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HENDERSON COUNTY SCHOOLS

District Numeracy Program

Henderson County Schools

2010-11

Henderson County Schools District Numeracy Program January 2011

The Henderson County School District Numeracy Program includes elements mandated in Senate Bill 1 and components for systematic school improvement in numeracy outlined in *Making the Mathematics Curriculum Count* in the continuing *Breaking Ranks* series. The creation of this plan began in August, 2008 with the formation of the **District Math Cadre**. The District Math Cadre consists of teacher representatives, classroom experts from all schools and across grade levels P-14. The Math Cadre functions as a professional learning community (PLC) to build capacity for continuous improvement in mathematics across the district. The primary charge of the cadre was to examine the district math program and create a plan to address low student performance in mathematics. Secondary purposes were to narrow the focus on standards to essential expectations for each grade (Appendix A), to reflect and **to align the program to the Kentucky Core Academic Standards (KCAS)**.

Prior to the release of the new standards, the cadre examined research and resources including: *The Final Report of the National Mathematics Advisory Panel* – US Department of Education 2008, *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics* – National Council of Teachers of Mathematics (NCTM), *Making the Mathematics Curriculum Count* – National Association of Secondary Principals, *American Diploma Project (ADP) – Benchmarks for Mathematics 2004* – Achieve, INC, www.Singaporemath.com, Math Leadership Support Network (MLSN) materials – University of Kentucky, *Getting Students Ready for Algebra 1* – Southern Regional Education Board (SREB), *College Readiness Benchmarks* – ACT's Educational Planning and Assessment System (EPAS), *How the Brain Learns Mathematics* – Dr. Sousa, and *DesCartes: A Continuum of Learning* – Northwest Evaluation Association (NWEA). A review of the district's math curriculum was conducted (Appendix B) and district data from MAP, KCCT and ACT was triangulated to determine root causes to low performance in mathematics and an action plan was developed to address identified needs (Appendix C). The cadre also served as the mathematic textbook adoption committee for K-5 (Appendix D). A resource audit was completed by curriculum specialists for elementary and high school (Appendix E). Middle school is in progress.

The objective of the program is to provide a model framework for school numeracy plans that would meet Kentucky Core Academic Standards and prepare graduates for readiness in college and real world numeracy. It is imperative that all HCS students have the opportunity to develop math skills which will enable them to "...succeed globally". The district program will serve as a guide for Henderson County schools in creating their individual school numeracy plans.

2010-11 Math Cadre Members

Chair: Robin Thacker

Members: Melissa Allinder, Bonny Bailey, Marsha Carver, Martina Crowley, Tracey Ezell, Lori Farmer, Beth Francis, Sherry Gish, Dana Guess-Chumbler, **Brandy Haley, Bethany Harper, Jill Johnson**, Laura Kopshever, Shasta Norman, Nichole O'Nan, Emily Phillips, Chris Powers, Renee Priest, Casey Richison, Staci Risley, **Beth Roberts, Elizabeth Schmitt**, Jill Stallings, Bethany Watson, **Rebecca Wells**, Allyson Williams, and Marci Williams,

***Bold** denotes MLSN participant or member since 2008.

The Henderson County District Numeracy Program will include:

- A rigorous curriculum aligned with the Kentucky Core Academic Standards
- Balanced Assessment System – universal screener, diagnostic, progress monitoring, formative and summative assessments and end-of-course assessments for secondary courses
- On-going embedded professional development in numeracy for teachers in all content areas
- Monitoring and review of the math program by school and district administration
- Research-based instructional strategies to develop understanding of mathematical problem-solving and inter-related components: concepts, skills, processes, attitudes and metacognition
- Targeted intervention strategies implemented at all grades, documented in academic Response to Intervention (RTI) plans
- Ongoing feedback from teachers (formative and summative) regarding numeracy skills
- Create a culture to support numeracy
- Collaborative Leadership in support of numeracy through the district math cadre and school numeracy teams to increase capacity for raising mathematics achievement

The Henderson County District Numeracy Program provides the following assurances for students:

- A focus on post-secondary readiness
- 60 minutes of daily math instruction in grades K-5
- Acquisition and application of mathematical concepts and skills in a wide range of situations, including non-routine, open-ended and real-world problems
- Access to and use of technology tools (hardware, software, web-based) with training in their ethical use
- Progress monitoring and feedback regarding math skills
- Opportunities across the curriculum to solve problems involving math
- Best practice in math instruction
- Opportunities for accelerated learning in math (gifted programs)
- Intervention for students lacking proficient math skills

The Henderson County District Numeracy Program Key Mathematical Practices

- 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

K-5 Expectations (Achieve, INC).

- The K-5 standards are organized in domains: counting and cardinality; operations and algebraic thinking; number and operations in base ten; number and operations of fractions; measurement and data; and geometry. The domains vary appropriately by grade-level; counting and cardinality is a key domain in kindergarten, while number and operations of fractions is introduced in third grade. The grade-by-grade K-5 standards provide students with a solid foundation in whole numbers, addition, subtraction, multiplication, division, fractions and decimals which provide students with a strong foundation for learning and applying more demanding math concepts and procedures and for moving into robust applications.
- The standards follow the practices of high-performing countries and the recommendations of our own National Research Council’s Early Math Panel report by focusing kindergarten work on the number core: learning how numbers correspond to quantities, and learning how to put numbers together and take them apart (the beginnings of addition and subtraction). These are complicated ideas that take time to learn. Research suggests that without these critical building blocks in place, math performance will suffer in later years.
- The K-5 standards provide guidance to teachers on how to navigate their way through knotty topics such as fractions, negative numbers, and geometry, and do so by maintaining a continuous progression from grade to grade. Today’s best state standards as well as international models, education research, and the insights of professional mathematicians informed these grade-by-grade progressions.
- By drawing on the best lessons from high-performing countries, the standards provide the foundation for redesigning and focusing the math curriculum in an attempt to move away from the “mile wide and inch deep” curricula.
- The focus in the K-5 standards is comparable to that seen in high-performing countries. It allows students time to master topics by developing procedural fluency as well as conceptual understanding.

Core Academic Standards for Math Overview (Elementary)

<p><u>Counting and Cardinality (Kindergarten Only)</u></p> <ul style="list-style-type: none"> • Know number names and the count sequence • Counting to tell the number of objects • Comparing numbers <p><u>Operations and Algebraic Thinking</u></p> <ul style="list-style-type: none"> • Understand the place value system • Perform operations with multi-digit whole numbers and with decimals to hundredths <p><u>Number and Operation in Base Ten</u></p> <ul style="list-style-type: none"> • Understand the place value system • Perform operations with multi-digit whole numbers and with decimals to hundredths 	<p><u>Number and Operations – Fractions</u></p> <ul style="list-style-type: none"> • 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 <p><u>Measurement and Data</u></p> <ul style="list-style-type: none"> • 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 <p><u>Geometry</u></p> <ul style="list-style-type: none"> • Graph points on the coordinate plane to solve real-world and mathematical problems • Classify two-dimensional figures into categories based on their properties
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Essential Expectations (Elementary)

Grade Domains	Counting and Cardinality	Operations and Algebraic Thinking	Number & Operations In Base Ten	Measurement and Data	Geometry	Technology
K Clusters	<ul style="list-style-type: none"> Know number names and the count sequence Counting to tell the number of objects Compare numbers 	<ul style="list-style-type: none"> Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from 	<ul style="list-style-type: none"> Work with numbers 11 – 19 to gain foundations for place value 	<ul style="list-style-type: none"> Describe and compare measurable attributes Classify objects and count the number of objects in each category 	<ul style="list-style-type: none"> Identify and describe shapes Analyze, compare, create and compose shapes 	Graphical Representation <ul style="list-style-type: none"> Create simple graph as a class (e.g., Excel, Create a Graph Website - http://nces.ed.gov/nceskids/graphing/)
Formative Assessments				Summative Assessments		

Grade Domains	Operations and Algebraic Thinking	Number & Operations in Base Ten	Measurement and Data	Geometry	Technology
1 Clusters	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Extend the counting sequence Understand place value Use place value understanding and properties of operations to add and subtract 	<ul style="list-style-type: none"> Measure lengths indirectly and by iterating length units Tell and write time Represent and interpret data 	<ul style="list-style-type: none"> Reason with shapes and their attributes 	Graphical Representation <ul style="list-style-type: none"> Create simple graph (e.g., Excel, Create a Graph Website - http://nces.ed.gov/nceskids/graphing/)
Formative Assessments			Summative Assessments		

Grade Domains	Operations and Algebraic Thinking	Number & Operations in Base Ten	Measurement and Data	Geometry	Technology
<p style="text-align: center;">2 Clusters</p>	<ul style="list-style-type: none"> • Represent and solve problems involving addition and subtraction • Add and subtract within 20 • Work with equal groups of objects to gain foundations for multiplication 	<ul style="list-style-type: none"> • Understand place value • Use place value understanding and properties of operations to add and subtract 	<ul style="list-style-type: none"> • Measure and estimate lengths in standard units • Relate addition and subtraction to length • Work with time and money • Represent and interpret data 	<ul style="list-style-type: none"> • Reason with shapes and their attributes 	<p>Excel</p> <ul style="list-style-type: none"> • Select a cell • Identify cell by name (e.g., A3) • Differentiate between columns and rows • Enter simple data in a cell • Navigate between cells (tab, enter, arrows, or point and click) • Sort data (e.g., alphabetize) • Create simple graph <p>Paint</p> <ul style="list-style-type: none"> • Use shape tools
Formative Assessments			Summative assessments		

Grade Domains	Operations and Algebraic Thinking	Number & Operations in Base Ten	Number & Operations: <i>Fractions</i>	Measurement and Data	Geometry	Technology
<p style="text-align: center;">3</p> <p>Clusters</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Use place value understanding and properties of operations to perform multi-digit arithmetic 	<ul style="list-style-type: none"> • Develop understanding of fractions as numbers 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Reason with shapes and their attributes 	<p>Excel</p> <ul style="list-style-type: none"> • Identify cell by name (e.g., A3) • Differentiate between columns and rows • Enter data in an organized format • Navigate between cells (tab, enter, arrows, or point and click) • Sort data • Create simple graph • Label graph with title and legend <p>Paint</p> <ul style="list-style-type: none"> • Use shape tools
Formative Assessments				Summative Assessments		

Grade Domains	Operations and Algebraic Thinking	Number & Operations in Base Ten	Number & Operations: <i>Fractions</i>	Measurement and Data	Geometry	Technology
<p style="text-align: center;">4 Clusters</p>	<ul style="list-style-type: none"> • Use the four operations with whole numbers to solve problems • Gain familiarity with factors and multiples • Generate and analyze patterns 	<ul style="list-style-type: none"> • Generalize place value understanding for multi-digit whole numbers • Use place value understanding and properties of operations to perform multi-digit arithmetic 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Draw and identify lines and angles, and classify shapes by properties of their lines and angles 	<p>Excel</p> <ul style="list-style-type: none"> • Enter data in an organized format • Navigate between cells (tab, enter, arrows, or point and click) • Sort data • Use simple formulas Create a graph • Label graph with title, legend, x- and y-axis <p>Paint</p> <ul style="list-style-type: none"> • Use tools for shapes, lines and angles
Formative Assessments				Summative Assessments		

Grade Domains	Operations and Algebraic Thinking	Number & Operations in Base Ten	Number & Operations: <i>Fractions</i>	Measurement and Data	Geometry	Technology
<p style="text-align: center;">5 Clusters</p>	<ul style="list-style-type: none"> • Perform operations with multi-digit whole numbers and with decimals to hundredths • Write and interpret numerical expressions • Analyze patterns and relationships 	<ul style="list-style-type: none"> • Understand the place value system • Perform operations with multi-digit whole numbers and with decimals to hundredths 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Graph points on the coordinate plane to solve real-world and mathematical problems • Classify two-dimensional figures into categories based on their properties 	<p>Excel</p> <ul style="list-style-type: none"> • Navigate between cells (tab, enter, arrows, or point and click) • Sort data • Use simple formulas • Create a graph • Label graph with title, legend, x- and y-axis • Use databases, data files to analyze data
Formative Assessments				Summative Assessments		

Middle School Expectations (Achieve, INC)

- The 6-8 standards are organized in domains: ratios and proportional relationships, the number system, expressions and equations, functions, geometry, and statistics and probability.
- Having built a strong foundation in K-5, students are prepared for robust learning in geometry, algebra, and probability and statistics in middle school.
- Students who have completed 7th grade and mastered the content and skills of the K-7 standards will be well prepared for algebra in grade 8 or after.
- The middle school standards provide a coherent and rich preparation for high school mathematics.

