest form • improper fraction	4.MD.1 4.MD.2 4.MD.4 4.NF.1 4.NF.2 4.NF.3a 4.NF.3b 4.NF.3d 4.NF.4a 4.NF.4b 4.NF.4c 4.OA.2 4.OA.3 CC.K-12.MP.1 CC.K-12.MP.2 CC.K-12.MP.3 CC.K-12.MP.4 CC.K-12.MP.6 CC.K-12.MP.7

Chapter 7 Overview – Decimals

Grade: 4

Brief Description of Chapter: In this unit, students learn to recognize, compare, and round decimals in tenths and hundredths. Decimals will be represented as an extension of the base-ten system of writing whole numbers. Students will represent numbers less than 1 and between consecutive numbers. Students are taught how to use money as a representation of decimals and fractional parts of a whole. The unit will focus on the connection between equivalent fractions and decimals through models and number lines.

Essential Questions:	**Enduring Understandings:**
• How can we show the relationship between a part and a whole with a decimal? • What is the relationship between mixed numbers and decimals?	• Understand decimals as an extension of place-value notation. • Amounts are parts of a whole using decimals. • Decimal points are used to separate whole numbers and the fractional part.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• tenth • decimal form • decimal point • expanded form • hundredth • placeholder zero • more than • less than • greater than • least • greatest • order • round • equivalent fraction	CC.K-12.MP.1 CC.K-12.MP.2 CC.K-12.MP.3 CC.K-12.MP.4 CC.K-12.MP.6 CC.K-12.MP.7 4.MD.1 4.NBT.1 4.NBT.2 4.NF.6 4.NF.5 4.NF.7 4.OA.5 4.NF.1 4.NF.3a

Chapter 8 Overview – Adding and Subtracting Decimals

Grade: 4	
Brief Description of Chapter: This unit focuses on adding and subtracting decimals up to two decimal places. Students will use the algorithms for whole numbers, numbers aligned vertically, and lining up the decimal points correctly before calculating.	
Essential Questions:	**Enduring Understandings:**
• How can you use whole number algorithms to add and subtract decimals?	• Adding and subtracting decimals using same algorithms as whole numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• decimal	4.MD.1 4.MD.2 4.NBT.1 4.NBT.2 4.NBT.4 4.NF.5 4.OA.3 CC.K-12.MP.1 CC.K-12.MP.4 CC.K-12.MP.7 CC.K-12.MP.8

Chapter 9 Overview – Angles

Grade: 4

Brief Description of Chapter: This unit focuses on angles and how they are formed when two rays or sides of a figure meet. Students learn how to estimate angle measures and measure angles with a protractor. Students will also be introduced to the degree symbol. They will learn to draw angles to 180°. Students will learn the relationship between rotations and angles.

Essential Questions:	**Enduring Understandings:**
• How can estimation help us more accurately measure angle? • What is the relationship between fractional turns and angle measures?	• Understand that angles can be seen and measured when two rays or sides of a shape meet. • Angles have measure. • Protractors are used to measure angles. • Fractions of a turn are equivalent to angle measures.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• ray • vertex • protractor • degree • inner scale • outer scale • acute angle • obtuse angle • straight angle • turn	CC.K-12.MP.1 CC.K-12.MP.2 CC.K-12.MP.3 CC.K-12.MP.4 CC.K-12.MP.5 CC.K-12.MP.6 4.G.1 4.MD.5 4.MD.5a 4.MD.6 4.MD.7 4.MD.5b

Chapter 10 Overview – Perpendicular and Parallel Line Segments

Grade: 4

Brief Description of Chapter: This unit extends student knowledge of line segments and continues to explore parallel and perpendicular line segments. Students will learn to use a protractor or a drawing triangle to draw perpendicular line segments when a grid is not provided. Students will build on their knowledge of perpendicular and parallel lines to identify horizontal and vertical lines.

Essential Questions:	Enduring Understandings:
• What is the difference between perpendicular and parallel line segments? • What is the difference between horizontal and vertical lines?	• Understanding that line segments go up and down and from side to side in every direction. • A drawing triangle can be used to draw perpendicular and parallel line segments. • Identify horizontal and vertical lines.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• perpendicular line segments • drawing triangle • parallel line segments • base • horizontal lines • vertical lines	CC.K-12.MP.1 CC.K-12.MP.3 CC.K-12.MP.5 CC.K-12.MP.6 4.G.1 4.G.2

Chapter 11 Overview – Squares and Rectangles

Grade: 4

Brief Description of Chapter: This unit focuses on the properties of squares and rectangles. Students will apply their knowledge of angles, perpendicular lines, and parallel line segments to identify and define squares and rectangles. Students will learn to break up shapes made up of square and rectangles using concrete materials to reinforce this concept. Students will also learn to find measures of adjacent angles and how to find the side lengths of composite figures by using the properties of a square.

Essential Questions:	**Enduring Understandings:**
• What are the properties of squares and rectangles? • How can we use squares and rectangles to find unknown angle measures and lengths of sides?	• Understand the properties of squares and rectangles. • Identify squares and rectangles based on properties. • Shapes can be decomposed into squares and rectangles. • Unknown angle measures and side lengths of figures can be found using the properties of squares and rectangles.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• square • right angle • rectangle • parallel	CC.K-12.MP.1 CC.K-12.MP.3 CC.K-12.MP.5 CC.K-12.MP.6 CC.K-12.MP.7 4.G.2 4.MD.1 4.MD.2 4.OA.3 4.MD.7

Chapter 12 Overview – Area and Perimeter

Grade: 4

Brief Description of Chapter: The primary focus of this unit is learning to find the area and perimeter of figures using formulas. Students learn to connect the model of counting squares in and around a figure as a model for using the formulas.

Essential Questions:	Enduring Understandings:
• How do you find the area of a rectangle using a formula? • How can decomposing figures into squares and rectangles help us find unknown lengths of side?	• Area and perimeter of a figure can be found by counting squares or using a formula. • By decomposing figures into squares and rectangles, unknown side lengths of a figure can be found.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• length • width • composite figure	CC.K-12.MP.1 CC.K-12.MP.2 CC.K-12.MP.3 CC.K-12.MP.4 CC.K-12.MP.5 CC.K-12.MP.6 CC.K-12.MP.7 CC.K-12.MP.8 4.MD.1 4.MD.2 4.MD.3 4.OA.3

Chapter 13 Overview – Symmetry

Grade: 4

Brief Description of Chapter: The primary focus of this unit is to identify lines of symmetry of figures and to make symmetric shapes and patterns. Students will apply knowledge from previous units on drawing, analyzing, comparing, and classifying two-dimensional shapes based on attributes and properties to solve problems involving congruence and symmetry. Students will experiment with making their own symmetric figures and identify figures with rotational symmetry.

Essential Questions:	**Enduring Understandings:**
• What is symmetry? • What is rotational symmetry? • How can you identify lines of symmetry?	• Understanding line symmetry and rotational symmetry and making symmetric shapes ad patterns. • Figures can have symmetry and rotational symmetry. • Folding and cutting patterns can be used to understand line symmetry and rotational symmetry.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• line of symmetry • symmetric figure • rotation • rotational symmetry • center of rotation • clockwise • counter-clockwise	CC.K-12.MP.1 CC.K-12.MP.3 CC.K-12.MP.6 CC.K-12.MP.7 4.OA.5 4.G.3

Chapter 14 Overview – Tessellations

Grade: 4

Brief Description of Chapter: The primary focus of this unit is to recognize tessellations, identify the repeated shapes used in a tessellation and recognize shapes that can tessellate. Students will learn to make tessellations with a given shape and draw tessellations on grid paper.

Essential Questions:	**Enduring Understandings:**
• How do you create a tessellation? • What does it mean to slide, rotate, and flip a shape?	• Identify tessellations as patterns formed by repeated shapes to cover a surface without gaps or overlaps. • Patterns are used to form tessellations.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• tessellation • repeated shape • slide • rotate • flip • modify	CC.K-12.MP.1 CC.K-12.MP.3 CC.K-12.MP.6 4.OA.5

Chapter 1 Overview – Whole Numbers

Grade: 5

Brief Description of Chapter: Students learn to represent 6 digit and 7 digit numbers in three forms. Students will explore place value through comparing and ordering numbers. Students will recognize the relationship between positive and negative numbers. In addition, students will estimate sums, differences, products and quotients through a variety of strategies.

Essential Questions:	**Enduring Understandings:**
• How can we compare and contrast numbers? • How can we decide when to use an exact answer and when to use an estimate?	• Place value to numbers through millions in various contexts • Writing numbers in standard form, word form, and expanded form • Notice number patterns by comparing numbers • Adopt strategies for estimating including front-end with adjustment and number lines
Key Words/Terminology:	**Math Proficiencies Addressed:**
• hundred thousand • standard form • word form • periods • million • place value • expanded form • greater than • less than • round • estimate • front end estimation with adjustment • compatible numbers	5.NBT.1

Chapter 2 Overview – Whole Number Multiplication and Division

Grade: 5

Brief Description of Chapter: Students will learn the basic functions of a calculator, multiply and divide using patterns and conventional algorithms, simplify numeric expressions using the order of operations and solve real-world problems involving multiplication and division. Students will also understand and apply the Distributive and Associative Properties of Multiplication.

Essential Questions:	**Enduring Understandings:**
• What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How are patterns of change related to the behavior of functions? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?	• Use a calculator to perform the four operations on whole numbers. • Multiply numbers by 10, 100, 1000 using patterns and multiply numbers up to 4 digits by 2 digit numbers using conventional algorithms. • Round numbers to estimate products and use them to check the reasonableness of their answers. • Divide numbers by 10, 100, 1000 using patterns and divide numbers up to 4 digits by 2 digit numbers using conventional algorithms. • Explore the inverse relationship of multiplication and division. • Simplify numeric expressions using the order of operations • Solve real world multiplication and division problems using tools and strategies including bar models and organized lists.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• product • factor • quotient • dividend • divisor • remainder • numeric expression • order of operations	5.OA.1 5.OA.2 5.OA.3 5.NBT.1 5.NBT.2 5.NBT.5 5.NBT.6

Chapter 3 Overview – Fractions and Mixed Numbers

Grade: 5

Brief Description of Chapter: In this unit, students will learn to add and subtract unlike fractions and mixed numbers. Students will also learn the relationships between fractions, mixed numbers, division expressions and decimals.

Essential Questions:	**Enduring Understandings:**
• How do operations affect numbers? • How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can we use physical models to clarify mathematical relationships?	• Add and subtract unlike fractions and mixed numbers by rewriting them with like denominators. • Explore the relationships and equivalences among fractions, mixed numbers, division expressions, and decimals, before they add and subtract mixed numbers. • Translate real world problems into division expressions and solve them.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• multiple • least common multiple • least common denominator • equivalent fractions • benchmark • division expression • mixed number	5.NF.1 5.NF.2 5.NF.3

Chapter 4 Overview – Multiplying and Dividing Fractions and Mixed Numbers

Grade: 5

Brief Description of Chapter: In this unit, students learn how to multiply and divide whole numbers, proper fractions, improper fractions and mixed numbers in any combination. Students will apply these strategies to solve real world problems.

Essential Questions:	**Enduring Understandings:**
• How can we use physical models to clarify mathematical relationships? • What makes a computational strategy both effective and efficient? • How do operations affect numbers? • How do mathematical ideas interconnect and build on one another to produce a coherent whole?	• Multiplying proper fractions using models and apply to real world problems. • Multiply an improper by an improper or proper fraction, a mixed number by a whole number, and apply to real world problems. • Divide a fraction by a whole number and apply to real world problems.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• product • common factor • proper fraction • improper fraction • mixed number • reciprocal	5.NF.4a 5.NF.4b 5.NF.5a 5.NF.6 5.NF.7.a 5.NF.7.c

Chapter 5 Overview – Algebra

Grade: 5

Brief Description of Chapter: In this unit, students will learn to write both numerical and algebraic expressions and equations that correspond to given situations. They will also learn to simplify and evaluate expressions, and use expressions, inequalities, and equations to solve real-world problems. They will learn that variables represent numbers whose exact values are not yet specified.

Essential Questions:	**Enduring Understandings:**
• How can we best represent and verify geometric/algebraic relationships? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships?	• Use algebraic expressions to describe situations and solve real-world problems. • Simplify and evaluate the expressions to solve problems.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• numerical expression • variable • algebraic expression • evaluate • simplify • like terms • inequality • equation • true • equality properties • solve	5.OA.1 5.OA.2

Chapter 6 Overview – Area of a Triangle

Grade: 5

Brief Description of Chapter: In this unit, students learn that base and height are measurements obtained from a triangle. These measurements can be used to find the area of the triangle. Students compare the area of a triangle with the area of its corresponding rectangle. Using the area of a rectangle, they define the formula for the area of a triangle. Students apply their knowledge that area is the amount of space covered by a particular region.

Essential Questions:	**Enduring Understandings:**
• How can measurements be used to solve problems? • How can we best represent and verify geometric/algebraic relationships?	• Explore various types of triangles. • Introduce the idea of finding a base and a corresponding perpendicular height of any given triangle. • Apply knowledge of the base and height pair to find the area of a triangle, including using area of the corresponding rectangle.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• vertex • side • angle • base • height • perpendicular • area • right triangle • acute triangle • obtuse triangle	5.G.3 5.G.4

Chapter 7 Overview – Ratio

Grade: 5	
Brief Description of Chapter: In this unit, students will learn to compare two numbers by using division and express this comparison as a ratio. They apply the concepts of equivalent ratios, part-whole, part-part, and whole-part comparisons to solve one and two step problems involving ratios.	
Essential Questions:	**Enduring Understandings:**
• How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • How can we compare and contrast numbers? • How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can the collection, organization, interpretation, and display of data be used to answer questions?	• Compare the relative sizes of two numbers or quantities using ratios (division). • Use equivalent ratios to find the simplest form of a ratio and missing terms in a ratio and apply these skills to solve real-world problems. • Express ratios in fraction form.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• ratio • term • equivalent ratios • simplest form • greatest common factor	5.NF.5.a 5.NBT

Chapter 8 Overview – Decimals

Grade: 5	
Brief Description of Chapter: In this unit, students will learn how to read and write decimals through thousandths, identify the relationship between fractions and decimals, compare and order decimals, and round decimals to the nearest hundredth. They will recognize that decimals are another way of writing fractions or mixed numbers. In addition, they will learn that the decimal notation is an extension of the base-ten system of whole numbers.	
Essential Questions:	**Enduring Understandings:**
• How can we compare and contrast numbers? • How do mathematical ideas interconnect and build on one another to produce a coherent whole?	• Represent thousandths as three-place decimals or as fractions. • Compare and order decimals to three places.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• thousandths • equivalent	5.NBT.1 5.NBT.3.a 5.NBT.3.b 5.NBT.4 5.NBT.7

Chapter 9 Overview – Multiplying and Dividing Decimals

Grade: 5	
Brief Description of Chapter: In this unit, students use patterns to help them multiply and divide decimals by 1-digit whole numbers, tens, hundred, and thousands. Students make reasonable estimates of decimal sums, differences, products, and quotients. Students will extend their knowledge of multiplication and division of whole numbers to the multiplication and division of decimals. Connections will be made to the base-ten system. Real-world problems involving measurement and money will be explored.	
Essential Questions:	**Enduring Understandings:**
• How can measurements be used to solve problems? • How do operations affect numbers? • How is place value through the base-ten system represented in decimal form?	• Multiplying and dividing decimals.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• Dividend • Per unit • Estimate • Divisor	5.NBT.2 5.NBT.1 5.NBT.4 5.NBT.7 5.NF.5.b

Chapter 10 Overview – Percent

Grade: 5	
Brief Description of Chapter: In this unit, students are introduced to the concept of percent. They learn that a percent can be expressed as a fraction with a denominator of 100 and study the relation between fractions, decimals, and percents. They find the percent of a number and solve real-world problems involving percent including concepts such as sales tax, meals tax, discount, and interest.	
Essential Questions:	**Enduring Understandings:**
• How do mathematical ideas interconnect and build on one another to produce a coherent whole? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?	• Learn the meaning of percent and the relationships between percents, fractions, and decimals. • Find the percent of a number and solve real-world problems involving percent, including those involving sales tax, meals tax, discount, and interest.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• percent • sales tax • meals tax • discount • interest	5.NF

Chapter 11 Overview – Graphs and Probability

Grade: 5

Brief Description of Chapter: In this unit, students learn to make and interpret double bar graphs, as well as graph linear equations on coordinate grids. Students learn to find and compare experimental and theoretical probabilities.

Essential Questions:	**Enduring Understandings:**
• How can the collection, organization, interpretation, and display of data be used to answer questions? • How can experimental and theoretical probabilities be used to make predictions or draw conclusions? • How can you determine the likelihood of an outcome based on possible combinations?	• Displaying data in a graph highlights some features of the data. • Probability measures the likelihood of an event occurring.

Key Words/Terminology:		**Math Proficiencies Addressed:**
• double bar graph • key • coordinate grid • x-axis • y-axis • coordinate planes • coordinates • ordered pair • x-coordinate • y-coordinate • origin	• straight line graph • equation • combinations • organized list • tree diagram • favorable outcome • theoretical probability • experimental probability	5.G.1 5.G.2 5.MD.2 5.MD.1

Chapter 15 Overview – Surface Area and Volume

Grade: 5	
Brief Description of Chapter: In this unit, students build solids using unit cubes, draw cubes and rectangular prisms on dot paper, find the surface areas of cubes and prisms, and find the volumes of cubes, rectangular prisms and liquids in rectangular containers. Students learn to recognize area and volume as an attribute of two-dimensional and three-dimensional space respectively.	
Essential Questions:	**Enduring Understandings:**
• How can measurements be used to solve problems? • How can we use geometrical models to describe physical relationships?	• Finding the surface area of prisms and the volumes of rectangular prisms, and relating these volumes to liquid measures.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• unit cube • surface area • right triangle	5.MD.1 5.MD.3.a 5.MD.3.b 5.MD.4 5.MD.5.a 5.MD.5.b 5.MD.5.c 5.NBT.5

Chapter 12 Overview – Angles

Grade: 5	
Brief Description of Chapter: In this unit, students are introduced to the properties of angles on a line, angles at a point, and vertical angles. Students will practice measuring angles, as well as drawing them to scale. In addition, students will see the relevance of angles in their daily lives.	
Essential Questions:	**Enduring Understandings:**
• How can measurements be used to solve problems?	• The sum of angle measures on a line is 180 degrees. • The sum of angle measures at a point is 360 degrees. • Vertical angles have equal measures.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• angles on a line • angles at a point • intersecting lines • vertical angles	5.MD

Chapter 13 Overview –
Properties of Triangles and Four-sided Figures

Grade: 5

Brief Description of Chapter: In this unit, students learn the properties of triangles and four-sided figures. They learn to identify special triangles such as right, isosceles, and equilateral triangles characterized by angle measures or side lengths. They learn that the sum of three angle measures in a triangle is 180 degrees. Students build on their knowledge of squares and rectangles by extending to parallelograms, rhombuses, and trapezoids.

Essential Questions:	**Enduring Understandings:**
• How can measurements be used to solve problems? • How can we best represent and verify geometric/algebraic relationships? • How can spatial relationships be described by careful use of geometric language?	• Properties of geometric figures state relationships among angles or sides of the figures. • Triangles and four-sided figures have their own special properties.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• equilateral triangle • isosceles triangle • scalene triangle • right triangle • obtuse triangle • acute triangle • parallelogram • rhombus • trapezoid	5.G

Chapter 14 Overview – Three-Dimensional Shapes

Grade: 5

Brief Description of Chapter: In this unit, students learn to recognize three-dimensional solid shapes and identify nets that can form some of these solids. The solids emphasized in this unit are prisms, pyramids, cylinders and cones.

Essential Questions:	**Enduring Understandings:**
• How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships?	• Identifying and classifying solid figures by the number of faces, edges, and vertices. • Identifying nets of prisms, pyramids and cylinders.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• face • base • edge • vertex • prism • rectangular prism • triangular prism • pyramid • square pyramid • triangular pyramid • net • cylinder • sphere • cone	5.MD

Math Pacing Guide: Grades 6-8

	Grade 6	Grade 7	Grade 8
September	**Chapter 1:** Positive Numbers and the Number Line	**Chapter 1:** The Real Number System	**Chapter 3:** Algebraic Linear Equations
	Chapter 2: Negative Numbers and the Number Line	**Chapter 2:** Rational Number Operations	
October	**Chapter 3:** Multiplying and Dividing Fractions and Decimals		**Chapter 4:** Lines and Linear Equations
November	**Chapter 4:** Ratio	**Chapter 3:** Algebraic Equations	**Chapter 5:** Systems of Linear Equations
			Chapter 6: Functions
December	**Chapter 5:** Rates	**Chapter 4:** Algebraic Equations and Inequalities	
January	**Chapter 6:** Percent		**Chapter 1:** Exponents
		Chapter 5: Direct and Inverse Proportions	**Chapter 2:** Scientific Notation
			Chapter 7: The Pythagorean Theorem
February	**Chapter 7:** Algebraic Expressions	**Chapter 7:** Geometric Construction	
		Chapter 9: Statistics	**Chapter 8:** Geometric Transformations
March	**Chapter 8:** Equations and Inequalities **Chapter 9:** The Coordinate Plane	**Chapter 10:** Probability	
April	**Chapter 10**: The Area of Polygons **Chapter 12:** Surface Area and Volume of Solids	**Chapter 6:** Angle Properties and Straight Lines	**Chapter 9:** Congruence and Similarity
May	**Chapter 13:** Introduction to Statistics **Chapter 14:** Measures of Central Tendency	**Chapter 8:** Volume and Surface Area of Solids	**Chapter 10:** Statistics
June	**Chapter 11:** Circumference and Area of a Circle	**Chapter 7:** Geometric Construction	**Chapter 11:** Probability

The above timeline is to be used as a guideline to provide a "snapshot" of the year at a glance.

Overview of Mathematics Chapters: Grades 6-8

Chapter 1 Overview – Positive Numbers and the Number Line

Grade: 6

Brief Description of Chapter: The big ideas in this chapter are whole numbers, fractions, and decimals are numbers that can be represented in multiple ways.