Core Academic Standards for Math Overview (Middle)

<p><u>Ratios & Proportional Relationships</u></p> <ul style="list-style-type: none">• Analyze proportional relationships and use them to solve real-world and mathematical problems <p><u>The Number System</u></p> <ul style="list-style-type: none">• Know that there are numbers that are not rational, and approximate them by rational numbers <p><u>Expressions and Equations</u></p> <ul style="list-style-type: none">• Work with radicals and integer exponents• Analyze and solve linear equations and pairs of simultaneous linear equations• Understand the connections between proportional relationships, lines, and linear equations	<p><u>Functions</u></p> <ul style="list-style-type: none">• Define, evaluate, and compare functions• Use functions to model relationships between quantities <p><u>Geometry</u></p> <ul style="list-style-type: none">• Understand congruence and similarity using physical models, transparencies, or geometry software• Understand and apply the Pythagorean Theorem• Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres <p><u>Statistics and Probability</u></p> <ul style="list-style-type: none">• Investigate patterns of association in bivariate data
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Essential Expectations (Middle)

Grade Domains	Ratios & Proportional Relationships	The Number System	Expressions and Equations	Geometry	Statistics and Probability	Technology
6 Clusters	<ul style="list-style-type: none"> Understand ratio concepts and use ratio reasoning to solve problems 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Solve real-world and mathematical problems involving area, surface area, and volume 	<ul style="list-style-type: none"> Develop understanding of statistical variability Summarize and describe distributions 	Excel <ul style="list-style-type: none"> Wrap text, merge cells Sort data and use data filters Insert rows and columns Use AutoFill Use formulas Select and use appropriate chart Format chart and change location
Formative Assessments				Summative Assessments		

Grade Domains	Ratios & Proportional Relationships	The Number System	Expressions and Equations	Geometry	Statistics and Probability	Technology
7 Clusters	<ul style="list-style-type: none"> Analyze proportional relationships and use them to solve real-world and mathematical problems 	<ul style="list-style-type: none"> Apply and extend previous understandings of operations with fractions to add, subtract, multiply and divide rational numbers 	<ul style="list-style-type: none"> Use properties of operations to generate equivalent expressions Solve real-life and mathematical problems using numerical and algebraic expressions and equations 	<ul style="list-style-type: none"> Draw, construct and describe geometrical figures and describe the relationships between them Solve real-life and mathematical problems involving angle measure, area, surface and volume 	<ul style="list-style-type: none"> Use random sampling to draw inferences about a population Draw informal comparative inferences about two populations Investigate chance processes and develop, use and evaluate probability models 	Excel <ul style="list-style-type: none"> Wrap text, merge cells Sort data and use data filters Insert rows and columns Use AutoFill Use formulas Select and use appropriate chart Format chart and change location Scale City http://www.ket.org/scalecity/
Formative Assessments				Summative Assessments		

Grade Domains	The Number System	Expressions and Equations	Functions	Geometry	Statistics & Probability	Technology
8 Cluster	<ul style="list-style-type: none"> Know that there are numbers that are not rational, and approximate them by rational numbers 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Define, evaluate, and compare functions Use functions to model relationships between quantities 	<ul style="list-style-type: none"> Understand congruence and similarity using physical models, transparencies, or geometry software Understand and apply the Pythagorean Theorem Solve real-world and mathematical problems involving volume of cylinders, cones and spheres 	<ul style="list-style-type: none"> Investigate patterns of association in bivariate data 	Excel <ul style="list-style-type: none"> Wrap text, merge cells Sort data and use data filters Insert rows and columns Use AutoFill Use formulas Select and use appropriate chart Format chart and change location
Formative Assessments				Summative Assessments		

Grade Domains	Ratios & Proportional Relationships	The Number System	Expressions and Equations	Geometry	Statistics and Probability	Technology
MS 1 Cluster	<ul style="list-style-type: none"> Understand ratio concepts and use ratio reasoning to solve problems Analyze proportional relationships and use them to solve real-world and mathematical problems 	<ul style="list-style-type: none"> Apply and extend previous understandings of multiplication and division to divide fractions by fractions Apply and extend previous understandings of operations with fractions to add, subtract, multiply and divide rational numbers 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Solve real-world and mathematical problems involving area, surface area, and volume Area and circumference of a circle 	<ul style="list-style-type: none"> Develop understanding of statistical variability Summarize and describe distributions Use random sampling to draw inferences about a population Draw informal comparative inferences about two populations 	<p>Excel</p> <ul style="list-style-type: none"> Wrap text, merge cells Sort data and use data filters Insert rows and columns Use AutoFill Use formulas Select and use appropriate chart Format chart and change location
Formative Assessments			Summative Assessments			

Grade Domains	The Number System	Expressions and Equations	Functions	Geometry	Statistics and Probability	Technology
MS2 Cluster	<ul style="list-style-type: none"> Know that there are numbers that are not rational, and approximate them by rational numbers Analyze and solve linear equations and pairs of simultaneous linear equations Understand the connections between proportional relationships, lines and linear equations 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Define, evaluate, and compare functions Use functions to model relationships between quantities 	<ul style="list-style-type: none"> Draw, construct and describe geometrical figures and describe the relationships between them Solve real-life and mathematical problems involving angle measure, area, surface and volume Understand congruence and similarity using physical models, transparencies, or geometry software Understand and apply the Pythagorean Theorem Solve real-world and mathematical problems involving volume of cylinders, cones and spheres 	<ul style="list-style-type: none"> Use random sampling to draw inferences about a population Draw informal comparative inferences about two populations Investigate chance processes and develop, use and evaluate probability models Investigate patterns of association in bivariate data 	<p>Excel</p> <ul style="list-style-type: none"> Wrap text, merge cells Sort data and use data filters Insert rows and columns Use AutoFill Use formulas Select and use appropriate chart Format chart and change location
Formative Assessments				Summative Assessments		

Grade Domains	Ratios & Proportional Relationships	Expressions and Equations	Expressions and Equations	Geometry	Statistics and Probability	Technology
ADV MS Clusters	<ul style="list-style-type: none"> Understand ratio concepts and use ratio reasoning to solve problems Analyze proportional relationships and use them to solve real-world and mathematical problems 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 Understand the connections between proportional relationships, lines, and linear equations Analyze and solve linear equations and pairs of simultaneous linear equations 	<ul style="list-style-type: none"> Develop understanding of statistical variability Summarize and describe distributions Draw, construct and describe geometrical figures and describe the relationships between them Solve real-life and mathematical problems involving angle measure, area, surface and volume Understand congruence and similarity using physical models, transparencies, or geometry software Understand and apply the Pythagorean Theorem Solve real-world and mathematical problems involving volume of cylinders, cones and spheres 	<ul style="list-style-type: none"> Develop understanding of statistical variability Summarize and describe distributions Use random sampling to draw inferences about a population Draw informal comparative inferences about two populations Investigate chance processes and develop, use and evaluate probability models Investigate patterns of association in bivariate data 	Excel <ul style="list-style-type: none"> Wrap text, merge cells Sort data and use data filters Insert rows and columns Use AutoFill Use formulas Select and use appropriate chart Format chart and change location
	Number system				Functions	
	<ul style="list-style-type: none"> Know that there are numbers that are not rational, and approximate them by rational numbers 				<ul style="list-style-type: none"> Define, evaluate, and compare functions Use functions to model relationships between quantities 	
Formative Assessments				Summative Assessments		

High School Expectations (Achieve, INC)

- The high school standards are organized around five conceptual categories: number and quantity, algebra, functions, geometry, and statistics and probability.
- The high school standards call on students to practice applying mathematical thinking to real world issues and challenges; they prepare students to think and reason mathematically.
- The high school standards set a rigorous definition of college and career readiness, not by piling topic upon topic, but by demanding that students develop a depth of understanding and an ability to apply mathematics to novel situations, as college students and employees regularly do.
- Standards indicated with a (+) are beyond the college and career readiness level but are necessary to take advanced mathematics courses such as calculus, advanced statistics, or discrete mathematics.
- The high school standards emphasize mathematical modeling. This is the use of mathematics and statistics to analyze empirical situations, to understand them more fully, and to make better decisions. For example, the standards state, "Modeling links classroom mathematics and statistics to everyday life, work, and decision-making. Modeling is the process of choosing and using appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions. Quantities and their relationships in physical, economic, public policy, social and everyday situations can be modeled using mathematical and statistical methods. When making mathematical models, technology is valuable for varying assumptions, exploring consequences, and comparing predictions with data."