Essential Questions:	Enduring Understandings:
• How do you represent numbers on a number line? • How do you write statements of inequality? (<,>,=) • How can we identify prime numbers? • How do you find factors and multiples of a whole number? • How can we use the order of operations to simplify a numerical expression? • How can we use geometric models to show exponents, i.e. squares and cubes?	• A number line will help students compare positive and negative numbers and will show the relative value. • Students will recall that prime numbers have only two factors, itself and 1. • A multiple of a number is the product of that number and any other whole number. • The knowledge of prime factorization will allow students to find the greatest common factor and least common multiple.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• base of an exponent • common factors • common multiples • composite numbers • cube • cube root • greatest common factor • least common multiple • order of operations • perfect cube • perfect square • positive/negative number • square root	6.NS.4 6.NS.6 6.NS.7a 6.EE.1 6.EE.2c 8.EE.2

Chapter 2 Overview – Negative Numbers and the Number Line

Grade: 6	
Brief Description of Chapter: The big ideas in this chapter focus on the following: Negative numbers are the opposites of positive numbers. For every positive number, there is a corresponding negative number. Students can write statements of equality using the number line.	
Essential Questions:	**Enduring Understandings:**
• How do you recognize positive and negative numbers in real-world situations? • How do you represent numbers on a number line? • How do you use the symbols <,>, = to compare numbers? • How do we use absolute values to interpret real-world situations?	• Students will represent and compare positive and negative numbers on a number line. • Students will understand that every non-zero number has an opposite. • Absolute value represents the distance a number is away from zero. The students realize it can not be a negative number unless it is zero.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• absolute value • negative number • opposite	6.NS.6 6.NS.6a 6.NS.7a 6.NS 7b 6.NS.7c

Chapter 3 Overview – Multiplying and Dividing Fractions and Decimals

Grade: 6

Brief Description of Chapter: The big idea in this chapter is whole number concepts can be extended to fractions and decimals when more precise calculations are needed. The students add and subtract decimals, express improper fractions as mixed numbers and the reverse concept. The students also practice multiplying a fraction by another fraction.

Essential Questions:	**Enduring Understandings:**
• How do you divide a whole number by a fraction, fraction by fraction, and a fraction by an improper fraction or a mixed number? • How do you multiply tenths and hundredths by a whole number, tenths by tenths, and decimals by decimals? • How do you divide a whole number by a decimal with one decimal place, with two decimal places? • How do you divide tenths by tenths, hundredths by hundredths and hundredths by tenths? • How can you multiply and divide decimals to solve real-world problems? • How can you divide a whole number by a fraction to solve multi-step problems? • How to decide which is more appropriate, rounding up or rounding down?	• Two numbers whose product equals 1 are called reciprocals • Dividing a number is the same as multiplying by the reciprocal of that number. • Before finding the reciprocal of a whole number or a mixed number, you first need to write it as an improper fraction. • Commutative property of multiplication states that two or more numbers can be multiplied in any order. • When finding multiples using a number line, recall that zero is not a multiple and that one must count the number of jumps, not count the starting point. • Add the number of decimal places in the factors to decide how many decimal places the product will have. • When dividing decimals students will understand that the dividend and the divisor must be multiplied by the same multiple of ten. (The decimal points must be moved the same number of places to the right.)
Key Words/Terminology:	**Math Proficiencies Addressed:**
• interval (p.89) • reciprocal • tenths, hundredths, thousandths	6.NS.1 6.NS.2 6.NS.3

Chapter 4 Overview – Ratios

Grade: 6

Brief Description of Chapter: The big idea in this chapter is to use a ratio to compare two quantities and to use ratios to solve problems.

Essential Questions:	**Enduring Understandings:**
• How do you use ratio to describe a relationship between two quantities? • How do we use the concept of unit rate to determine value of one? • How can we use tables to show equivalent ratios and missing values in the table? • How can students determine the unknown value in a proportion? • How can we use ratio reasoning to convert units?	• Students must understand that the order of terms in ratios matters. • Ratios must be changed to equivalent ratios in order to get a common term. • You can write equivalent ratios by multiplying or dividing the terms of a ratio by the same factor. • A pair of equivalent ratios forms a proportion. • When comparing measurement quantities in ratios, both quantities must be expressed using the same units. i.e., convert millimeters to centimeters, feet to inches, etc. • Use division to determine a unit rate. • To find a missing term in a proportion, multiply the known values divided by the unknown.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• equivalent ratios • proportion • ratio • simplest form of a ratio • term of a ratio • unitary method/unit rate (p.140)	6.RP.1 6.RP.3 6.RP.3a 6.RP.3d

Chapter 5 Overview – Rates

Grade: 6	
Brief Description of Chapter: The big idea in this chapter is to use a rate to compare one quantity to another quantity and to use rates to solve problems.	
Essential Questions:	**Enduring Understandings:**
• How do you express and compute unit rates? • How can you calculate a unit rate? • How do you compare unit rates? • How can you find the speed or rate of travel of a moving object?	• You can use a rate to compare two quantities of different units. • You can use a unit rate to compare a quantity to one unit of a different quantity. • To find a unit rate one must use division. • Distance = rate x time. • When it comes to wise purchasing decisions, shoppers should consider value not just price. • When converting measurement units, always convert to the simplest form i.e., 1 hour = 60 minutes, use the minutes.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• average speed • rate • speed • unit rate	6.NS.1 6.NS.2 6.RP.1 6.RP.2 6.RP.3 6.RP3b 6.RP.3d

Chapter 6 Overview – Percent

Grade: 6

Brief Description of Chapter: The big idea of this chapter is that percents are used to compare quantities expressed per hundred.

Essential Questions:	Enduring Understandings:
• What is the meaning of percent? • How do you find the percent represented by a fraction by multiplying 100%? • How can you express a decimal as a percent? • How can you express a percent as a fraction? • How do you find the quantity represented by the percent? • How do you find the whole given a quantity and its percent? • How do you solve real-world problems using sales tax, commission, interest and interest rate? • How can we solve word problems involving taxes and interest? • How do we solve problems involving markup and discount?	• Find a percent of a quantity as a rate per 100. • A percent is a part-whole comparison in which the whole is divided into 100 equal parts. • 100% is the same value as 1. • Solve problems involving finding the whole, given a part and the percent. • Multiply by a decimal by 100 to find the percent. • When given a fraction divide the numerator by the denominator and multiply by 100. • You can use models to find a percent of a quantity or a percent change.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• base (of a percent) • commission • discount • interest • markup • percent • sales tax	6.RP.3 6.RP3c 7.RP.3

Chapter 7 Overview – Algebraic Expressions

Grade: 6

Brief Description of Chapter: The big idea of this chapter is algebraic expressions can be used to describe situations and real-world problems.

Essential Questions:	Enduring Understandings:
• How do you use a variable to represent unknown numbers? • How do you use a variable to write addition and subtraction expressions? • How do you use a variable to write multiplication and division? • How are algebraic expressions evaluated for given values of the variable? • How can you simplify algebraic expressions? • How do you use the distributive property to expand algebraic expressions? • How can you solve real-world problems using algebraic expressions?	• A letter or variable in an algebraic expression represents an unknown specific number. • Write, read and evaluate expressions where letters stand for numbers. • Identify parts of an expression using mathematic terms. • Expanding and factoring are inverse operations. • Evaluate expressions at specific values of their values. • Apply the properties of operations to generate equivalent expressions. • Use variables to solve real-world problems.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• algebraic expression • coefficient • equivalent expression • evaluate • expand • factor • like terms • simplify • substitute • term • variable	6.EE.2a.b.c. 6.EE.2 6.EE.2c 6.EE.3 6.EE.4 6.EE.6

Chapter 8 Overview – Equations and Inequalities

Grade: 6

Brief Description of Chapter: The big idea in this chapter is equations and inequalities can be used to describe situations and solve real-world problems.

Essential Questions:	**Enduring Understandings:**
• How can we use substitution, addition, subtraction and division to solve algebraic equations? • How do we write a linear equation to represent a given situation? • How can we use tables and graphs to represent linear equations? • How can we determine solutions for inequalities? • How do we write algebraic equations to solve real-world problems?	• Equations can be solved by substitution, by adding, subtracting, multiplying, and dividing each side of the equation by the same nonzero number. • The solution of an equation is a value or values that make the equation true. • A linear equation has a dependent and independent variable. • The solution of an inequality is a set of values that makes the inequality true. • An inequality can be solved by substitution or by graphing on a number line.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• dependent variable • equation • inequality • linear equations • independent variable • solution	6.EE.2a 6.EE2c 6.EE.5 6.EE.7 6.EE.8 6.EE.9

Chapter 9 Overview – The Coordinate Plane

Grade: 6

Brief Description of Chapter: Every point on the coordinate plane can be represented by a pair of coordinates. Students apply this concept to graph real world problems.

Essential Questions:	Enduring Understandings:
• How do you find the coordinates of points on a coordinate plane? • How do you find the lengths of line segments on the x and y axis? • How can we graph an equation on the coordinate plane?	• The x and y axis divide the coordinate plane into four quadrants. • The quadrants are called I, II, III, and IV. • Each point on a coordinate plane can be located by using an ordered pair (x, y). • For any point the x coordinate tells how far to the left or the right of the origin the point is relative to the x-axis. • For any point the y coordinate tells how far up or down of the origin the point is relative to the y-axis. • Points to the left of the y-axis have a negative x coordinate. • Points below the x-axis have a negative y coordinate. • A straight line graph is also called a linear graph. • A linear equation has a straight line graph.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• coordinates • coordinate plane • linear graph • quadrant • x-axis • y-axis	6.G.3 6.NS.6 6.NS.6c 6.NS.7 6.NS7c 6.NS.8 6.RP.3b

Chapter 10 Overview – Area of Polygons

Grade: 6	
Brief Description of Chapter: The area of a polygon can be found by dividing it into smaller shapes and then adding the areas of those shapes.	
Essential Questions:	**Enduring Understandings:**
• How can you derive the formula for triangles and parallelograms, trapezoids? • How do we find the areas of regular polygons? • How can we recognize that a plane figure can be divided into other polygons?	• The area of a triangle is ½ bh. • The area of a parallelogram is bh. • The area of a trapezoid is ½ $h(b_1+b_2)$. • Any polygon can be divided into triangles. • You can find the area of the polygon by calculating the sum of the areas of all the triangles (triangulation). • Composite figures can be divided into shapes such as triangles, parallelograms, and trapezoids.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• base of a triangle • composite figures • formula • height • regular polygon	6.G.1 6.G3 6.EE.2c

Chapter 12 Overview – Surface Area and Volume of Solids

Grade: 6

Brief Description of Chapter: The big ideas in this chapter are the following: area is measured in square units and volume is measured in cubic units and the surface area of a prism or a pyramid is the sum of the areas of its faces. The volume of a prism is the area of its base times its height.

Essential Questions:	**Enduring Understandings:**
• How do you recognize the net of a cube, rectangular prism, triangular prism and square pyramid? • How can you find the surface area of a cube, rectangular prism, triangular prism, and pyramid? • How do you derive and use the formula for the volume of rectangular prism? • How do we form cross sections of prisms? • How can we use a formula to find the volume of any prism?	• The volume of a rectangular prism is the product of its length, width, and height. • The volume of a prism is the product of its base and its height. • The surface area of a prism or pyramid is the sum of the areas of its faces.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• cross section • net • prism • pyramid • surface area	6.EE.1 6.EE.2c 6.G.2 6.G.4

Chapter 13 Overview – Introduction to Statistics

Grade: 6	
Brief Description of Chapter: The big idea is to know how and why statistics are collected.	
Essential Questions:	**Enduring Understandings:**
• How can you collect and tabulate data? • How do you represent data using a line plot? • What does the shape of a set of data tell us? • How do you represent numerical data using a histogram? • How do you choose an appropriate interval to organize data? • How do you interpret data from a distribution?	• Statistical questions need many pieces of data to answer • The answers to statistical questions require collecting and organizing data. • Organized data can show patterns of shape, range, outliers and symmetry. • The results of statistical investigation can be used to support or refute an argument.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• dot plot • frequency • histogram • outlier • range • skewed • symmetrical	6.SP.1 6SP.2 6.SP.4 6.SP.5 6.SP.5a,b,d.

Chapter 14 Overview – Measures of Central Tendency

Grade: 6	
Brief Description of Chapter: The big idea in this chapter is measures of central tendency can be used to summarize data distributions and help you make decisions in real-world problems.	
Essential Questions:	**Enduring Understandings:**
• How do you understand and find the three measures of central tendency? • How do you decide whether to use mean, median and mode?	• The three measures of central tendency are mean, median and mode. • Each measure is a single number summarizing all the values in the data set. • Mode is most useful in describing non-numeric data. • Mean and median are both used to describe the center of a set of numeric data. • The mean gives more weight to outliers and extreme values than the median does. • In a skewed distribution median and mode will be close together, but the mean will move toward the outliers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• mean • median • mode • outlier	6.SP.2 6.SP.3 6.SP4 6.SP.5 6.SP.5a,c,d

Chapter 11 Overview – Circumference and Area of a Circle

Grade: 6

Brief Description of Chapter: The big idea is that a circle is a geometric figure that has many useful applications in the real world.

Essential Questions:	**Enduring Understandings:**
• How do you identify: the center, the radius, diameter, circumference of a circle? • How can you recognize that half of a circle is a semicircle and that quarter of a circle is a quadrant? • How do we find the lengths of a semicircular arc and the arc of a quadrant? • How can we use the formula for circumference and are of a circle to solve real-world problems?	• All radii of a circle are equal. • Diameter of a circle is twice it's radius. • The number π is the ratio of the circumference to the diameter of a circle.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• arc • center • circumference • compass • diameter • pi (π) • protractor • quadrant of a circle • radii • radius • semicircle	6.NS.3 6.EE.1 6.EE.2c 7.G.1 7.G.4

Chapter 1 Overview- The Real Number System

Grade: 7

Brief Description of Chapter: Real numbers are represented as points on an infinite line and are used to count, measure, estimate, or approximate quantities.

Essential Questions:	**Enduring Understandings:**
• How are rational numbers represented on a number line? • How can rational numbers be written? • What are irrational numbers? • What is The Real Number System? • Why are significant digits meaningful to mathematics?	• Students will understand the size and value of rational/irrational numbers, and where they would fall on a number line. • Students will understand how to change the form of a rational number into fractions. • Irrational numbers can be characterized by non-terminating and non-repeating decimals. • The number system includes both rational and irrational numbers. • Students will learn how to identify leading and trailing zeros while applying the rules to determine which digits are significant.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• approximate • irrational number • negative integers • opposites • positive integers • rational number • real number • real number line • repeating decimal • set of integers • significant digits • terminating decimals	7.NS.1 7.NS.2d

Chapter 2 Overview- Rational Number Operations

Grade: 7	
Brief Description of Chapter: The operations of addition, subtraction, multiplication and division can be applied to rational numbers including negative numbers.	
Essential Questions:	**Enduring Understandings:**
• How can operations with rational numbers be applied in the real-world? • How do you apply the order of operations with rational numbers?	• Students can use a variety of methods, including number lines, absolute values, and algorithms to add or subtract integers, rational numbers, and decimal numbers. • Students will be able to apply the rules of addition, subtraction, multiplication and division, with or without a number line. • Students will learn how to apply addition, subtraction, multiplication, and division operations in the correct order with integers. • Students will extend the same rules to all rational numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• additive inverse • complex fraction • least common denominator • zero pair	7.NS.1 7. NS.1a 7.NS.1c 7.NS.d 7.NS.2 7.NS.2a 7.NS.2b 7.NS.2c 7.NS.3

Chapter 3 Overview – Algebraic Expressions

Grade: 7	
Brief Description of Chapter: Algebraic expressions containing rational numbers and several variables can be simplified, expanded, or factored to write equivalent expressions.	
Essential Questions:	**Enduring Understandings:**
• How can algebraic terms be simplified? • How can algebraic expressions be written in different forms? • How are word problems written in symbolic form with use of variables and coefficients? • How do you apply algebraic reasoning to real-world problems?	• Students will understand algebraic expressions may contain more than one variable with rational coefficients, and rational constants. • Students will use the commutative property with like terms. • Students will understand how to expand an algebraic expression with the use of the distributive property. • Students will understand how to factor an algebraic expression.
Key Words/Terminology:	**Math Proficiencies Addressed:**
No new vocabulary; however, the ELL section on page TE 133 (like terms) is a vocabulary term that all students will need to define.	7.EE.1 7.EE.2 7.EE.3

Chapter 4 Overview – Algebraic Equations and Inequalities

Grade: 7	
Brief Description of Chapter: Algebraic equations and inequalities can be used to model mathematical or real world situations and to find the values of variables.	
Essential Questions:	**Enduring Understandings:**
• How can algebraic equations be written in separate forms to represent the same solution? • What methods can be used to create and solve algebraic equations or inequalities to address real-world problems?	• Students will understand equations with the same solution are called equivalent equations. • Students will solve an equation by isolating the variable on one side of the equation by writing a series of equivalent equations. • Students will use an inequality symbol to compare two quantities that are not equal or may not be equal. • Students will understand that the orientation of the inequality symbol must be reversed when both sides of an inequality are multiplied or divided by the same negative number.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• equivalent equations • solutions set • equivalent inequalities	7.EE.4 7.EE.4a 7.EE.4b

Chapter 5 Overview – Direct and Inverse Proportions

Grade: 7	
Brief Description of Chapter: Two quantities that are in a proportional relationship can be used to solve real-world and mathematical problems.	
Essential Questions:	**Enduring Understandings:**
• What are the similarities and difference between direct and inverse proportions? • What are the different representations of direct and inverse proportions? • What methods can be used to solve direct and indirect proportions?	• Students will understand the algebraic equation for a direct proportion is y=kx, or y/x= k. • Students will understand graphing a direct proportion is always a straight line that passes through the orgin, (0,0); but does not lie on an axis. • Students will understand the algebraic equation for an inverse proportion is xy=k, or y=k/x. • Students will understand how to graph an inverse proportion knowing that it is a curve that never crosses the horizontal and vertical axes.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• constant of proportionality • cross product • direct proportion • inverse proportion • proportion	7.RP.2 7.RP.2a 7.RP.2b 7.RP.2c 7 RP.2d 7.RP.3

Chapter 7 Overview – Geometric Construction

Grade: 7	
Brief Description of Chapter: Triangles and quadrilaterals can be constructed using a compass, a protractor, and a straightedge.	
Essential Questions:	**Enduring Understandings:**
• What methods can be applied to construct geometric figures? • How can a scale drawing be used to determine the size of a real world object?	• Students will understand the constraints of angle bisectors and perpendicular bisectors. • Students will be able to draw 2 and 3 dimensional figures. • Students will understand the properties of triangles and quadrilaterals. • Students will understand the properties of enlargements and reductions in scale drawings.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• bisect • bisector • equidistant • included angle • included side • midpoint • perpendicular bisector • scale • scale factor • straightedge	7.G.1 7.G.2

Chapter 9 Overview – Statistics

Grade: 7

Brief Description of Chapter: Measures of central tendency can be used to estimate the center of data. Measures of variation estimate how far data are spread from the center. These measures are used to draw conclusions about populations.

Essential Questions:	**Enduring Understandings:**
• What organizational methods can be used to interpret statistical data? • What are ways of achieving accurate samples of a population, and what inferences can be drawn based upon this information?	• Students will develop methods of organizing statistical data such as; tables, box and whisker plots, & stem and leaf plots. • Students will develop an understanding of investigating median through the use of quartiles. • Students will develop a stronger understanding of random sampling methods.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• biased sample • box plot • box and whisker plot • first quartile • inference • interquartile range • leaf • lower quartile • mean absolute deviation • measure of variation • population random sample • range • sample • sample size • second quartile • simple random sampling • stem • stem and leaf plot • stratified random sampling • systematic random sampling • third quartile • unbiased sample • upper quartile	7.SP.1 7.SP.2 7.SP.3 7.SP.4

Chapter 10 Overview – Probability

Grade: 7

Brief Description of Chapter: Events happen around you every day, some more likely than others. You can use probability to describe how likely an event is to occur.

Essential Questions:	Enduring Understandings:
• What processes can be used to define outcomes, events, and sample space? • What are the ways of finding probability of events? • How can probability models help to simplify real-world events?	• Students will identify outcomes of events to determine theoretical probability. • Students will use data to determine experimental probability. • Students will create probability models.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• biased • complementary event • event • experimental probability • fair • mutually exclusive • non-uniform probability mod • observed frequency • outcomes • probability • probability distribution • probability model • relative frequency • sample space • theoretical probability • uniform probability model • Venn diagram	7.SP.5 7.SP.6 7.SP.7 7.SP.8 7.SP.8a 7.SP.8b 7.SP.8c

Chapter 6 Overview – Angle Properties and Straight Lines

Grade: 7	
Brief Description of Chapter: Angles formed on a straight line, or by parallel lines and a transversal, have special properties that are useful in solving problems.	
Essential Questions:	**Enduring Understandings:**
• What relationships exist between different types of angles? • What relationship exists between the angles in quadrilaterals and triangles?	• Students will understand the rules of supplementary, adjacent, complementary, vertical, interior, exterior, and corresponding angles. • Students will understand the sum of all angles that meet at a point will equal 360 degrees. • Students will understand that the sum of all angles that form a line will equal 180 degrees. • Students will understand that the sum of the interior angles of a triangle equals 180 degrees. • Students will understand that the measure of an exterior angle of a triangle is equal to the sum of the measures of the interior angles that are not adjacent to the exterior angle.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• adjacent angles • alternate exterior angles • alternate interior angles • complementary angles • congruent angles • corresponding angles • exterior angles • interior angles • supplementary angles • transversal • vertical angles	7.G.2 7.G.5

Chapter 8 Overview – Volume and Surface Area of Solids

Grade: 7	
Brief Description of Chapter: Solids such as pyramids, cylinders, cones, and spheres are all around you. You can find their surface areas and volumes to solve real-world problems.	
Essential Questions:	**Enduring Understandings:**
• What methods are used to recognize if a net can be constructed into a 3D solid? • How can you determine the volume and surface area of 3D solids? • How to identify and determine the properties of composite solids in the real-world?	• Students will be able manipulate, visualize, model construction of nets into 3D solids. • Students will be able to know and use the formulas of volume and surface areas for 3D shapes. • Students will identify the volume or surface area of a composite solid by identifying the solids that make it up. By finding the volume or surface area of each solid, and then adding or subtracting they will find the total composite.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• cylinder • cone • cross section • hemisphere • lateral surface • plane • slant height • sphere • surface area • volume	7.G.3 7.G.4 7.G.6

Chapter 3 Overview – Algebraic Linear Equations

Grade: 8

Brief Description of Chapter: This chapter builds on students' work in Course 2 (7th grade). In that course, they solved one-variable equations that required many steps including distributing positive numbers over parenthetical expressions, such as (X-3). In this chapter, students will need to work carefully as they learn to distribute negative numbers over these expressions, and then extend to linear relationships whose graphs do not pass through the origin {this concept continues through chapter 4}.

Essential Questions:	**Enduring Understandings:**
• What makes a computational strategy both effective and efficient? • How can change be best represented mathematically? • How can the collection, organization, interpretation, and display of data be used to answer questions?	• Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations. • The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • The message conveyed by the data depends on how the data is collected, represented, and summarized.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• consistent equation • identity • inconsistent equation	8.EE.5 8.EE.7 8.EE.7a 8.EE.7b

Chapter 4 Overview – Lines and Linear Equations

Grade: 8

Brief Description of Chapter: In this chapter, students explore linear relationships between two quantities. They are introduced to the concept of slope and learn how to identify the slopes of lines from both their graphs and their equations. Once students are familiar with slope, students learn how to represent linear relationships in multiple ways.

Essential Questions:	**Enduring Understandings:**
• How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • How are patterns of change related to the behavior of functions? • What makes an algebraic algorithm both effective and efficient?	• Algebraic representation can be used to generalize patterns and relationships. • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• linear relationship • rise • run • slope • slope-intercept form	8.EE.5 8.EE.6

Chapter 5 Overview – Systems of Linear Equations

Grade: 8

Brief Description of Chapter: In this chapter, students are introduced to systems of linear equations and learn about inconsistent and dependent systems within linear equations. Inconsistent and dependent systems of linear equations are also introduced.