Core Academic Standards for Math Overview (High)

<p><u>Number and Quantity</u></p> <ul style="list-style-type: none">• Extend the properties of exponents to rational exponents• Reason quantitatively and use units to solve problems• Perform arithmetic operations with complex numbers• Represent and model with vector quantities• Perform operations on vectors <p><u>Algebra</u></p> <ul style="list-style-type: none">• Interpret the structure of expressions• Perform arithmetic operations on polynomials• Create equations that describe numbers or relationships• Understand solving equations as a process of reasoning and explain the reasoning <p><u>Functions</u></p> <ul style="list-style-type: none">• Understand the concept of a function and use function notation• Build a function that models a relationship between two quantities• Construct and compare linear, quadratic, and exponential models and solve problems• Extend the domain of trigonometric functions using the unit circle	<p><u>Geometry</u></p> <ul style="list-style-type: none">• Experiment with transformations in the plane• Understand similarity in terms of similarity transformations• Define trigonometric ratios and solve problems involving right triangles• Understand and apply theorems about circles• Translate between the geometric description and the equation for a conic section• Use coordinates to prove simple geometric theorems algebraically• Explain volume formulas and use them to solve problems• Visualize relationships between two-dimensional and three-dimensional objects• Apply geometric concepts in modeling situations <p><u>Statistics and Probability</u></p> <ul style="list-style-type: none">• Summarize, represent, and interpret data on a single count or measurement variable• Understand and evaluate random processes underlying statistical experiments• Understand independence and conditional probability and use them to interpret data• Calculate expected values and use them to solve problems• Use probability to evaluate outcomes of decisions
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Essential Expectations (High School):

Algebraic Concepts (HS 1) (Bold Advance Only)	Concept	<u>Number and Quantity</u>	<u>Algebra</u>	<u>Functions</u>	<u>Statistics & Probability</u>	<u>Technology</u>
	Domain	The Real Number System	Seeing Structure in Expressions	Interpreting Functions	Interpreting Categorical and Quantitative Data	Excel <ul style="list-style-type: none"> Sort data and use data filters Use formulas Select and use appropriate chart, format chart and change location Digital Tools <ul style="list-style-type: none"> Use data collection tools (e.g., data probe, PDA, GPS, or other digital handheld device) Use digital imaging devices (e.g., digital camera, digital camcorder, document camera, web camera, projector, scanner, etc.) Use portable storage devices (also known as thumb drive, jump drive, memory key, USB key, etc.) Use graphing calculators
	Clusters	<ul style="list-style-type: none"> Extend the properties of exponents to rational exponents Use properties of rational and irrational numbers 	<ul style="list-style-type: none"> Interpret the structure of expressions 	<ul style="list-style-type: none"> Understand the concept of a function and use function notation Analyze functions using different representations 	<ul style="list-style-type: none"> Summarize, represent, and interpret data on a single count or measurement variable Interpret linear models 	
	Domain	Quantities	Arithmetic with Polynomials and Rational Expressions	Building Functions	Making Inferences and Justifying Conclusions	
	Clusters	<ul style="list-style-type: none"> Reason quantitatively and use units to solve problems 	<ul style="list-style-type: none"> Perform arithmetic operations on polynomials 	<ul style="list-style-type: none"> Build a function that models a relationship between two quantities Build new functions from existing functions 	<ul style="list-style-type: none"> Understand and evaluate random processes underlying statistical experiments 	
	Domain	Expressions and Equations (8)	Creating Equations	Linear, Quadratic, and Exponential Models	Conditional Probability and the Rules of Probability	
	Clusters	<ul style="list-style-type: none"> Work with radicals and integer exponents Understand the connections between proportional relationships, lines, and linear equations 	<ul style="list-style-type: none"> Create equations that describe numbers or relationships 	<ul style="list-style-type: none"> Construct and compare linear, quadratic, and exponential models and solve problems 	<ul style="list-style-type: none"> Understand independence and conditional probability and use them to interpret data Use the rules of probability to compute probabilities of compound events in a uniform probability model 	
	Domain	Ratios & Proportional Relationships(7)	Reasoning with Equations and Inequalities			
Clusters	<ul style="list-style-type: none"> Analyze proportional relationships and use them to solve real-world and mathematical problem 	<ul style="list-style-type: none"> Understand solving equations as a process of reasoning and explain the reasoning Solve equations and inequalities in one variable Solve systems of equations Represent and solve equations and inequalities graphically 				

Algebra 1 (HS2) (Bold Advance Only)	Concept	<u>Number and Quantity</u>	<u>Algebra</u>	<u>Functions</u>	<u>Statistics and Probability</u>	<u>Technology</u>
	Domain	The Real Number System	Seeing Structure in Expressions	Interpreting Functions	Interpreting Categorical and Quantitative Data	Excel <ul style="list-style-type: none"> Sort data and use data filters Use formulas Select and use appropriate chart, format chart and change location
	Clusters	<ul style="list-style-type: none"> Extend the properties of exponents to rational exponents. 	<ul style="list-style-type: none"> Interpret the structure of expressions Write expressions in equivalent forms to solve problems 	<ul style="list-style-type: none"> Interpret functions that arise in applications in terms of the context Analyze functions using different representations (STEM) 	<ul style="list-style-type: none"> Summarize, represent, and interpret data on a single count or measurement variable Summarize, represent, and interpret data on two categorical and quantitative variables Interpret linear models 	
	Domain	Quantities	Arithmetic with Polynomials and Rational Expressions	Building Functions	Making Inferences and Justifying Conclusions	Digital Tools <ul style="list-style-type: none"> Use data collection tools (e.g., data probe, PDA, GPS, or other digital handheld device) Use digital imaging devices (e.g., digital camera, digital camcorder, document camera, web camera, projector, scanner, etc.) Use portable storage devices (also known as thumb drive, jump drive, memory key, USB key, etc.) Use graphing calculators
	Clusters	<ul style="list-style-type: none"> Reason quantitatively and use units to solve problems 	<ul style="list-style-type: none"> Perform arithmetic operations on polynomials Understand the relationship between zeros and factors of polynomials Use polynomial identities to solve problems (STEM) Rewrite rational expressions (STEM) 	<ul style="list-style-type: none"> Build Function that models a relationship between two quantities Build new functions from existing functions 	<ul style="list-style-type: none"> Understand and evaluate random processes underlying statistical experiments Make inferences and justify conclusions from sample surveys, experiments and observational studies 	
	Domain	The complex Number system	Creating Equations	Linear, Quadratic, and Exponential Models	Conditional Probability and the Rules of Probability	
	Clusters	<ul style="list-style-type: none"> Perform arithmetic operations with complex numbers 	<ul style="list-style-type: none"> Create equations that describe numbers or relationships 	<ul style="list-style-type: none"> Construct and compare linear, quadratic, and exponential models and solve problems Interpret expressions for functions in terms of the situation they model 	<ul style="list-style-type: none"> Understand independence and conditional probability and use them to interpret data 	
	Domain		Reasoning with Equations and Inequalities			
Clusters	<ul style="list-style-type: none"> Understand solving equations as a process of reasoning and explain the reasoning Solve equations and inequalities in one variable Solve System of equations Represent and solve equations and inequalities graphically 					

Algebra 2 (HS 3) (Bold Advance Only)	Concept	<u>Number and Quantity</u>	<u>Algebra</u>	<u>Functions</u>	<u>Statistics and Probability</u>	<u>Technology</u>
	Domain	Quantities	Reasoning w Equations and Inequalities	Interpreting Functions	Conditional probability and the Rules of Probability	Excel <ul style="list-style-type: none"> Sort data and use data filters Use formulas Select and use appropriate chart, format chart and change location Digital Tools <ul style="list-style-type: none"> Use data collection tools (e.g., data probe, PDA, GPS, or other digital handheld device) Use digital imaging devices (e.g., digital camera, digital camcorder, document camera, web camera, projector, scanner, etc.) Use portable storage devices (also known as thumb drive, jump drive, memory key, USB key, etc.) Use graphing calculators
	Clusters	<ul style="list-style-type: none"> Reason quantitatively and use units to solve problems 	<ul style="list-style-type: none"> Solve Systems of equations Solve Systems of equations (stem) 	<ul style="list-style-type: none"> Understand the concept of a function and use function notation Interpret functions that arise in applications in terms of the context Analyze functions using different representations 	<ul style="list-style-type: none"> Understand independence and conditional probability and use them to interpret data Use the rules of probability to compute probabilities of compound events in a uniform probability model 	
	Domain	Complex Number System		Building Functions	Using probability to make decisions	
	Clusters	<ul style="list-style-type: none"> Perform arithmetic operations with complex numbers Represent complex numbers and their operations on the complex plane Use complex numbers in polynomial identities and equations 	<ul style="list-style-type: none"> Build a function that models a relationship between two quantities (STEM) Build new functions from existing functions(STEM) 	<ul style="list-style-type: none"> Calculate expected values and use them to solve problems Use probability to evaluate outcomes of decisions 		
	Domain	Vector and Matrix Quantities		Linear, Quadratic, and Exponential Models	Interpreting Categorical and Quantitative Data	
	Clusters	<ul style="list-style-type: none"> Represent and Model with vector quantities Perform operations on matrices and use matrices in applications Perform operations on matrices and use matrices in applications. 	<ul style="list-style-type: none"> Construct and compare linear, quadratic, and exponential models and solve problems 	<ul style="list-style-type: none"> Summarize, represent, and interpret data on a single count or measurement variable 		

Geometry (Bold Advance Only)	Concept	<u>Number and Quantity/Functions</u>	<u>Geometry</u>	<u>Geometry</u>	<u>Geometry</u>	<u>Technology</u>
	Domain	The Real Number System	Congruence	Circles	Expressing Geometric Properties with Equations	Excel <ul style="list-style-type: none"> • Sort data and use data filters • Use formulas • Select and use appropriate chart, format chart and change location Digital Tools <ul style="list-style-type: none"> • Use data collection tools (e.g., data probe, PDA, GPS, or other digital handheld device) • Use digital imaging devices (e.g., digital camera, digital camcorder, document camera, web camera, projector, scanner, etc.) • Use portable storage devices (also known as thumb drive, jump drive, memory key, USB key, etc.) • Use graphing calculators
	Clusters	<ul style="list-style-type: none"> • Reason Quantitatively and use units to solve problems 	<ul style="list-style-type: none"> • Experiment with transformations in the plane Understand congruence in terms of rigid motions • Prove geometric theorems • Make geometric constructions 	<ul style="list-style-type: none"> • Understand and apply theorems about circles (STEM) • Find arc lengths and areas of sectors of circles 	<ul style="list-style-type: none"> • Translate between the geometric description and the equation for a conic section (STEM) • Use coordinates to prove simple geometric theorems algebraically 	
	Domain	Trigonometric Functions	Similarity, Right Triangles, and Trigonometry	Modeling with Geometry	Geometric Measurement and Dimension	
Clusters	<ul style="list-style-type: none"> • Extend the domain of trigonometric functions using the unit circle • Model periodic phenomena with trigonometric functions • Prove and apply trigonometric identities • Model periodic phenomena with trigonometric functions 	<ul style="list-style-type: none"> • Understand similarity in terms of similarity transformations • Prove theorems involving similarity • Define trigonometric ratios and solve problems involving right triangles • Apply trigonometry to general triangles(STEM) 	<ul style="list-style-type: none"> • Apply geometric concepts in modeling situations 	<ul style="list-style-type: none"> • Explain volume formulas and use them to solve problems (STEM) • Visualize relationships between two dimensional and three-dimensional objects 		

District Numeracy Program

Henderson County Schools

APPENDIX

2010-11

Appendix A – Completed May 2009

Henderson County Schools Essential Math Skills for Exiting Grade Level

Grade	Numbers/Operations	Measurement	Geometry	Data Analysis/Probability	Algebraic Thinking
Preschool	<ul style="list-style-type: none"> Identify, Model, Count and Write numbers 0 – 10. 	<ul style="list-style-type: none"> Be able to sort and describe objects Use size a position words (big, little, over, under, thick, thin) 	<ul style="list-style-type: none"> Understanding of shapes and colors (introduced) Be able to manipulate shapes and objects Be able to recognize basic shapes 	<ul style="list-style-type: none"> Sort objects at least by one way (color, size, shape) Verbalize similarities and differences Have been introduced to a bar graph and pictograph 	<ul style="list-style-type: none"> Recognize and copy an AB pattern Be able to create an AB pattern Extend an AB pattern
Kindergarten	<ul style="list-style-type: none"> Identify, Model, Count and Write numbers 0 – 50. Ordering & Comparing objects & numbers to 50. Know Place Value 1s and 10s. Skip Count by 5s, 10s to 100. Be able to Add & Subtract to 10 using single digits. Skip Count by 2's to 20 	<ul style="list-style-type: none"> Identify coins (quarter, dime, nickel, and penny) Tell time to hour Use non-standard units to measure Days of the week and months of the year Know measurement vocabulary (shorter, taller, more than, less than, bigger, smaller) 	<ul style="list-style-type: none"> Describe position in space up/down, left, right, in/out, in front of/behind Be able to recognize 2D shapes: circle, oval, square, rectangle 	<ul style="list-style-type: none"> Be able to read a simple pictograph with 1-1 correspondence and be able to make simple generalizations (more like bananas than apples) Be able to sort and describe objects 	<ul style="list-style-type: none"> Be able to identify, complete, extend, and create a simple shape and number patterns 0 - 50 (AB, ABA, ABC) Be able to model addition and subtraction of a whole number with objects, pictures, and symbols
1st Grade	<ul style="list-style-type: none"> Identify, Model, Write, Compare and Order numbers 0 – 100. Know Place Value to 100s (Decomposing & Composing). Mental mastery of Addition & Subtraction facts to 10. Addition & Subtraction without regrouping up to 2 digits. Know how to recognize if a number is an Even & Odd number. 	<ul style="list-style-type: none"> Tell time to the whole and half hour: and quarter hour Identify the value of the coins Use a ruler to measure to nearest inch or centimeter 	<ul style="list-style-type: none"> Be able to identify, compare, and describe 2D shapes: circle, oval, square, rectangle, triangle Be able to describe and give examples of geometric figures in terms of shape and number of sides. 	<ul style="list-style-type: none"> Be able to explain and make predictions from a bar graph and a pictograph 	<ul style="list-style-type: none"> Be able to count and write numbers by 2's, 5's, and 10's to 100.
2nd Grade	<ul style="list-style-type: none"> Identify, Model, Write, Compare, and Order numbers 0 – 1000 (Decomposing & Composing). Mental mastery of Addition & Subtraction facts to 20. Addition & Subtraction up to 3 digits with one regrouping. Be able to use estimation and rounding strategies to 10s. Identify fractions as part of a whole (1/2, 1/3 & ¼) 	<ul style="list-style-type: none"> Measure to nearest inch, foot, yard, and centimeter Identify time to nearest 5 min. Know difference between length and width Counting coins to \$1.00 Identify tools to measure liquid: cup and gallon 	<ul style="list-style-type: none"> Be able to recognize when an object is symmetrical Be able to identify 2D and 3D shapes and the correct name for each Example: Given a picture a student can identify a cone, sphere, cube, and cylinder Be able to relate 3D shapes to the real world 	<ul style="list-style-type: none"> Find title and labels on graph, tables, and charts Answer basic questions about simple tables and graphs (bar and picture) Collect data using simple tally charts 	<ul style="list-style-type: none"> Be able to apply correct property to a one step word problem, knowing vocabulary cum, difference, in all, how many more Be able to identify, complete, extend, and create a cumber pattern (2, 4, __, 8,10, __,14) Know addition and subtraction fact families

Grade	Numbers/Operations	Measurement	Geometry	Data Analysis/Probability	Algebraic Thinking
3rd Grade	<ul style="list-style-type: none"> Identify, Model, Write, Compare, and Order 0 – 10,000. Be able to line up 3 digit numbers to add and subtract (with & without regrouping). Round numbers to the nearest 100 and use estimation strategies. (including in addition & subtraction word problems) Mental mastery of multiplication facts 1-10 & their relationship to division. Identify and compare fraction with picture representations (fourths, thirds, halves) 	<ul style="list-style-type: none"> Combine coins and bills and make correct change to a dollar Identify elapsed time when given a start and finish time (by half hours) Measure and estimate to nearest quarter, half and inch Use customary and metric units of linear measurement (in., ½ inch, cm) Understand area and perimeter of figures 	<ul style="list-style-type: none"> Describe analyze, compare, and classify 2D shapes by their sides and angles Identify symmetrical figures and draw one line of symmetry Identify line segments, sides, and angles Recognize congruent figures 	<ul style="list-style-type: none"> Be able to read, analyze, a bar graph, pictograph, table, and tally chart Be able to display data in tables or charts. Know if an event is unlikely or likely. 	<ul style="list-style-type: none"> Choose the correct operation to solve a one step word problem Be able solve equations with missing addends Given the input and rule, be able to solve for the output Be able to extend a pattern when a rule is given
4th Grade	<ul style="list-style-type: none"> Identify, Model, Write, Compare and Order Whole numbers to seven digits and decimals to 100ths. Add & Subtract whole numbers, multiply 2 digit numbers by 2 digit multiples, and divide a 3 digit dividend by one digit divisor w/ remainders. Add, Subtract, Compare, and Order fractions with like denominators. Be able to identify multiples and factors of numbers and memorize division facts. Be able to apply estimation strategies to real world problems. 	<ul style="list-style-type: none"> Know conversion facts (12 inches=1 foot 16 ounces =1 pound) Know how to determine elapsed to quarter hour. Use standard units to measure length to the nearest ¼ inch, cm Be able to measure time to 5 minutes. Be able to determine perimeter and area of rectangles. 	<ul style="list-style-type: none"> Identify and apply geometric terms/elements (line, line segment, ray, point, parallel, perpendicular, right angle, acute angle, obtuse angle, 2 dimensional shapes Locate point on a coordinate grid Describe 3 dimensional figures by attributes (rectangular prism, cube, pyramid, sphere, cone, cylinder Apply understanding of similar figures, congruency and symmetry 	<ul style="list-style-type: none"> Be able to analyze, construct and interpret bar graph, pictograph, tables, charts, and simple Venn Diagrams (with two circles) Express simple probabilities as fractions Be able to collect data and choose correct type of data display 	<ul style="list-style-type: none"> Solve simple algebraic equations (N-14=21) Create and extend number pattern an be able to identify rule Describe input/output functions when rule is given Be able to solve one step word problems by creating a number sentence
5th Grade	<ul style="list-style-type: none"> Read, Write, Compare, and Order Whole numbers to 1,000,000 and decimals to 1000ths. Add & Subtract whole numbers & decimals, multiply 3 digit by 2 digit multiples (whole #'s & decimals), and divide 4 digit numbers by 1 digit divisor (including decimals), and add and subtract fractions with like denominators. Identify fractions and those that are equivalent and be able to change it to a decimal. Be able to apply basic operations & estimation strategies to real world problems Be able to identify prime and composite numbers, multiples and factors, and LCM. 	<ul style="list-style-type: none"> Determine perimeter and area of rectangles in real world situations Be able to convert units of measurement inches-feet, feet-yards, yards-miles, ounces to pounds. Measure to nearest ¼ and 1/8 inch Measure temperature to nearest degree in Fahrenheit and Celsius Be able to measure time to nearest minute and calculate elapsed time. 	<ul style="list-style-type: none"> Identify , label, draw, and describe 2D shapes, 3D figures, and their elements/attributes Describe symmetrical figures, draw lines of symmetry, and complete symmetrical figures Identify x and y axis, point of origin, ordered pairs, and plot points in quadrant 1 Recognize and label transformations (reflections, rotations, translations) Know the basic elements of lines, rays, segments, points, angles (obtuse, acute, and right), and polygon 	<ul style="list-style-type: none"> Be able to analyze, construct and interpret bar graph, pictograph, tables, charts, line graphs, and simple Venn Diagrams (with two circles) Identify or calculate mean, median, mode and range Be able to determine possible outcomes up to 12 Determine probability of a given event (as a fraction) 	<ul style="list-style-type: none"> Be able to solve two step word problems by creating the correct equations Determine value (variable, missing value, input and output Be able to extend patterns, find missing terms, and describe rules.

Grade	Numbers/Operations	Measurement	Geometry	Data Analysis/Probability	Algebraic Thinking
6th Grade	<ul style="list-style-type: none"> • Basic operations with fractions, whole numbers, and decimals • Simplify fractions number line (ruler) place numbers to the eighths • Estimating/rounding decimals to a given place value (to the nearest thousandths) • Apply the order of operations • All basic operations with whole numbers, fractions and decimals • Determine factors and multiples including GCF & LCM 	<ul style="list-style-type: none"> • Basic conversion including metric • Use a ruler to measure in centimeters and 1/8 inches • Calculate area and perimeter of parallelograms and triangles • Find perimeter and circumference of basic geometric shapes 	<ul style="list-style-type: none"> • Know the relationship between quadrilaterals • Identify triangles by their sides and by their angles • 3-d shapes (faces, edges, vertices – identifying) • Plot reflections and translations identify rotations in quadrant 1 • Plot points in all quadrants 	<ul style="list-style-type: none"> • Interpret and graph data to calculate mean, median, mode, and range • Collect, organize and construct line graphs and bar graphs • Determine simple probabilities using tree diagrams 	<ul style="list-style-type: none"> • Solve one-step equations using multiplication and division • Substitute for multiple variables in an expression • find the function in a input/output table – 1 step
7th Grade	<ul style="list-style-type: none"> • Solve simple percent, fraction and decimal problems mentally • Convert, order, and compare fractions/decimals/percents • Identify, explain, and apply all properties except distributive property • Add, subtract, multiply, and divide integers • Properties: commutative and associative 	<ul style="list-style-type: none"> • Measure to 1/16 of inch and millimeters • Area of trapezoids • Area and circumference of circles • Area of compound figures • Area and perimeter of irregular polygons 	<ul style="list-style-type: none"> • Find area and perimeter of irregular figures • Apply the coordinate system to real-life situations using all four quadrants clarification • Determine the sum of the measure of angles in a polygon (3 and 4 sided) • Understand difference between similar and congruent figures 	<ul style="list-style-type: none"> • Determine experimental probability and theoretical probability • Analyze, interpret, and create line plots & stem-and-leaf plots • Apply counting principle to determine sample space • Use appropriate graphs to display data 	<ul style="list-style-type: none"> • Solve two-step equations • Write algebraic expressions to represent word problems • will be able to create a function using a function table
8th Grade	<ul style="list-style-type: none"> • Use fractions, decimals, and percents to solve problems • Identify, compare, and order both rational and irrational numbers • Identify and compute with rational numbers • Distributive property 	<ul style="list-style-type: none"> • Calculate surface area and volume of polyhedrons, prisms, and cylinders • Calculate perimeter and area of irregular figures by using appropriate units • Pythagorean theorem 	<ul style="list-style-type: none"> • Understand and apply the Pythagorean Theorem • Transformations including dilations • Relationships between angles formed by parallel lines cut by a transversal not coordinate planes 	<ul style="list-style-type: none"> • Calculate probability of independent/dependent events • Basic understanding of the effects of outliers, clusters, and gaps • Misleading graphs • Combinations and permutations 	<ul style="list-style-type: none"> • Solve and graph linear equations • Represent a situation using graphs, tables, and equations • Solving 2-step equations and inequalities