Essential Questions:	**Enduring Understandings:**
• How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • What makes an algebraic algorithm both effective and efficient? • How can we use mathematical models to describe physical relationships? • How can we use physical models to clarify mathematical relationships?	• Algebraic representation can be used to generalize patterns and relationships. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole. • Mathematical models can be used to describe and quantify physical relationships. • Physical models can be used to clarify mathematical relationships.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• common term • elimination method • dependent system of equations • graphical method • inconsistent system of equations • point of intersection	8.EE.8 8.EE.8a 8.EE.8b 8.EE.8c

Chapter 6 Overview – Functions

Grade: 8	
Brief Description of Chapter: In this chapter, students are introduced to relations and learn to identify functions. They learn to represent a function in different forms. Students learn to identify linear and nonlinear functions from graphs. They describe and sketch functions to show their qualitative features. They compare linear functions represented in the same form and in different forms.	
Essential Questions:	**Enduring Understandings:**
• How can change be best represented mathematically? • How are patterns of change related to the behavior of functions?	• The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• function • input • linear function • many-to-many • many-to-one • mapping diagram • nonlinear function • one-to-many	8.F.1 8.F.2 8.F.3 8.F.4 8.F.5

Chapter 1 Overview – Exponents

Grade: 8

Brief Description of Chapter: In this chapter, students learn to use exponential notation. After learning the product of powers property and the quotient of powers property, they multiply and divide expressions in exponential notation. Students learn how to raise a power to a power, are introduced to the power of a product property and the power of a quotient property. All these properties are built upon the foundational definition of exponents and the product and quotient of powers properties.

Essential Questions:	**Enduring Understandings:**
• How can we compare and contrast numbers?	• A quantity can be represented in various ways. Problem solving depends on choosing wise ways.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• exponent • exponential notation • power • prime factorization	8.NS.1 8.NS.2 8.EE.1 8.EE.2

Chapter 2 Overview – Scientific Notation

Grade: 8	
Brief Description of Chapter: In this chapter, students learn why scientists and mathematicians express quantities in scientific notation and how to convert numbers between scientific notation and standard form. Students will also learn to perform operations on numbers in scientific notation and to use such numbers to solve real-world problems.	
Essential Questions:	**Enduring Understandings:**
• How can we compare and contrast numbers? • How can counting, measuring, or labeling help to make sense of the world around us?	• A quantity can be represented in various ways. Problem solving depends on choosing wise ways. • Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• coefficient • scientific notation • standard form	8.EE.1 8.EE.3 8.EE.4

Chapter 7 Overview – Pythagorean Theorem

Grade: 8	
Brief Description of Chapter: In this chapter, students learn the Pythagorean Theorem, its converse, and its applications. They will apply the Pythagorean Theorem in mathematical and real-world problems in both two and three-dimensions.	
Essential Questions:	**Enduring Understandings:**
• How do geometric relationships help us solve problems and/or make sense of phenomena? • How can we best represent and verify geometric/algebraic relationships? • How can be measurements be used to solve problems?	• Geometric relationships provide a means to make sense of a variety of phenomena. • Coordinate geometry can be used to represent and verify geometric/algebraic relationships. • Everyday objects have a variety of attributes, each of which can be measured in many ways. • Measurements can be used to describe, compare, and make sense of phenomena.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• hypotenuse • leg • Pythagorean Theorem	8.EE.2 8.G.6 8.G.7 8.G.8 8.G.9

Chapter 8 Overview – Geometric Transformations

Grade: 8

Brief Description of Chapter: This chapter introduces the distance-preserving transformation (translations, reflections, and rotations-and dilations). The students will learn to draw these transformations on coordinate planes, represent them using algebraic function notations, and use them in problem-solving.

Essential Questions:	**Enduring Understandings:**
• What situations can be analyzed using transformations and symmetries? • How can spatial relationships be described by careful use of geometric language? • How do geometric relationships help us solve problems and/or make sense of phenomena?	• Shape and area can be conserved during mathematical transformations. • Geometric properties can be used to construct geometric figures. • Geometric relationships provide a means to make sense of a variety of phenomena.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• angle of rotation • center of dilation • center of rotation • clockwise • counterclockwise • dilation • half turn • image	8.G.1 8.G.1a 8.G.1b 8.G.1c 8.G.3

Chapter 9 Overview – Congruence and Similarity

Grade: 8

Brief Description of Chapter: In this chapter, students learn to describe congruent figures more precisely. Students have learned that similar figures have "the same shape but not necessarily the same size." This intuitive definition can be misleading, because some students may think that all rectangles are similar, since they all have a rectangular shape. Congruent figures are a subset of similar figures, since congruent figures are similar with a constant of proportionality of 1.

Essential Questions:	**Enduring Understandings:**
• What situations can be analyzed using transformations and symmetries? • How can we best represent and verify geometric/algebraic relationships? • How can we use physical models to clarify mathematical relationships?	• Shape and area can be conserved during mathematical transformations. • How can we best represent and verify geometric/algebraic relationships? • Physical models can be used to clarify mathematical relationships.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• congruence • corresponding angles • corresponding sides • statement of congruence	8.G.2 8.G.4 8.G.5

Chapter 10 Overview – Statistics

Grade: 8	
Brief Description of Chapter: In this chapter, students explore bivariate data. Given two sets of quantitative data. Given two sets of quantitative data, they learn to construct a scatter plot showing the corresponding data points on a coordinate plane. This allows them to analyze patterns of association between the data sets, patterns of association between the data sets, and identify any outliers. They will also learn to read, construct and interpret two-way tables of categorical data.	
Essential Questions:	**Enduring Understandings:**
• How can change be best represented mathematically? • How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations? • How can the collection, organization, interpretation, and display of data be used to answer questions?	• The symbolic language of algebra is used to communicate and generalize patterns in mathematics. • Algebraic representation can be used to generalize patterns and relationships. • The message conveyed by the data depends on how the data is collected, represented, and summarized. • The results of statistical investigation can be used to support or refute an argument.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• association • bivariate data • categorical data • clustering • extrapolate • interpolate	8.SP.1 8.SP.2 8.SP.3 8.SP.4

Chapter 11 Overview – Probability

Grade: 8	
Brief Description of Chapter: In this chapter, students build on work from Course 2 (7th Grade) as they learn to compute probabilities of compound as they learn to compute probabilities of compound events, both independent and dependent events. Not only will they learn to identify whether compound events are independent or dependent, they will also learn how to apply the multiplication and addition rules for probability to them.	
Essential Questions:	**Enduring Understandings:**
• How can experimental and theoretical probabilities be used to make predictions or draw conclusions? • How can the collection, organization, interpretation, and display of data be used to answer questions?	• Experimental results tend to approach theoretical probabilities after a large number of trials. • The message conveyed by the data depends on how the data is collected, represented, and summarized.
Key Words/Terminology:	**Math Proficiencies Addressed:**
• Addition Rule of Probability • compound event • dependent events • independent events • Multiplication Rule of Probability	7.SP.5 7.SP.6 7.SP.8 7.SP.8a 7.SP.8b 7.SP.8c

INSTRUCTIONAL STRATEGIES

Instructional Strategies

In order to achieve the goals of our mathematics curriculum and address the various learning styles and multiple intelligences of all our students, teachers must maintain a repertoire of appropriate, effective, and flexible strategies and resources. Hands-on experiences involving manipulatives, games, and other mathematical tools provide children the opportunity to explore math in visual, tactile, and concrete ways. A variety of tools and resources should be used at all grade levels to assist students as they investigate mathematical topics, build conceptual understanding, and develop problem-solving strategies.

Instructional strategies also assist educators in supporting students' development and enhancement of mathematical communication abilities. Students use various tools including notebooks, mathematical reflections, and learning logs to communicate how and what they have understood about a concept or unit of study. Teachers may encourage students to employ strategies, such as jigsawing or carouseling, to promote increased mathematical communication when introducing new concepts, exploring open-ended problems, defining vocabulary, or sharing what they have learned.

Encouraging the regular use of cooperative learning as an instructional tool affords all students the opportunity to become active participants in their learning process. Integrating mathematics with other disciplines across the curriculum encourages students to make connections between content areas, making learning more meaningful and facilitating generalization. To this end, an interdisciplinary approach incorporating STEM lessons/problem-based learning is encouraged.

By employing varied and engaging strategies appropriately, teachers assist students in becoming confident and competent learners of mathematics. The following table incorporates strategies and suggestions from a variety of sources including professional literature and electronic resources. In addition to the table, NCTM has identified Effective Mathematics Teaching Practices which can be found in the appendix.

Differentiation of Instruction

"If everyone is thinking alike, then somebody isn't thinking." - George S. Patton

Within the math classroom, teachers will have a variety of learners. These students will range from accelerated learners to reluctant or struggling learners. Math teachers will maintain high expectations for all students regardless of their aptitude. In order for all students to perform at their personal best, differentiation of instruction is essential. This may include, but is not limited to the following strategies:

- Incorporating a math workshop model using homogeneous or skill-based groupings;
- Providing differentiated assignments within each, tailored for students of different levels of achievement;
- Incorporating academic choice
- Providing enrichment materials to extend concepts where appropriate;
- Cultivating an environment that values critical thinking and problem solving, exploring multiple solutions
- Creating learning centers with activities geared to different learning styles, readiness and levels of interest; and
- Providing students with opportunities to explore topics in which they have strong interest and find personal meaning.

Whether teachers differentiate content, process, or product, responding to the unique needs of learners is paramount to the implementation of the Mathematics curriculum at all grade levels.

INSTRUCTIONAL STRATEGIES

Resource	Description	Suggestions for Application
Bulletin Board	An interactive visual that provides students an opportunity to explore a particular mathematical concept in greater depth, practice math skills and self-assess progress.	1. Students visit the board to choose learning activities including vocabulary, math puzzles, and logic exercises. 2. Students use the board to share and report about a math story they enjoyed reading.
Carouseling	A brainstorming activity where learners travel from station to station as in carousel motion sharing, recording, and reporting ideas or participating in activities.	1. At each station, the learners will construct a word problem for a specific mathematical idea. 2. At each station students will list the attributes and defining rules of specific polygons.
Cooperative Learning	Small heterogeneous groups of learners working together to achieve a common goal.	Suggested structures: 1. Think - Pair - Share 2. Investigation 3. Partner quiz 4. Team interview 5. Peer tutoring
Creative Dramatics	Original enactments of math concepts and problem solving situations. Examples include poetry, music, and role play.	1. The learners act out “The Three Billy Goats Gruff” to reinforce the concepts of ordinal numbers (first, second, third) and spatial relations (over and under the bridge). 2. The learners will cooperatively write a rap song to reinforce their math vocabulary.
Data Representations	Information is organized and presented graphically; a pictorial device used to show mathematical relationships. Examples include the following: charts, graphs, diagrams, tables, flowcharts, and maps.	1. The learner will extrapolate data from a line graph, calculate the differences between data points, find a pattern, and make predictions. 2. The learner will create a chart to order currency from the greatest to least. 3. The learner will design a flowchart describing the steps of the long division process.

Resource	Description	Suggestions for Application
Effective Questioning	Purposeful questions require students to use thinking skills; questions can be organized according to Bloom's Taxonomy, higher and lower level, open and closed.	Sample questions: 1. What do you notice? What do you wonder? 2. Why did you choose to solve the problem that way? 3. How did you get your answer? 4. How could you solve this problem a different way? 5. Explain the strategies you would use to solve this problem. 6. How is one strategy similar or different from another strategy?
Flexible Grouping	Small homogenous groups of learners working together to achieve a common goal.	Suggested structures: 1. Re-teach 2. Extra practice 3. Enrichment 4. Problem-solving 5. Computational fluency 6. Technology 7. Tactile Games
Games	Motivational activities to introduce, reinforce, or review content skills. Examples include the following: Bingo/Quizmo, Buzz, Concentration, Around the World (Traveler), Guess My Rule, 24 Game, Top-It, etc.	1. The learners participate in Top-It to compare numbers and promote increased number sense. 2. Students play Beat the Calculator to promote mental math and computational thinking and increase exposure to calculators. 3. The learners play Bingo listening to multiplication number facts and covering the product on their card.

Resource	Description	Suggestions for Application
Graphic Organizers	Visual illustration of verbal and/or mathematical statements; they help the learner organize, comprehend, summarize, and synthesize information. Examples include the following: timeline, problem/solution outline, network, herringbone map, cycle, Venn diagram, tree diagram, mindmap, web, ranking ladder, and K-W-L.	1. The learner will use a Venn diagram to sort attribute blocks according to color, shape, and size. 2. After reading a word problem, a cooperative group of learners will record it on a problem/solution outline. 3. The learners will construct tree diagrams for choices of bicycles or clothes.
Jigsawing	Each student in turn becomes the "expert" on one subject by working with members from other teams. Upon returning to their team, each "expert" teaches the home group.	May be used for the following: 1. Acquiring new math concepts. 2. Reviewing math concepts learned. 3. Learning and sharing different problem solving strategies.
Manipulatives	Concrete, hands-on materials used to build mathematical understandings. Examples include unifix cubes, counters, pattern blocks, straws and connectors, etc.	1. The learner will freely explore mathematical operations using counters. 2. The learner will identify, create, or match patterns using buttons. 3. After teacher instruction, the learner will build a geometric model for understanding of surface area using unifix cubes. 4. Students use angle rulers and plastic shapes to study the properties of polygons.
Mathematical Reflections	Opportunities for students to reflect on their own mathematical understanding, often used in self-assessment, unit review, or investigation culmination. Reflections are often completed in notebooks or journals.	1. At the end of a unit on polygons, students are asked to choose one polygon and reflect on what they have learned about its attributes. 2. A culminating activity for a lesson on calculating tax asks students to reflect on how tax may impact a household's grocery budget.

Resource	Description	Suggestions for Application
Media	Incorporation of the "real-world" into mathematics instruction through the use of newspapers, catalogs, magazines, almanacs, TV/radio broadcast schedules, directories, TV Guide, Guinness Book, stock market reports, etc.	1. The learner will answer teacher-created questions about a graph appearing in a newspaper. 2. Cutting out magazine pictures, the learner will create a collage of "real-world" uses for large numbers. 3. Given a specific amount of money, the learner will design a list of purchases from a store catalog for his/her room.
Modeling	The act of demonstrating the behavior or activity which is to be elicited from the learner.	1. The teacher models a clap-snap pattern for the learners according to colors on a calendar. 2. The teacher demonstrates the use of tangrams to discover varieties of polygons before the learners attempt the activity independently. 3. The learner will model subtraction of integers using two-color counters and zero sums. 4. The learner will model telling time by moving the minute hand of a clock five minutes at a time and saying the time aloud.
Museum	A designated area of the classroom used to display real-world objects reflective of mathematical concepts or special student presentations.	1. Students collect various real world objects which represent quadrangles, hexagons, octagons, etc. and display them in a polygons museum. 2. The teacher displays a collection of student multimedia presentations in a project museum.
Notebook	A convenient, familiar, and flexible method for students to record and reflect on their thoughts, feelings, ideas, experiences, or thought processes.	<u>May be used in the following ways</u>: 1. To respond to an open-ended question. 2. To record computation, strategy, modeling, etc to solve a posed task. 3. To record notes from the teacher or group discussion. 4. To reflect on mathematical practice.

Resource	Description	Suggestions for Application
Problem-solving Process	A structure which gives students a guide for reasoning and solving math problems. In each step, students are asked questions which help direct their thinking.	When approaching a word problem, students are encouraged to use a systematic process: • establishing context • evaluating given information • determining what is being asked • developing a plan/determining if the plan makes sense in the context/story • solving the problem • evaluating the strategy for efficiency
Tools	Instruments used to investigate mathematical topics and/or solve problems. Examples include the following: calculator, clock, protractor, calendar, ruler, computer, compass, tangrams, balance scales, angle rulers, number line, thermometer, geoboard, measuring devices, hundreds chart/number grid, slates, templates.	1. The learner will use a number grid and/or number line for addition of whole numbers. 2. Simulating a store situation, the learner will use a calculator to add cost of purchases and/or make change. 3. To illustrate the parts of an equation, the learner will use a balance scale with manipulatives. 4. The learner will explore geometric shapes with a geoboard and rubber bands.

ASSESSMENT

Assessment

Student assessment is paramount for observing and describing performance, diagnosing instructional needs, ascertaining progress, planning instruction and communicating progress to others.

A variety of assessment strategies are used to adequately monitor and evaluate students' individual development of mathematical concepts and habits of mind. Assessment practices and tools closely match instructional strategies and activities, both in format and design.

Assessment is ongoing and multi-dimensional; both driving instruction and evaluating progress. Formative assessments allow teachers to monitor student understanding as they assimilate schema and mathematical skills/concepts, as well as apply mathematics into their everyday lives. Summative assessments monitor student attainment of their grade-level proficiencies, development of mathematical practices, and application to novel situations. Both forms of assessment are embedded throughout the units of study.

Feedback from assessment tasks assists students in setting goals and becoming independent learners. Toward this end, assessment needs to be meaningful to both students and teachers, and authentic in nature. Additionally, effective assessment encourages students to accept shared responsibility for their learning.

District-wide assessments, also referred to as common/benchmark assessments, are utilized in all subject areas to both inform instruction, as well as determine proficiency. These assessments provide consistency across classrooms and grade levels. They may take the form of traditional assessments or performance tasks, but more commonly use standardized administration and scoring procedures to help maintain validity, reliability, and fairness. Typically, teachers administer common assessments to all students in the same course and grade at prescribed intervals, which vary by content area. Common assessment instruments measure proficiency on subsets of standards and might include end-of-unit assessments, open-ended/open-response tasks, investigations, and projects.

The assessment strategies that follow are utilized by Mathematics teachers to assist in assessing and evaluating student progress.

MATHEMATICS ASSESSMENT RESOURCES AND STRATEGIES

Resource	Description	Strategy/ Example
Anecdotal Notes	Teacher documents observations of student/class performance, strengths, needs and interactions, including affective response.	Teachers may document each individual student's progress toward learning goals and include this record in a student conference folder. Teacher may record on post it notes, checklist, and/or in a notebook. These notes are used to inform instruction.
Checklist	Allows teachers to record students' progress toward specific learning goals.	Teachers use this tool as they observe and assess the class at work to document progress of each student toward learning goals for a given month, marking period, or set time period. This gives a snapshot of the status of the class at large.
Cooperative Problem Solving	Teacher assigns small groups of students to work together to achieve a common goal or solve a problem.	In cooperative work, the group is confronted with a situation that challenges everyone. The group must work together to understand the problem, construct a plan, implement the plan, make revisions, and verify solutions.
Effective Questioning	The teacher asks carefully-framed questions to elicit student explanations and evaluate students' thinking and reasoning. The questions must require students to think about mathematics and provide opportunities to discover and validate ideas.	Sample questions: 1. What do you notice? What do you wonder? 2. Why did you choose to solve the problem that way? 3. How did you get your answer? 4. How could you solve this problem a different way? 5. Explain the strategies you would use to solve this problem. 6. How is one strategy similar or different from another strategy?
ExamView	A resource CD internet tool that offers teachers opportunities to individualize assessments easily.	A teacher may use this program to modify, eliminate, or add questions to an existing test. This tool also enables teachers to draw from a bank of questions to create their own test. Teachers are able to modify font, format, and spacing to adapt to the needs of their learners.
Exit Slips/Ticket Out the Door	Student responses to open-ended questions completed at the close of a lesson or unit.	Teachers may use the Exit slip/Ticket out the Door master or a similar document to gauge students' ability to solve a problem, produce an example, or respond to an open-ended question at the end of a lesson or unit.
Games	Games serve as a critical tool for ongoing assessment. Application of skills, use of strategies, and disposition	Teachers may use Checklists, Profiles, Progress Indicators, or anecdotal notes to record students' progress and performance during games. Such ongoing assessment aides teachers in

Resource	Description	Strategy/ Example
	towards mathematics should be observed as students play math games.	gaining a complete picture of a student's mathematical understanding.
Individual Conferences (Structured and Flexible)	The teacher and student interact in a dialogue about mathematics and the concept being explored.	Teachers may use conferring to assess students' conceptual understanding of a particular problem/task or discuss a piece of student work.
Mid-Year and End-of-Year Assessments	Periodic assessment tools designed as one aspect of a balanced assessment plan. These tools help teachers to gauge students' progress at critical times during the school year. While they cover important content from the MiF program, their use should be balanced with other types of assessment in analyzing student progress.	A teacher administers the Mid-Year and End-of-Year Assessments to students at the appropriate times during the school year. Data from this assessment helps to indicate student progress toward learning goals for the year. This tool should neither serve as a pre-test, nor as a single measure of a student's understanding of presented content.
Models	Students will build a representation of a concept or problem solution from materials or manipulatives, individually or cooperatively.	Students may be asked to use straws and connectors, toothpicks and gumdrops, or poly-strips to construct a three-dimensional representation of a named solid.
Notebook Checklist	An organizational tool which assists students in guiding the structure of their notebook journal.	A teacher may suggest students use the Notebook Checklist to review their notebooks in preparation for them being collected and graded.
Notebook Quiz	A teacher-created tool used to assess students' ability to navigate an organized student notebook/journal.	A teacher may ask specific questions to determine if students are effectively using their notebooks to organize definitions, solutions, strategies, examples, and notes to assist them in solving problems. This can be completed electronically.
Observation	The teacher observes students in a learning situation, checks for evidence of understanding, and processes the information so that instructional decisions can be made.	While informal observation is invaluable to teachers to reflect on and make changes to instruction, it is often best to document observations when they are used to assess student progress. (see Status of the Class).