Grade	Numbers/Operations	Measurement	Geometry	Data Analysis/Probability	Algebraic Thinking
Algebra I	<ul style="list-style-type: none"> • Solving and simplifying expression involving Linear Equations (multi-step equations, solving, graphing, table of values this includes $(3x+5)-4(9x+2)=1/2(4x-6)$ and $Y=6(3x+5x-7)$)Linear equations are anything with a degree of 1. • Word problems that lead to a linear equation, solve that equation, and interpret results. • Add, subtract, and multiplying binomials 			<ul style="list-style-type: none"> • Graphing Equations linear without technology • Word problems that lead to a linear equation, solve that equation, and interpret results. • Graph lines by equations, or descriptions of the line (vertical, horizontal, slope and a point, table of values, y or x intercepts.) 	<ul style="list-style-type: none"> • Solving and simplifying expression involving Linear Equations (multi-step equations, solving, graphing, table of values this includes $(3x+5)-4(9x+2)=1/2(4x-6)$ and $Y=6(3x+5x-7)$)Linear equations are anything with a degree of 1. • Graphing Equations linear without technology Word problems that lead to a linear equation, solve that equation, and interpret results. • Factoring GCF binomials and trinomials • Factoring trinomials ax^2+bx+c and x^2+bx+c in expression and equation forms by grouping or trial and error. • Add, subtract, and multiplying binomials • Graph lines by equations, or descriptions of the line (vertical, horizontal, slope and a point, table of values, y or x intercepts.)
Algebra II	<ul style="list-style-type: none"> • Simplify Radicals (Square root of a constant) without the TI program 			<ul style="list-style-type: none"> • Recognize linear, quadratic exponential functions from equations, tables or graphs. 	<ul style="list-style-type: none"> • Solve systems without technology (substitution or elimination) • Laws of exponents including Fractional exponents • Simplify Radicals (Square root of a constant) without the TI program • Solve quadric equations by factoring, taking the square root of both sides and using quadratic formula without TI program. • Characteristics of the quadratic equation y intercepts, vertex, zeros, graph, and interpret the parabola for application problems • Factoring of all types including multi-step problems, GCF, differences of squares, trinomials by trial and error or other methods, and factoring-by-grouping

					<ul style="list-style-type: none"> Recognize linear, quadratic exponential functions from equations, tables or graphs.
Geometry		<ul style="list-style-type: none"> Use similar figures to solve problems like the flag pole problem or scale drawing to model to real life Calculate the area and perimeter of polygons give basic information Calculate the area and circumference of circles given basic information Area and perimeter of composite figures Use Parallel and perpendicular properties from figures and equations to solve problems Identify and describe solids Surface area of right angle cones, cylinders, prisms, pyramids 	<ul style="list-style-type: none"> Show if two triangles are congruent Use similar figures to solve problems like the flag pole problem or scale drawing to model to real life Calculate the area and perimeter of polygons give basic information Calculate the area and circumference of circles given basic information Right triangle Trigonometry to solve for missing side lengths or angles in a triangle. Area and perimeter of composite figures Use Parallel and perpendicular properties from figures and equations to solve problems Identify and describe solids Triangle sum theorem Pythagorean Theorem Surface area of right angle cones, cylinders, prisms, pyramids Volume of right angle cones, cylinders, prisms, pyramids Transformations: translations, rotations, reflections 		<ul style="list-style-type: none"> Show if two triangles are congruent Right triangle Trigonometry to solve for missing side lengths or angles in a triangle. Use similar figures to solve problems like the flag pole problem or scale drawing to model to real life Use Parallel and perpendicular properties from figures and equations to solve problems Pythagorean Theorem Surface area of right angle cones, cylinders, prisms, pyramids Transformations: translations, rotations, reflections

Appendix B – Completed March 2010

Math Curriculum Review Henderson County Math Cadre

The Math Cadre conducted a crosswalk between the current Henderson County Curriculum for Mathematics based on Kentucky's Program of Studies, Core Content 4.1 and Descartes with the January draft of the Common Core K-12 Mathematics Standards aligned with SB 1.

Please note: The Common Core Standards continue to undergo revision. There were sequential drafts in February and March that have not been released. A resolution was signed by KDE, the Council of Postsecondary Education and the Educational Professional Standards Board that they will integrate the final standards approved by the Council of Chief State School Officers and National Governors Association Center for Best Practices in the Common Core Standards project.

There is a substantial paradigm shift to include:

- Less, deeper, slower
- Quantity vs. symbolism
- Hands-on/modeling of concepts
- Pedagogy - Subitizing and Cardinality
- Mastery before advancing to other concepts

At the elementary level, instead of addressing five (5) domains (Numbers/Operations, Measurement, Geometry, Data Analysis and Algebraic Thinking), there is a defined focus on two (2) domains (Number and Geometry). Number includes: counting and cardinality, base ten computations, early relations and operations, quality and measurement, operations and the problems they solve, and fractions. Geometry includes: shapes, coordinates, geometry. Minimally included is data -statistics.

At the middle school, instead of addressing five (5) domains (Numbers/Operations, Measurement, Geometry, Data Analysis and Algebraic Thinking), the focus is on two (2) domains (Algebra and Data). Algebra includes: ratios and proportional relationships, expressions and equations, and functions and the situations they model. Minimally included are number system and geometry.

At the high school, the standards seem similar between the new and old; however the depth is much more advanced.

There is a noticeable shift in thought process of how standards connect from one grade to the next. With the introduction of Core Content 3.0 and the Program of Studies, standards were placed in curriculum across grade levels through four steps: Introduce, Reinforce, Master and Extend. Now, the first three steps occur at each grade level.

Consideration for the following to ensure successful implementation:

- Timeline for scope and sequence
- Transition for curriculum between 4.1 and SB 1
- MAP - Accountability for schools/teachers
- PD on pedagogy and modeling
- Resources Inventory - What do we have? What do we need based on new pedagogy?
- Textbook/program – Time to develop understanding of what we need to select

Grade-level	Similarities	Removed	Added
K 16 vs. 42	<ul style="list-style-type: none"> • Count 100 • Place value (ones and tens) • Write 30 • Attributes (Large vs. Small) • Addition/Subtraction to 10 only • 2-D shapes 	<ul style="list-style-type: none"> • Number lines • Patterns • Calendar • Money • Time 	<ul style="list-style-type: none"> • Movement of shapes <ol style="list-style-type: none"> 1. Translation 2. Reflection 3. Rotation • 3-D shapes
1 st 22 vs. 46	<ul style="list-style-type: none"> • Numbers to 100 • Place value (ones, tens, hundreds) • Composing and decomposing • Addition/Subtraction 2 digit • Time • Fraction (half and quarter) 	<ul style="list-style-type: none"> • Number lines • Estimation • Multiplication • Division • Money • Probability 	<ul style="list-style-type: none"> • Construct and deconstruct 3 D shapes
2 nd 20 vs. 45	<ul style="list-style-type: none"> • Numbers to 1000 • Mental Mastery to 20 • Addition/Subtraction 3 digit • Fractions – $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ • Money to \$1.00 • Bar Graphs • Number lines 	<ul style="list-style-type: none"> • Symmetry • Patterns 	<ul style="list-style-type: none"> • Triangles – (Equilateral, Isosceles) • Radii • Diameter

Grade-level	Similarities	Removed	Added
3 rd 21 vs. 54	<ul style="list-style-type: none"> • Multiply – 1-10 • Fractions • Time • Measurement to ¼ inch • Bar graph • Word problems • Convert units of same measurement • Perimeter • Properties of addition 	<ul style="list-style-type: none"> • Compare whole, fractions and decimals • Patterns • Estimation • 3 digit division • Common multiples 	<ul style="list-style-type: none"> • Multiply 11 and 12 • Factor pairs • Factor equivalence • Compare area w/ square units
4 th 30 vs. 66	<ul style="list-style-type: none"> • Compare, order whole numbers and decimals • Multiply 2 digit • Divide by 1 digit • Add/Subtract Fractions (like denominators) • Estimation • Perimeter and area • Geometric terms and elements • Construction and interpret graphs and tables • Collect and display data 	<ul style="list-style-type: none"> • Decimals to thousandths • Estimation by rounding • Multiply fractions • Patterns • Coordinate System • Probability • Algebraic expression and equations 	<ul style="list-style-type: none"> • Property of arithmetic to explain logarithms • Dot Plots • Draw to scale • Angles/protractors • Associate various angles
5 th 21 vs. 62	<ul style="list-style-type: none"> • Order/compare decimals and fractions • Multiple representation of equivalent • Addition/Subtraction – decimals • Coordinate System • Construct and display data • Analyze and make inferences from data 	<ul style="list-style-type: none"> • LCM • Prime Numbers • Patterns • Functions • Output/input • Equation and inequalities • Mean, median and mode • Probability 	<ul style="list-style-type: none"> • Multiplication and division units by whole • 2 Digit division w remainder • Very large versus very small numbers • Property of arithmetic • Cubic volumes • Ratio comparisons • Multiple step problems

Grade-level	Similarities	Removed	Added
6 th 20 vs. 39	<ul style="list-style-type: none"> • Rational Numbers (elevation, temperature and account balance) • All basic operations • Algebraic thinking - Solve for unknown involving 2 equal ratios • Number lines/ Number system • Compare quantities with absolute zero • Cartesian Coordinate Plane – all 4 quadrants 	<ul style="list-style-type: none"> • Primes and factorization • Probability • Graphs • Basics of computation • Measurement • Elements of Geometry • Transformations 	<ul style="list-style-type: none"> • Integers/rational numbers • All 4 quadrants in the coordinate plane • Solving equations • Area • Volume • Surface area
7 th 26 vs. 45	<ul style="list-style-type: none"> • Integers and Rational Numbers (elevation, temperature and account balance) • Probability/Statistics • Graphs to display data • Algebraic expressions for word problems • Ratios/Proportional Relationships • Number System • Expressions and Equations 	<ul style="list-style-type: none"> • Circle graph • Estimation • Prime numbers/LCM/GCF • Operations without purpose • Measurement • Elements of 2D geometry • Graphing ordered pairs • Box and whisker plots • Most graphs except histogram and bar graph • Mean, median and mode • Basic patterns 	<ul style="list-style-type: none"> • Direct variations • Rational numbers • Absolute value equations • Similar triangles • Volume • Dilations • Cross-sections of 3D shapes • Equations-multi-step
8 th 22 vs. 39	<ul style="list-style-type: none"> • Functions – 2 variable quantities • Number System – Irrational numbers • Geometry – Pythagorean theorem, proofs, angle sum of triangles • Statistics • Probability – theoretical and experimental • Graph linear functions 	<ul style="list-style-type: none"> • All geometry except Pythagorean Theorem • No operations w/numbers • No basic equation solving • Circle graph, line graph, bar graph, histogram 	<ul style="list-style-type: none"> • More in depth with the algebraic thinking and including graphs of lines • Intersection of lines • Constructions in geometry • Linear function for scatter plot • Compound probabilities

Grade-level	Similarities	Removed	Added
High School 136 vs. 143	<ul style="list-style-type: none"> • Numbers/operation • Measurement • Geometry • Data Analysis/Probability • Algebraic Thinking 		<ul style="list-style-type: none"> • Expressions – structure, arithmetic of polynomials and rational functions • Equations • Functions • Coordinates • Modeling • Statistics • Probability • Geometry • Pre-Calculus

Appendix C – Created May 2010

Math Cadre Action Plan

Purpose: Address low percentage of HCS students at proficiency in Math.

Priority List:

1. Develop Common Math Language
2. Determine PD needed
3. Determine activities
4. Increase understanding of Math not just application

Goal: Develop and implement school-wide tools for math instruction.

	Root Cause Question	I/P/I/NI	Timeline	Impact Check (April 2011)
1	<p>What additional data do we have on ORQs to validate/predict student performance?</p> <p>11-School</p> <p>School/District Common Assessment</p>	I	<p>2010-11</p> <p>Continue</p>	<p>District Common Assessment</p> <p>School Common Assessments</p> <p>Performance Calculator – Some elementary and most secondary schools implemented and used to analyze common assessments for 2010-11 school year. Schools moved toward group scoring for common assessments</p> <p>All Algebra 1 and 2 common assessments were analyzed by schools and reviewed by district.</p>
2	<p>Is the ORQ process being practiced and modeled consistently K-12?</p> <p>11-District</p> <p>5-School</p>	IP	<p>2010-11</p> <p>Refine</p>	<p>Document strategies to include in Math Cadre Instructional Strategies Notebook</p> <p>Create a common math ORQ Rubric to be used district-wide. Implemented for Algebra 1 and 2 courses and piloting K -8 Spring 2011.</p>

3	How do reading and writing skills impact ORQ performance? 2-District 10-School	IP	2010-11 Continue	New Common Core Reviewed Skills Coach: Write Math- Spring 2011 Secondary – LFT training to incorporate reading and writing strategies Elementary – model and focus on power verbs
4	Do questions reflect high order thinking in classrooms on a daily basis? 11-School	IP	2010-11 Continue	RAISE – included elementary 2010-11 Elementary – MIF and Every Day Counts Training Quadrant Posters were created specifically for mathematic courses – January 2011 Dr. Sousa recommended that the district conduct PD on Questioning for Higher Order Thinking and based on brain research. – March 2011 Plan for July 2011
5	Are materials, resources and instructional strategies the same across the district? 11-District	IP	2010-11 FOCUS	Core Math Program purchased for 2010-11 school year. Implementation Guide followed. Elementary courses aligned to KCAS and implemented 2010-11. Bar-modeling PD for secondary teachers – summer 2011 Resource audit (APPENDIX D) was conducted K-12 to determine gaps between KCAS and current curriculum. Elementary – MIF and Everyday Counts and secondary KCAS and current units. Secondary courses were re-aligned at secondary level to the KCAS for 2011-12 implementations.
6	Have EPAS test taking strategies been identified/shared/implemented across the district with staff and students? 11-District	IP	2010-11 FOCUS	Overview 3 years ago Reviews conducted in secondary math courses for Explore, PLAN and ACT. Spring 2011 Elementary – PD needed for elementary principals and teachers – Fall 2011

Appendix D – Completed- May 2010

Textbook Adoption for 2010-11

The Math Cadre was formed in August 2008 to address student performance in mathematics and served as the committee for math textbook adoption. It consists of teacher representatives from all schools and across grade-levels P-14. Much study has gone into the selection of math texts. Over the past two (2) years, teachers, principals and district staff have visited schools that have implemented Math in Focus. *Math in Focus* asks students to work with fewer standards at each grade level while going deeper into the concepts, resulting in an expectation of mastery of the standards at each grade. The cadre has also studied the draft of the National Common Core Standards for Math. Once finalized, these standards will be adopted by the state of Kentucky. The math cadre, along with other teachers, curriculum specialists and principals investigated available math materials. By consensus at the March meeting, the Math Cadre proposed that the *Math in Focus* series be adopted and implemented K-5 and made this recommendation to the elementary school principals at the principals' April meeting. Principals, in discussion with their school staff and SBDM Councils, agreed to the Math Cadre's recommendation. On May 17, 2010, the Henderson Board of Education gave assurance of financial support for Math in Focus as approved by KDE.

NOTE: District Implementation Guide was created (June 2010) and followed during the 2010-11 school year.

Appendix E – Completed April 2011(Elementary) January 2011 (High School) Currently (Middle School)

Resource Audit

Crosswalk Grade K

KCAS	Math In Focus	Everyday Counts	Gap
Domain: Counting and Cardinality			
Sub-domain: Know number names and the count sequence.			
K.CC.1: Count to 100 by ones and by tens.	Numbers & Operations: Count <ul style="list-style-type: none"> • Count up to 20 objects in a set • Count on and back to 20 • Count in 2's and 5's up to 20 Chapter 4 (L1, 3, 4) Chapter 6 (L1,2,3,4) Chapter 12 (L1-4) Chapter 14 (L1-3)	TE: Aug./ Sept. 21–26, Oct. 39–40, Nov. 48–49, 52–53, Dec. 66–67, Jan. 75–77, 79–80, Feb. 92–93, Mar. 106–108, Apr. 121–122, May 132–133	
K.CC.2: Count forward beginning from a given number within the known sequence (instead of having to begin at 1).	Numbers & Operations: Count <ul style="list-style-type: none"> • Count up to 20 objects in a set • Count on and back to 20 • Count in 2's and 5's up to 20 Chapter 4 (L1, 3, 4) Chapter 6 (L1,2,3,4) Chapter 12 (L1-4) Chapter 14 (L1-3)	TE: Aug./Sept 21–24, 28, Nov. 52–53, Dec. 66–67, Jan. 75–77, 79–80, Feb. 90, 92–93, 96, Apr. 118–119, 121–122, May 132–133	
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).	Numbers & Operations: Count <ul style="list-style-type: none"> • Count up to 20 objects in a set Numbers & Operations: Number Representation <ul style="list-style-type: none"> • Use numbers to represent quantities and write numbers. Representation: Use Representation to Model, Organize, and Record <ul style="list-style-type: none"> • Use numbers and numerals to represent quantities up to 20 Chapter 1 (L1, 3-5) Chapter 2 (L1-4) Chapter 6 (L3)	TE: Oct.37, 39, Jan. 76	

Sub-domain: Counting to tell the number of objects.

<p>K.CC.4: Understand the relationship between numbers and quantities; connect counting to cardinality.</p> <p>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.</p>	<p>Numbers & Operations: Count</p> <ul style="list-style-type: none"> Using numbers and numerals to represent quantities Applying the concepts of numbers 1-20 by matching one-to-one Understanding the concept of <i>one more</i>. <p>Representation: Use Representation to Model, Organize, and Record</p> <ul style="list-style-type: none"> Use concrete models to create a set with a given number of objects (up to 20) <p>Chapter 1 (L1-6) Chapter 2 (L1-7) Chapter 4 (L1-2, 6-9) Chapter 6 (L1-5)</p>	<p>TE: Aug./Sept. 20, 21–26, Oct. 34–36, 37–38, 43, Nov. 48–49, Dec. 66–67, Feb. 89–90, May 132–133</p>	
<p>K.CC.4: Understand the relationship between numbers and quantities; connect counting to cardinality.</p> <p>b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.</p>		<p>TE: Oct. 34–36, Nov. 48–49, Feb. 89–90, May 132–133</p>	
<p>K.CC.4: Understand the relationship between numbers and quantities; connect counting to cardinality.</p> <p>c. Understand that each successive number name refers to a quantity that is one larger</p>		<p>TE: Aug./Sept. 25–26, Oct. 38, 39–40, Nov. 51, Dec. 64–65, 66, Jan. 76, 80, Feb. 93, 98–99, Mar. 108</p>	
<p>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.</p>	<p>Numbers & Operations: Sets and Numbers; Count</p> <ul style="list-style-type: none"> Use concrete models to create set with a given number of objects (up to 20) Count up to 20 objects in a set <p>Representation: Use Representation to Model, Organize, and Record</p> <ul style="list-style-type: none"> Use concrete models to create a set with a given number of objects (up to 20) <p>Chapter 4 (L1-9) Chapter 6 (L1-6)</p>	<p>TE: Sept. 23, 25–27, Oct. 39, Nov. 54–55, 63, 64–65, 67, Mar. 103–104, May 135</p>	

Sub-domain: Comparing numbers.

<p>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. (Note: Include groups with up to ten objects.)</p>	<p>Numbers & Operations: Compare & Order</p> <ul style="list-style-type: none"> • Compare and order sets up to 20 • Compare and order using the terms <i>fewer</i>, <i>more</i>, and <i>less</i>. <p>Chapter 2 (L6-7)</p>	<p>TE: Oct.41–43, Nov.54–55, Apr.122–123, May 132–133</p>	
<p>K.CC.7: Compare two numbers between 1 and 10 presented as written numerals</p>		<p>TE: Sept. 25–26, Oct.37–38, 40, Nov. 50–51, Dec.62–63, 64–65, 66–67, Feb. 90–91, May 132–133</p>	<p>Compares sets; not numbers</p>

Sub-domain: Understanding addition as putting together and adding to, and understanding subtraction as taking apart and taking from.

<p>K.OA.1: Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. (Note: Drawings need not show details, but should show the mathematics in the problem -- this applies wherever drawings are mentioned in the Standards.)</p>	<p>Number & Operations: Whole Number Computation: Addition and Subtraction Real-World Problems</p> <ul style="list-style-type: none"> • Represent addition and subtraction stories <p>Numbers & Operations: Whole Number Computation: Addition and Subtraction</p> <ul style="list-style-type: none"> • Model joining and separating sets <p>Algebra: Number Sentences and Equations</p> <ul style="list-style-type: none"> • Model addition and subtraction stories with addition and subtraction stories <p>Problem Solving: Build Skills through Problem Solving</p> <ul style="list-style-type: none"> • Build skills in addition and subtraction through problem solving <p>Problem Solving: Solve Real World Problems</p> <ul style="list-style-type: none"> • Solve real-world problems involving addition and subtraction <p>Representation: Use Representations to Model, Organize, and Record</p> <ul style="list-style-type: none"> • Model addition and subtraction stories with addition and subtraction number sentences • Represent addition and subtraction stories 	<p>TE: Sept.25–26, Oct.37, 39–40, Nov. 48–49, Dec.64–65, 66–67, Mar.105–106, May 131–132</p>	
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	Chapter 17 (L1-L2) Chapter 18 (L1-L3)		
K.OA.2: Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.	<p>Number & Operations: Whole Number Computation: Addition and Subtraction Real-World Problems</p> <ul style="list-style-type: none"> Represent addition and subtraction stories <p>Algebra: Number Sentences and Equations</p> <ul style="list-style-type: none"> Model addition and subtraction stories with addition and subtraction stories <p>Problem Solving: Build Skills through Problem Solving</p> <ul style="list-style-type: none"> Build skills in addition and subtraction through problem solving <p>Problem Solving: Solve Real World Problems</p> <ul style="list-style-type: none"> Solve real-world problems involving addition and subtraction <p>Representation: Use Representations to Model, Organize, and Record</p> <ul style="list-style-type: none"> Model addition and subtraction stories with addition and subtraction number sentences Represent addition and subtraction stories <p>Chapter 17 (L1-L2) Chapter 18 (L1-L3)</p>	TE: Sept.23, Oct.37, Nov. 48–49, Dec.64–65, Apr.120–121, May 131–132	
K.OA.3: Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).	<p>How Many in All?</p> <ul style="list-style-type: none"> Count On <p>Chapter 9 (L5)</p>	TE: Oct.41, Dec. 62–63, Mar.106, Apr.120–121, May 131–132	
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.	<p>Numbers & Operations</p> <ul style="list-style-type: none"> Model joining and separating sets <p>Chapter 14 (L1)</p>	TE: Nov.49, Jan. 77–79, Feb. 90–91, Apr.118–119, May 131–132	
K.OA.5: Fluently add and subtract within 5.		TE: Dec.62–63, Jan.77–79, Feb.90–91, Apr.120–121, May 130–132	Teaches adding and subtracting but doesn't assess fluency of it

Sub-domain: Working with numbers 11 – 19 to gain foundations for place value.