Resource	Description	Strategy/ Example
Open-ended/ Open-Response Problems	Open-ended, real-world contextualized tasks that require students to apply previously learned skills. • May contain multiple steps. • Often have more than one correct solution. • Work is assessed using a rubric.	For examples of open-ended tasks, teachers are encouraged to use the Open-Ended Resource. These tasks, while designed for grades 3 and 4, may be easily modified to address other levels. Additional resources for open-ended tasks may be found in the Technology Resource (see Exemplars). Example rubrics for Open-Ended tasks for all grades are shown on the following pages.
Performance-based Tasks	Tasks that require students to undertake an action or create a product that demonstrates their knowledge or skills. Effective performance assessment requires the student to produce and explain an answer rather than select one from given choices.	Performance assessment tasks include writing short essays, doing mathematical computations, conducting experiments, completing projects, making presentations, or assembling a portfolio of representative work.
Presentations or Demonstrations	Formal or informal presentations by students that focus on a learned concept, process, or problem-solving situation	For example, a teacher assigns each student or small group a different polygon on which to report. Students are directed to include a definition, illustration, real-world use, constructed model and geometric attributes of their polygon in their presentation. Alternate forms of presentations are encouraged including the creation of a screencast, slideshow, or other electronic format.
Pre-test	Recall prior knowledge lesson.	Teachers use this assessment at the beginning of each chapter to determine if students have the prerequisite knowledge to be successful with the new chapter. Teachers use this data to inform instruction and respond to student needs.
Quizzes	Short assessments that involve evaluating student work, presented in reflections, workbook pages, and any other tasks which represent a student's understanding.	Teachers use this assessment informally at various times throughout the chapter to both inform instruction as well as demonstrate obtainment of math concepts. Window quizzes are a prime example of this type assessment.
Rubrics	Rubrics may be used to assess progress towards a standard, learning goal, or mathematical practices. Rubrics reflect multiple levels of performance based on	A teacher may use a rubric to assess students' progress on variety of assessment tools including notebooks, tests, quizzes, problems/tasks, and projects. While use of a standard or general record is appropriate for many periodic or standardized

Resource	Description	Strategy/ Example
	content, reasoning and modeling.	assessments, teachers should tailor rubric criteria for most projects, notebooks, and similar product assessment tools.
Self-Assessment	A reflective tool completed at the culmination of each unit that asks students to summarize their math learning and explain their contributions to the class.	Self-assessment provides students the opportunity to develop their communication about mathematics. It enables teachers to examine students' metacognition.
Slate Assessment	A slate assessment offers an informal quick-review of a presented skill or concept.	Slate assessments are created by teachers. These assessments allow teachers to ask a question and gauge each student's response instantly. Documentation of student progress should be anecdotal notes.
Student Portfolios	Collections of representative pieces of student work to document and assess progress over the course of an established period of time.	Portfolio work samples may include long-term projects, daily notes, journal entries, charts, graphs, drawings, problems of the week, best tests, worst tests, and homework. Contents should represent content and effort and may document a period ranging from one unit to one year.
Student-created Problems and Tasks	Students construct tasks, charts, graphs, or problems that reflect their understanding of the targeted skills.	To prepare students for an end-of-unit or end-of-investigation assessment, the teacher may provide students with a list of concepts or "big ideas" which the test will encompass. Students are then asked to construct problems, questions, or diagrams to include on the test. A student's ability to construct an effective problem or pertinent question yields information about his or her understanding, while promoting the learner's mathematical communication and confidence.
Tests	Test Prep Chapter Assessments in grades 1-5, Chapter Test A or B in grades 6-8, and electronic assessments should be utilized.	Teachers administer the assessment at the end of each chapter. Basic vs. novel skill items should be weighted differently. Use of this periodic assessment tool should be balanced with ongoing, product, and teacher-created periodic assessment tools when assessing students' mathematical abilities and understanding.

APPENDICES

Appendix A: Technology Integration

Appendix B: 21st Century Life and Career Skills

Appendix C: Literature Connections

Appendix D: Effective Mathematics Teaching Practices

Appendix E: Articles

Appendix A: Technology Integration

> *Strategic use of technology in the teaching and learning of mathematics is the use of digital and physical tools by students and teachers in thoughtfully designed ways and at carefully determined times so that the capabilities of the technology enhance how students and educators learn, experience, communicate, and do mathematics. Technology must be used in this way in all classrooms to support all students' learning of mathematical concepts and procedures, including those that students eventually employ without the aid of technology. Strategic uses support effective teaching practices and are consistent with research in teaching and learning.*
>
> -A Position of the National Council of Teachers of Mathematics on Technology (July 2015)

The use of technology and tools in the mathematics classroom allows students to move from skills in isolation to exploration and discovery. Research suggests that the strategic use of technology and mathematical tools not only makes mathematics more engaging and fun, but also facilitates the students' ability to engage in real life applications of mathematics and prepares students for the demands of this century. Mathematically proficient students are able to make sound decisions about when to use electronic tools, as well as identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems and to explore and deepen their understanding of concepts.

It is important to consider the dynamic nature of technology, as well as the unique needs of each learner/class before selecting electronic resources. To this end, math implementation resources are updated periodically to reflect best practice and ensure alignment to standards and/or mathematical practices. Grade and program specific implementation guides are accessible by teachers on the district webpage.

Math in Focus Technology Resources

Online Student Book eBook (Grades K-8) - Provides online access to the Student Book pages. Students receive their own account and can log on to view their book materials from any computer with an internet connection.

Online Teacher's Edition eBook - Provides online access to the Teacher's edition. Teachers each receive their own account and can log on to view the Teacher's Edition from any computer with an Internet connection. The online platform also features an online lesson planner.

Exam View Assessment Suite/Exam View Test Generator - Teachers can create unlimited online customized tests and practice materials for students including multiple choice, short response, and extended response problems. Grades six through eight (Courses 1-3) are available on a CD-ROM.

Online Assessment System (Grades 6-8) - Online test preparation with a learning management system and reports. Teachers and students can access through my.hrw.com.

Teacher One Stop CD-ROM (Grades 6-8) - Complete printable PDFs of available Teacher Resources for ease of use and daily lesson planning.

Virtual Manipulatives - The online virtual manipulatives are ready to be used with the interactive whiteboard or other projection technology. These digital tools provide engaging activities to model concepts and enhance instruction.

Online Student Workbook eBook (Grades K-5) - Teachers can access all of the Student Workbook pages in printable, digital format.

Online Teacher Resources - Printable blackline masters of: Problem of the Lesson, Reteach, Extra Practice, Enrichment, Assessments, School-to-Home Connections, Additional Resources

Math Background Videos - Singapore math pedagogy video podcast and parent support videos for teachers and parents. Teachers can access math background videos and podcasts to ensure they have a solid understanding of the math behind the Math in Focus lessons. Parents can learn more about Singapore math and how to help their children succeed.

Interactive Whiteboard Lessons - Interactive whiteboard packages include the Learn, Guided Practice, Let's Explore and Problem of the Lesson portions of the lesson.

Online Student Interactivities - Interactive online tutorials, activities, and quizzes for students in grades K-5. Aligned to Singapore math concepts, student interactivities provide a great way to differentiate instruction. Students can access interactivities at home for practice and in class at a math center.

Online Transition Resource Map - Designed to be used in conjunction with the Teacher's Guide to Transition, this online resource makes it easier to locate and print previous grade level Reteach and Extra Practice content to address transition related knowledge and skill gaps.

Singapore Math Bar Models for iPad - This app uses signature Singapore math bar modeling method for problem solving to visually represent word problems in a fun and interactive way.

Think Central - www.thinkcentral.com *Math in Focus* website for the elementary grades, K-5.

Holt McDougal Online - my.hrw.com *Math in Focus* website for the middle grades, 6-8.

Appendix B: 21st Century Life and Career Skills

In today's global economy, students need to be lifelong learners who have the knowledge and skills to adapt to an evolving workplace and world. To address these demands, Standard 9, 21st Century Life and Careers, establishes clear guidelines for what students need to know and be able to do in order to be successful in their future careers and to achieve financial independence.

In Evesham, 21st century life and career skills focus on enabling student to make informed decisions that will prepare them to engage as active citizens in a dynamic global society and to successfully meet the challenges and opportunities of the 21st century global workplace. Therefore, these life and career skills are integrated across the K-8 curriculum in various subject areas, where appropriate. It is our goal to build a solid foundation for the high school that foster a population that:

- Continually self-reflects and seeks to improve the essential life and career practices that lead to success.
- Uses effective communication and collaboration skills and resources to interact with a global society.
- Is financially literate and financially responsible at home and in the broader community.
- Is knowledgeable about careers and can plan, execute, and alter career goals in response to changing societal and economic conditions.
- Seeks to attain skill and content mastery to achieve success in a chosen career path.

The Standards: Standard 9 is composed of the Career Ready Practices and Standard 9.1 and 9.2 which are outlined below:

- **Career Ready Practices**
  These following practices outline the skills that all individuals need to have to truly be adaptable, reflective, and proactive in life and careers. These are researched practices that are essential to career readiness.

  - CRP1. Act as a responsible and contributing citizen and employee.
  - CRP2. Apply appropriate academic and technical skills.
  - CRP3. Attend to personal health and financial well-being.
  - CRP4. Communicate clearly and effectively and with reason.
  - CRP5. Consider the environmental, social and economic impacts of decisions.
  - CRP6. Demonstrate creativity and innovation.
  - CRP7. Employ valid and reliable research strategies.

- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP10. Plan education and career paths aligned to personal goals.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using cultural global competence

- **9.1 Personal Financial Literacy**
  This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

- **9.2 Career Awareness, Exploration, and Preparation**
  This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

The links below can be accessed by teachers to further elaborate on Standard 9 and identifies areas across the curriculum where these concepts and skills are integrated into instruction.

CPIs to reach by grade 4

CPIs to reach by grade 8

Appendix C: Literature Connections

Children learn best when subject matter is meaningful and useful. Literature helps bring meaning to mathematics by highlighting situations where people use math for real purposes. When selected strategically, children's books provide opportunities for students to think and reason mathematically, as well as to teach important math concepts and skills. Literacy and mathematics require development of many of the same processes including classifying, recognizing patterns, analyzing relationships, organizing thoughts, solving problems, and justifying opinions and perspectives. Finding and using natural mathematical connections in children's literature provide opportunities to develop and link the processes in these two content areas. Investigation of mathematics through literature offers a natural way for students to connect the abstract ideas, language, and symbols of mathematics to a context they understand (Felux, C., 2013).

According to the National Council for Teachers of Mathematics (NCTM), "learning mathematics is enhanced when content is placed in context and is connected to other subject areas and when students are given multiple opportunities to apply mathematics in meaningful ways as part of the learning process." Comprehension is the vehicle to conceptual understanding and successful learning of mathematics. Students gain conceptual understanding through the use of strategies, which include making connections, questioning, visualizing, inferring, predicting and synthesizing. To this end, we embrace the integration of children's literature into mathematics to enhance instruction and facilitate communication.

The following list of literature resources are recommended to supplement instruction and should be incorporated when time permits.

Grade K Literature Collection *20 Books - Paperback and Hardcover*			
Chapter	**Topic**	**Title**	**Author**
1	Numbers to 5	Five Little Monkeys Jumping on the Bed	Eileen Christelow
2	Numbers to 10	Mouse Count	Ellen Stoll Walsh
3	Order by Size, Length or Width	The Best Bug Parade	Stuart Murphy
4	Counting Numbers 0 to 10	Can You Count Ten Toes?	Lezlie Evans
5	Size and Position	Big Dog, Little Dog	P. D. Eastman
6	Numbers 0 to 20	City By Numbers	Stephen Johnson
7	Solid and Flat Shapes	Circus Shapes	Stuart Murphy
8	Numbers to 100	How Many Feet in the Bed	Diane Johnston Hamm
9	Comparing Sets	Ten Black Dots	Donald Crews
10	Ordinal Numbers	The First Day of Winter	Denise Fleming
11	Calendar Patterns	Today is Monday	Eric Carle
12	Counting On and Counting Back	Jack the Builder	Stuart Murphy
13	Patterns	Pattern Fish	Trudy Harris
14	Number Facts	Quack and Count	Keith Baker
15	Length and Height	How Big Were the Dinosaurs	Bernard Most
16	Classifying and Sorting	The Button Box	Margarette Reid
17	Addition Stories	Rooster's Off to See the World	Eric Carle
18	Subtraction Stories	Math Fables	Greg Tang
19	Measurement	The Grouchy Lady Bug	Eric Carle
20	Money	26 Letters and 99 Cents	Tana Hoban