<p>NBT.1: Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equations (e.g., $18 = 10 + 8$); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.</p>	<p><i>Not in Math in Focus</i></p>	<p>TE: Mar.103–104, Apr. 118–119, May 130</p>	<p>Gap: Record each composition or decomposition by a drawing or equation (e.g., $18 = 10 + 8$)</p>
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Domain: Number and Operations – Fractions(NF)

<p>None</p>			
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Domain: Measurement and Data

Sub-domain: Describe and compare measurable attributes.

<p>K.MD.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.</p>	<p>Geometry: Size and Position</p> <ul style="list-style-type: none"> Understand big, middle-sized, and small <p>Measurement: Length and Distance</p> <ul style="list-style-type: none"> Compare lengths and heights using non-standard units Compare and order lengths (long, short, longest, shortest) <p>Measurement: Weight/Mass</p> <ul style="list-style-type: none"> Order objects by weight Compare weights using non-standard units. <p>Measurement: Capacity/Volume</p> <ul style="list-style-type: none"> Compare capacities using non standard units <p>Representation: Interpret Phenomena through Representation</p> <ul style="list-style-type: none"> Show understanding of big, middle sized, small, and same size. <p>Chapter 3 (L1, 4) Chapter 5 (L1) Chapter 7 (L3) Chapter 15 (L1-5)</p>	<p>TE: Nov.54–55, 56–57, Dec. 67–69, 70–71, Jan.82–83, Mar.112–113, Apr.124–125</p>	
<p>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. <i>For example, directly</i></p>	<p>Number and Order: Compare and Order</p> <ul style="list-style-type: none"> Compare and order using the terms fewer, more, and less. <p>Geometry: Size and Position</p> <ul style="list-style-type: none"> Understand big, middle-sized, and small 	<p>TE: Sept.27–29, Oct.33, Nov.56–57, Dec.70–71, Jan.80–81, 82–83, Feb. 98–99, Mar.112–113, Apr.124–125</p>	

<p><i>compare the heights of two children and describe one child as taller/shorter.</i></p>	<p>Measurement: Length and Distance</p> <ul style="list-style-type: none"> • Compare lengths and heights using non-standard units • Compare and order lengths (long, short, longest, shortest) <p>Measurement: Weight/Mass</p> <ul style="list-style-type: none"> • Order objects by weight • Compare weights using non-standard units. <p>Measurement: Capacity/Volume</p> <ul style="list-style-type: none"> • Compare capacities using non standard units <p>Representation: Interpret Phenomena through Representation</p> <ul style="list-style-type: none"> • Show understanding of big, middle sized, small, and same size. <p>Chapter 7 (L3) Chapter 15 (L1-L15)</p>		
<p>Sub-domain: Classify objects and count the number of objects in each category.</p>			
<p>K.MD.3: Classify objects or people into given categories; count the numbers in each category and sort the categories by count. (Note: Limit category counts to be less than or equal to 10.)</p>	<p>Number and Order: Compare and Order</p> <ul style="list-style-type: none"> • Compare and order using the terms fewer, more, and less. <p>Algebra: Patterns</p> <ul style="list-style-type: none"> • Describe a rule for sorting objects <p>Geometry: Two-Dimensional Shapes</p> <ul style="list-style-type: none"> • Identify, describe, sort, and classify two-dimensional shapes <p>Geometry: Three-Dimensional Shapes</p> <ul style="list-style-type: none"> • Name and sort shapes <p>Problem Solving: Identify, Demonstrate, and Explain Mathematical Proof</p> <ul style="list-style-type: none"> • Describe, sort, and classify two- and three dimensional shapes <p>Data Analysis: Classifying and Sorting</p> <ul style="list-style-type: none"> • Understanding similarities and differences in objects and shapes • Sorting an classifying objects using one or two attributes <p>Representation: Use Representations to Model, Organize, and Record</p> <ul style="list-style-type: none"> • Describe a rule for sorting objects <p>Chapter 16 (L1-3)</p>	<p>TE: Oct.36, 41–43, 54–55, Dec. 67–69, Jan. 80–81, Feb. 94–97, Mar.108–111, Apr.122–123, May 135</p>	

Domain: Geometry

Sub-domain: Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

<p>K.G.1: Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as <i>above</i>, <i>below</i>, <i>beside</i>, <i>in front of</i>, <i>behind</i>, and <i>next to</i>.</p>	<p>Geometry: Size and Position</p> <ul style="list-style-type: none"> Describe and compare objects by positions <p>Geometry: Two Dimensional Shapes</p> <ul style="list-style-type: none"> Name flat shapes that make up real-world objects <p>Chapter 3 (L2) Chapter 5 (L4-5)</p>	<p>TE: Nov.46–47, Jan.74–75, Mar.102–103, Apr.116–117, May 133–135</p>	<p>Gap: Vocabulary-above, below, beside</p>
<p>K.G.2: Correctly name shapes regardless of their orientations or overall size.</p>	<p>Geometry: Two Dimensional Shapes</p> <ul style="list-style-type: none"> Name flat shapes that make up real-world objects <p>Geometry: Three Dimensional Shapes</p> <ul style="list-style-type: none"> Name and sort solid shapes <p>Chapter 7 (L3)</p>	<p>TE: Sept.20,Nov. 46–47, Dec.60–61, Mar.102–103, May 133–135</p>	
<p>K.G.3: Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).</p>		<p>TE: Sept.28–29, Dec. 60–61, Jan.74–75, Apr.116–117</p>	<p>Gap</p>
<p>Sub-domain: Analyze, compare, create, and compose shapes.</p>			
<p>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).</p>	<p>Geometry: Two-Dimensional Shapes</p> <ul style="list-style-type: none"> Identify similarities and differences Identify, describe, sort, and classify two dimensional shapes Compare areas using non-standard units <p>Geometry: Three Dimensional Shapes</p> <ul style="list-style-type: none"> Name and sort solid shapes Understand that three dimensional shapes are made up of two-dimensional shapes <p>Chapter 7 (L1-5)</p>	<p>TE: Nov.46–47, May 133–135</p>	<p>Number of sides referred to as “edges” Vertices referred to as “corners”</p>
<p>K.G.5: Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.</p>			<p>Gap</p>
<p>K.G.6: Compose simple shapes to form larger shapes. <i>For example, “Can you join these two triangles with full sides touching to make a rectangle?”</i></p>			<p>Gap</p>

Resource Audit
Crosswalk Grade 1st

KACS	Math In Focus	Everyday Counts	Gap
Domain: Operations and Algebraic Thinking (OA)			
Sub-domain: Represent and solve problems involving addition and subtraction.			
<p>1.OA.1: Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. (Note: See Glossary, Table 1.)</p>	<p>Chapter 3 SE/TE-A: 48-50, 52, 57-63</p> <p>Chapter 4 SE/TE-A: 67, 70, 74-76, 82-85, 87-89, 93</p> <p>Chapter 8 SE/TE-A: 195, 198, 203, 205, 209-213, 217 Workbook A: 61A, 63A, 93A, 93C, 215A, 217A, 249D, 249G</p> <p>Chapter 13 SE/TE-B: 123-129</p> <p>Chapter 14 SE/TE-B: 147-148</p> <p>Workbook B: 129A, 131D, 140A, 148A, 149A</p>	<p>TE :Aug./Sept. 21–23, Sept.30–31, 36–38, 40–42, Nov.50–51, 55–57, Dec.64–65, Jan. 79, Feb. 89–90, Mar. 104–105, Apr.117–119, May 130–131</p>	
<p>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.</p>	<p>Chapter 8 SE/TE-A: 214</p> <p>Workbook A: 215A</p> <p>Chapter 13 SE/TE-B: 119-122, 129, 130</p> <p>Workbook B: 122A, 129B, 131C, 148A Assessments: 36, 82, 109, 125, 167 Enrichment B: 33 Reteach B: 85-86 Extra Practice B: 61-62</p>		

Sub-domain: Understand and apply properties of operations and the relationship between addition and subtraction.

<p>1.OA.3: Apply properties of operations as strategies to add and subtract. (Note: Students need not use formal terms for these properties.) <i>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.)</i></p>	<p>Chapter 2 SE/TE-A: 36</p> <p>Chapter 3 SE/TE-A: 48-52, 63</p> <p>Workbook A: 52A, 63A, 93C, 215A</p> <p>Chapter 13 SE/TE-B: 120, 130</p> <p>Chapter 14 137-138, 140, 146, 149</p> <p>Workbook B: 140A, 148A</p>	<p>TE: Jan. 75–77, Apr.117–119</p>	
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<p>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.</p>	<p>Chapter 4 SE/TE-A: 67-73, 74-76, 77-81, 82-91, 92-93</p> <p>Chapter 8 SE/TE-A: 203-208, 210-215, 217</p> <p>Workbook A: 73A, 76A, 81A, 91A, 93A, 93C, 208A, 215A,217A, 249E, 249F, 249G</p> <p>Chapter 13 SE/TE-B: 101-110, 113-118, 124-129, 131</p> <p>Chapter 17 SE/TE-B: 222-229, 230-236, 239</p> <p>Workbook B: 110A, 118A, 129A, 129B, 131A</p>		
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Sub-domain: Add and subtract within 20.

<p>1.OA.5: Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).</p>	<p>Chapter 3 SE/TE-A: 43-47, 62</p> <p>Chapter 4 SE/TE-A: 70-73</p> <p>Workbook A: 47A, 63A, 73A, 93A</p> <p>Chapter 12 SE/TE-B: 57, 61</p>	<p>TE: Dec.68–69, Feb.87–89, Mar.98–99, 102–103</p>	
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	<p>Chapter 13 SE/TE-B: 84</p> <p>Chapter 16 SE/TE-B:176, 187, 189-190</p> <p>Workbook B: 62A, 93A, 201A, 215A, 239D</p>		
<p>1.OA.6: Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).</p>	<p>Chapter 3 SE/TE-A: 42-47, 48-52, 53-56, 57-61, 62-63</p> <p>Chapter 4 SE/TE-A: 67-73, 74-76, 77-81, 82-91, 92-93</p> <p>Chapter 8 SE/TE-A: 195-197, 198-199, 200-202, 203-208, 209-215, 216-217</p> <p>Workbook A: 47A, 52A, 56A, 61A, 63A, 73A, 76A, 81A, 91A, 93A, 93C, 197A, 199A, 202A, 208A, 208B, 215A, 217A, 249C, 249D, 249E, 249F, 249G</p> <p>Chapter 13 SE/TE-B: 119-122, 123-129, 130</p> <p>Chapter 14 SE/TE-B: 136-137, 139-140, 141-142, 145-148, 149</p> <p>Workbook B: 122A, 129A, 129B, 131A, 131C, 140A, 148A, 149A</p>	TE: Jan. 75–77, Apr.117–119	
Sub-domain: Work with addition and subtraction equations.			
<p>1.OA.7: Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. <i>For example, which of the following equations are true and which are false? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$.</i></p>	<p>Chapter 3 SE/TE-A: 42-47, 48-52, 53-56, 57-61, 62-63</p> <p>Chapter 4 SE/TE-A:67-73, 74-76,77-81, 82-91, 92-93</p> <p>Chapter 8 SE/TE-A:195-197, 198-199, 200-202, 203-208, 209-215, 215A, 216-217</p>		

	<p>Workbook A: 47A, 52A, 56A, 61A, 63A, 73A, 76A, 81A, 91A,93A, 197A, 199A, 202A, 208A, 208B, 215A, 217A, 249C, 249D, 249E, 249F, 249G</p> <p>Chapter 13 SE/TE-B: 84-93, 95-100, 101-110, 112-118, 119-122, 123-129, 130-131</p> <p>Chapter 14 SE/TE-B: 136-140, 141-148, 149</p> <p>Chapter 17 SE/TE-B:209-215, 216-221, 222-229, 230-236, 237, 237A, 238-239</p> <p>Chapter 19 SE/TE-B:284-289, 290, 293</p> <p>Workbook B: 93A, 100A, 110A, 118A, 122A, 129A, 129B, 131A, 131C, 131D, 140A, 148A, 149A, 215A, 221A, 221B, 229A, 236A, 236B, 239A, 239C, 239D, 289A, 289B, 289C, 291A, 291B, 293A, 293C, 293D, 293E, 293F</p>		
<p>1.OA.8: Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers. <i>For example, determine the unknown number that makes the equation true in each of the equations $8 + ? = 11$, $5 = \square - 3$, $6 + 6 = \square$.</i></p>	<p>Chapter 3 SE/TE-A: 43, 58-59</p> <p>Chapter 4 SE/TE-A: 82-83</p> <p>Chapter 8 SE/TE-A: 201-202, 203, 205</p> <p>Chapter 13 SE/TE-B: 84-85, 87-92, 96, 98, 101-102, 104-109, 113-115,119, 121, 123-127, 130-131</p> <p>Chapter 14 SE/TE-B: 140, 141-146, 149</p> <p>Chapter 17 SE/TE-B: 209-212,214, 216, 219, 222-227, 230-233, 238-239</p>		

Domain: Number and Operations in Base Ten (NBT)

Sub-domain: Extend the counting sequence.