From http://www.everydayschool.com/Singapore/SingGK.htm

Grade 1 Literature Collection *19 Books - Paperback and Hardcover*			
Chapter	**Topic**	**Title**	**Author**
1	Numbers to 10	Fish Eyes: A Book You Can Count On	Lois Ehlert
2	Number Bonds	Anno's Counting Book	Mitsumasa Anno
3	Addition Facts to 10	Two Ways to Count to Ten	Ruby Dee
4	Subtraction Facts to 10	Ten Sly Piranhas	William Wise
5	Shapes and Patterns	Round is a Mooncake	Roseanne Thong
6	Ordinal Numbers and Position	Henry the Fourth	Stuart Murphy
7	Numbers to 20	One Moose, Twenty Mice	Clare Beaton
8	Addition Facts and Subtraction to 20	Elevator Magic	Stuart Murphy
9	Length	Inch by Inch	Leo Lioni
10	Weight	Mighty Maddie	Stuart Murphy
11	Picture Graphs and Bar Graphs	Lemonade for Sale	Stuart Murphy
12	Numbers to 40	Bat Jamboree	Kathi Appelt
13	Addition Facts and Subtraction to 40	Math-terpieces	Gregg Tang
14	Mental Math Strategies	Probably Pistachio	Stuart Murphy
15	Calendar and Time	Its About Time Max	Kitty Richards
16	Numbers to 100	Emily's First 100 Days of School	Rosemary Wells
17	Addition Facts and Subtraction to 100	Splash	Ann Jonas
18	Multiplication and Division	One Is a Snail, Ten Is a Crab	April Pulley Sayre
19	Money	Benny's Pennies	Pat Brisson

From http://www.everydayschool.com/Singapore/SingG1.htm

Grade 2 Literature Collection *19 Books - Paperback and Hardcover*			
Chapter	**Topic**	**Title**	**Author**
1	Numbers to 1,000	12 Ways to Get to 11	Eve Merriman
2	Addition to 1,000	Mission: Addition	Loreen Leedy
3	Subtraction to 1,000	Subtraction Action	Loreen Leedy
4	Using Bar Models: Addition and Subtraction	The Best Vacation Ever	Stuart Murphy
5	Multiplication and Division	A Remainder of One	Elinor Pinczes
6	Multiplication tables of 2, 5, 10	The Best of Times	Greg Tang
7	Metric Measurement of Length	Measuring Penny	Loreen Leedy
8	Mass	On the Scale, a Weighty Tale	Brian Cleary
9	Volume	Pigs in the Pantry	Amy Axelrod
10	Mental Math Estimation	Betcha!	Stuart Murphy
11	Money	The Monster Money Book	Loreen Leedy
12	Fractions	Jump, Kangaroo, Jump	Stuart Murphy
13	Customary Measurement of Length	How Big is a Foot?	Rolf Myller
14	Time	Pigs on a Blanket	Amy Axelrod
15	Multiplication Tables of 3 and 4	Double the Ducks	Stuart Murphy
16	Using Bar Models: Multiplication & Division	The Great Graph Contest	Loreen Leedy
17	Picture Graphs	From One to One Hundred	Teri Sloat
18	Lines and Surfaces	When a Line Bends a Shape Begins	Rhonda Gowler Greene
19	Shapes and Patterns	Picture Pie	Ed Emberly

From http://www.everydayschool.com/Singapore/SingG2.htm

Grade 3 Literature Collection *19 Books - Paperback and Hardcover*			
Chapter	**Topic**	**Title**	**Author**
1	Numbers to 10,000	The Grapes of Math	Greg Tang
2	Mental Math Estimation	How Many Seeds in a Pumpkin	Margaret McNamara
3	Addition up to 10,000	Each Orange has Eight Slices	Paul Giganti
4	Subtraction up to 10,000	Math for All Seasons	Greg Tang
5	Using Bar Models: Addition and Subtraction	Mathematickles	Betsy Franco
6	Multiplication Tables of 6,7,8,9	One Hundred Hungry Ants	Elinor Pinczes
7	Multiplication	Sir Cumference and All the King's Tens	Cindy Neuschwander
8	Division	The Doorbell Rang	Pat Hutchins
9	Using Bar Models	The Grizzly Gazette	Stuart Murphy
10	Money	If You Made a Million	David Schwartz
11	Metric Length, Mass and Volume	How Tall, How Short, How Far Away	David Adler
12	Real World: Measurement	Millions to Measure	David Schwartz
13	Bar Graph & Line Plots	Cactus Hotel	Brenda Guiberson
14	Fractions	Give Me Half	Stuart Murphy
15	Customary Length, Weight and Capacity	Who Sank the Boat?	Pamela Allen
16	Time & Temperature	Clocks and More Clocks	Pat Hutchins
17	Angles & Lines	Hamster Champs	Stuart Murphy
18	Two-Dimensional Shapes	Shape Up	David Adler
19	Area & Perimeter	Perimeter, Area & Volume, A Monster Book	David Adler

From http://www.everydayschool.com/Singapore/SingG3.htm

Grade 4 Literature Collection *14 Books - Paperback and Hardcover*			
Chapter	**Topic**	**Title**	**Author**
1	Place Value and Whole Numbers	How Much is a Million?	David Schwartz
2	Estimation and Number Theory	Great Estimations	Bruce Goldstone
3	Whole Number Multiplication & Division	Anno's Mysterious Multiplying Jar	Mitsumasa Anno
4	Tables and Line Graphs	A Fly on the Ceiling	Julie Glass
5	Data and Probability	Do You Want to Bet	Jean Cushman
6	Fractions and Mixed-Numbers	Fraction Action	Loreen Leedy
7	Decimals	Piece=Part=Portion: Fractions=Decimals=Percent	Scott Gifford
8	Adding and Subtracting Decimals	Fractions, Decimals, and Percents	David Adler
9	Angles	Sir Cumference & the Great Knight of Angleland	Cindy Neuschwander
10	Perpendicular & Parallel Line Segments	Pigs on the Ball	Amy Axelrod
11	Squares and Rectangles	Sam Johnson and the Blue Ribbon Quilt	Lisa Campbell Ernst
12	Area and Perimeter	Spaghetti and Meatballs for All	Marilyn Burns
13	Symmetry	Math Potatoes	Greg Tang
14	Tessellations	A Cloak for the Dreamer	Aileen Friedman

From http://www.everydayschool.com/Singapore/SingG4.htm

Grade 5 Literature Collection *14 Books - Paperback and Hardcover*			
Chapter	**Topic**	**Title**	**Author**
1	Whole Numbers	Can You Count to a Google?	Robert Wells
2	Whole Number Multiplication and Division	On Beyond a Million	David Schwartz
3	Fractions and Mixed Numbers	Polar Bear Math	Ann Whitehead Nagda
4	Multiplying and Dividing Fractions	The King's Chessboard	David Birch
5	Algebra	Anno's Magic Seeds	Mitsumasa Anno
6	Area of a Triangle	The Greedy Triangle	Marilyn Burns
7	Ratio	Counting On Frank	Rod Clement
8	Decimals	Apple Fractions	Jerry Pallotta
10	Percent	If the World Were a Village	David Smith
11	Graphs and Probability	If You Hopped Like a Frog	David Schwartz
12	Angles	What's Your Angle, Pythagoras?	Julie Ellis
13	Properties of Triangles & Four-sided Figures	Grandfather Tangs Story	Ann Tompert
14	Three-Dimensional Shapes	Sir Cumference and the Sword in the Cone	Cindy Neuschwander
15	Surface Area and Volume	Flatland	Edwin Abbott

From http://www.everydayschool.com/Singapore/SingG5.htm

Literature Resources for Grades 6-8

Author	Title
Anno, Mitsumasa	Anno's Math Games
Anno, Mitsumasa	Anno's Math Games II
Blatner, David	The Joy of Pi
Cooney, Miriam P.	Celebrating Women in Mathematics and Science
Demi	One Grain of Rice: A Mathematical Folktale
Duffy, Trent	The Clock
Field, Robert	Geometric Patterns from Roman Mosaics: And How to Draw Them
Henderson, Harry	Modern Mathematicians
Hopkins, Lee Bennett	Marvelous Math: A Book of Poems
Hopkinson, Deborah	Sweet Clara and the Freedom Quilt
Juster, Norton	The Dot and the Line: A Romance in Lower Mathematics
Juster, Norton	The Phantom Tollbooth
Mathis, Sharon Bell	The Hundred Penny Box
Nagda, Ann Whitehead and Cindy Bickel	Tiger Math: Learning to Graph from a Baby Tiger
Neuschwander, Cindy	Sir Cumference and the Dragon of Pi: A Math Adventure
Neuschwander, Cindy	Sir Cumference and the First Round Table
Norton, Mary	The Borrowers
Packard, Edward	Big Numbers: And Pictures that Show Just How Big They Are!
Pappas, Theoni	Fractals, Googols and other Mathematical Tales
Pappas, Theoni	Math Talk: Mathematical Ideas in Poems for Two Voices
Pappas, Theoni	Mathematical Footprints: Discovering Mathematical Impressions All Around Us
Paulos, John Allen	Innumeracy: Mathematical Illiteracy and its Consequences
Paulos, John Allen	Once Upon a Number
Perl, Teri	Math Equals: Biographies of Women Mathematicians + Related Activities
Pittman, Helena Clare	A Grain of Rice
Reeves, Diane Lindsey	Career Ideas for Kids Who Like Math
Reimer, Luetta and Wilbert	Mathematicians Are People, Too: Stories from the Lives of Great Mathematicians, Volume One
Reimer, Luetta and Wilbert	Mathematicians Are People, Too: Stories from the Lives of Great Mathematicians, Volume Two
Sachar, Louis	Sideways Arithmetic from Wayside School
Sachar, Louis	More Sideways Arithmetic from Wayside School
Schimmel, Annemarie	The Mystery of Numbers
Schmandt-Besserat, Denise	The History of Counting
Schwartz, David M.	G Is for Googol: A Math Alphabet Book
Scieszka, Jon	Math Curse
Sharman, Lydia	The Amazing Book of Shapes: Explore Math Through Shapes and Patterns
Skurzynski, Gloria	On Time: From Seasons to Split Seconds
Stein, Sherman K.	How the Other Half Thinks
Stein, Sherman K.	Strength in Numbers: Discovering the Joy and Power of Mathematics in Everyday Life
Tang, Greg	The Grapes of Math: Mind-Stretching Math Riddles
Thompson, Lauren	One Riddle, One Answer
Wells, Robert E.	What's Smaller than a Pygmy Shrew?

Appendix D: Effective Mathematics Teaching Practices

Effective Mathematics Teaching Practices
Establish mathematics goals to focus learning. Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.
Implement tasks that promote reasoning and problem solving. Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies.
Use and connect mathematical representations. Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.
Facilitate meaningful mathematical discourse. Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.
Pose purposeful questions. Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.
Build procedural fluency from conceptual understanding. Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.
Support productive struggle in learning mathematics. Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.
Elicit and use evidence of student thinking. Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

"Practices" in Mathematics Education

NCTM Teaching Practices

(Effective Math Teacher Job Description)

- Establish mathematics goals to focus learning.
- **Implement tasks that promote reasoning and problem solving.**
- Use and connect mathematical representations.
- Facilitate meaningful discourse.
- Pose purposeful questions.
- Build procedural fluency from conceptual understanding.
- Support productive struggle in learning mathematics.
- Elicit and use evidence of student thinking

Principles to Action: Ensuring Mathematical Success for All (NCTM, 2014)

Standards for Mathematical Practice

(Effective Math Student Job Description)

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). *Common Core State Standards for Mathematics*. Washington, DC: Authors.

Appendix E: Articles

- *Constructing Meaning: Standards for Mathematical Practice*
- Accessible Mathematics, Chapter 11. *Just Ask Them "Why?"*
- *Listening to and Learning from Student Thinking*
- Minds on Mathematics, Chapter 1. *Minds-on Math Workshop*
- Powerful Problem Solving, Chapter 4. *Noticing and Wondering*
- National Council of Teachers of Mathematics (NCTM). *Statement of Beliefs (2016)*
- Math Work Stations, Chapter 1. *What Is a Math Work Station?*
- Classroom Discussions in Math, pp. xv-xvii. *Why Use Talk in Mathematics Classrooms?*