<p>1.NBT.1: Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.</p>	<p>Chapter 1 SE/TE-A: 4-12, 19, 22, 27</p> <p>Chapter 4 SE/TE-A: 72-73, 92</p> <p>Chapter 7 SE/TE-A: 165-170, 171-173, 184, 188, 190</p> <p>Workbook A: 12A, 25A, 26A, 27A, 33A, 33B, 33C, 38A, 38B, 38C, 73A, 93A, 170A, 170B, 191A, 249E, 249F</p> <p>Chapter 12 SE/TE-B: 57-62, 63-65, 66, 78</p> <p>Chapter 16 SE/TE-B: 176-183, 184-186, 188, 202</p> <p>Workbook B: 62A, 79A, 110A, 183A, 186A, 186B, 201A, 203A, 229A, 239D, 293F</p>	<p>TE: Aug./Sept.30–31, Nov. 48–50, Dec.62–64, 66–67, Jan.74–75, 77–78, Feb. 86, 91–94, Mar. 107–108</p>
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Sub-domain: Understand place value.

<p>1.NBT.2: Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:</p> <p>a. 10 can be thought of as a bundle of ten ones — called a “ten.”</p>	<p>Chapter 7 SE/TE-A: 165-168, 170, 171-174, 177-179, 190-191</p> <p>Workbook A: 170A, 170B, 174A</p> <p>Chapter 12 SE/TE-B: 58-61, 63-65, 67-69, 72, 78</p> <p>Chapter 13 SE/TE-B: 84, 86-92, 96-98, 101, 103-109, 113, 115,</p> <p>Chapter 16 SE/TE-B: 176-179, 182, 184-186, 192-194, 198, 202</p> <p>Chapter 17 SE/TE-B: 209-212, 214, 216-217, 219,</p>	<p>TE: Aug./Sept.24–27, Oct.40–42, Nov. 52–53, 55–57, Dec.66–67, Jan.79, Feb. 91–94, Mar. 107–108, Apr.121–122, May 131–132</p>
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	222, 224-227, 230-232 Workbook B: 62A, 73A, 79A, 93A, 131C, 183A, 186A, 186B, 239C, 293E, 293F		
1.NBT.2: Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones cases:	Chapter 7 SE/TE-A: 165-168, 170, 171-174, 175-179, 183-188-191 Workbook A: 170A, 170B, 174A, 181, 181A, 182, 188A, 189A, 191A	TE: Sept.24–27, Oct.40–42, Nov.52–53,Dec. 66–67, Feb.91–94	
1.NBT.2: Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special 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).	Workbook A: 174A Chapter 12 SE/TE-B: 58, 59, 65 Chapter 13 SE/TE-B: 87-88, 104, 105 Chapter 16 SE/TE-B: 176-178, 185-186, 192, 202 Chapter 17 SE/TE-B: 211, 224, 225 Workbook B: 62A	TE: Sept.24–27,Oct. 40–42,Nov. 52–53,Feb. 92–94	
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 $<$.	Chapter 7 SE/TE-A: 183-186, 188, 189, 191 Workbook A: 188A, 191A, 249F Chapter 12 SE/TE-B: 69-70, 72-73, 74, 77A, 79 Chapter 16 SE/TE-B: 194-195, 198-199, 200-201, 203 Workbook B: 73A, 73B, 77A, 79A, 199A, 201A, 203A, 293F	TE: Nov. 54–55	
Sub-domain: Use place value understanding and properties of operations to add and subtract.			
1.NBT.4: Add within 100, including adding a	Chapter 4	TE: Dec. 68–69	

<p>two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.</p>	<p>SE/TE-A: 68, 72-73, 74-76, 78, 83-84, 89, 92</p> <p>Chapter 8 SE/TE-A: 195, 198-199, 203-208, 210-215, 216-217</p> <p>Workbook A: 52A, 73A, 76A, 81A, 93A, 199A, 202A, 208A, 208B, 215A, 217A, 249C, 249D, 249E, 249F</p> <p>Chapter 13 SE/TE-B: 84-86, 93, 96-97, 100, 101-103, 110, 113-114, 117-118, 123-124, 126, 129, 130-131</p> <p>Chapter 14 SE/TE-B: 137-138, 140, 142-145, 147-149</p> <p>Chapter 17 SE/TE-B: 209, 210, 215, 216-217, 221, 222-223, 229, 230-231, 236, 238-239</p> <p>Workbook B: 93A, 100A, 110A, 118A, 129A, 129B, 131A, 131C, 131D, 140A, 149A, 171C, 215A, 221A, 221B, 229A, 236A, 236B, 239A, 239C, 239D</p>		
<p>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.</p>	<p>Chapter 14 SE/TE-B: 138, 140, 140A, 144, 147, 149, 149A</p> <p>Chapter 15 SE/TE-B: 171C</p> <p>Workbook B: 140A, 149A, 171C</p>	<p>TE: Oct. 40–42, Jan. 79</p>	
<p>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</p>	<p>Chapter 13 SE/TE-B: 104, 110</p> <p>Chapter 17 SE/TE-B: 224-225, 229</p> <p>Workbook B: 110A, 229A, 236B, 239A</p>	<p>TE: Apr. 121–122</p>	

method and explain the reasoning used.			
Domain: Measurement and Data (MD)			
Sub-domain: 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.	Chapter 9 SE/TE-A: 226-230, 247, 248 Workbook A: 230A, 247A, 249A, 249C, 249D	TE: Oct. 38–40	
1.MD.2: Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. <i>Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.</i>	Chapter 9 SE/TE-A: 234-239, 240-241, 243-244, 246, 249 Workbook A: 239A, 249A, 249D, 249E	TE: Oct.38–40, Nov. 54–55	
Sub-domain: Tell and write time.			
1.MD.3: Tell and write time in hours and half-hours using analog and digital clocks.	Chapter 15 SE/TE-B: 162-165, 166-169, 170, 171 Workbook B: 165A, 165B, 169A, 170A, 171A, 171C, 293F	TE: Sept. 28–30, Oct. 43–44, Nov. 59, Dec. 70–71, Jan. 81–82, Feb. 97–98, Mar. 110, May 134–135	
Sub-domain: Represent and interpret data.			
1.MD.4: Organize, represent, and interpret data with up to three categories; ask and answer questions about the	Chapter 11 SE/TE-B: 31-35, 36-41, 42-48, 49, 50-51	TE: Oct. 44–45, Nov. 48–50, Jan. 83, Feb. 98–99, Mar. 111–113, Apr. 123–125	

<p>total number of data points, how many in each category, and how many more or less are in one category than in another.</p>	<p>Workbook B: 35A, 41A, 41B, 48A, 49A, 51A, 131B, 293G</p>		
Domain: Geometry (G)			
Sub-domain: Reason with shapes and their attributes.			
<p>1.G.1: Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.</p>	<p>Chapter 5 SE/TE-A: 99-105, 106-109, 136</p> <p>Workbook A: 105A, 120A, 135A, 137A, 249E</p>	<p>TE: Sept. 18–20, Oct. 34–36, Nov. 48–50</p>	
<p>1.G.2: Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Note: Students do not need to learn formal names such as “right rectangular prism.”)</p>	<p>Chapter 5 SE/TE-A: 107-109, 116-120, 121-123, 137</p> <p>Workbook A: 120A, 135A, 135B, 137A</p>	<p>TE: Oct. 36, 43, Nov. 49</p>	
<p>1.G.3: Partition circles and rectangles into two and four equal shares, describe the shares using the words <i>halves</i>, <i>fourths</i>, and <i>quarters</i>, and use the phrases <i>half of</i>, <i>fourth of</i>, and <i>quarter of</i>. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.</p>	<p>The skills and concepts presented on these pages prepare students to address the state standard in more depth at Grade 2.</p> <p>Chapter 5 SE/TE-A: 106–109, 116–120</p> <p>Workbook A: 120A</p> <p>Chapter 18 SE/TE-B: 247–250</p>		

	Workbook B: 250A–250B, 255A See Grade 2: SE/TE-A: 73, 75–82, 87, 94–95 SE/TE-B: 73A, 82A, 82B		
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Standard	Math In Focus	Everyday Counts	Gap
Domain: Operations and Algebraic Thinking (OA)			
Sub-domain: Represent and solve problems involving addition and subtraction.			
<p>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.</p>	<p>Chapter 4 SE/TE-A: 96-99, 103-104, 106, 119-113, 115-119</p> <p>Workbook A: 102A, 108A, 114A, 121A, 121B, 123A, 123C, 123D, 283D, 283F</p> <p>Chapter 10 SE/TE-B: 6-7, 17-19, 40</p> <p>Chapter 13 122-125, 129</p> <p>Workbook B: 19A, 126A, 129A, 305F</p>	<p>August/September TE: 20–22, 24–25, 27–29</p> <p>October TE: 34–37</p> <p>November TE: 48–49, 53–56</p> <p>December TE: 63–66</p> <p>January TE: 74–77, 80–82</p> <p>February TE: 88–91, 96–97</p> <p>March TE: 103–105, 109–110</p> <p>April TE: 121–122</p> <p>May/June TE: 127–129</p>	
Sub-domain: Add and subtract within 20.			
<p>2.OA.2: Fluently add and subtract within 20 using mental strategies. (Note: See standard 1.OA.6 for a list of mental strategies). By end of Grade 2, know from memory all sums of two one-digit numbers.</p>	<p>Chapter 10 SE/TE-B: 8-15, 16, 20-26, 27, 40</p> <p>Workbook B: 15A, 26A, 41A, 99C</p>	<p>August/September TE: 24–27</p> <p>October TE: 36–38</p> <p>November TE: 48–49, 53–56</p> <p>December</p>	

		TE: 66–68 January TE: 74–75, 80–82 February TE: 88–91, 96–97 March TE: 109–111 April TE: 121–123 May/June TE: 127–129	
Sub-domain: 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 2s; write an equation to express an even number as a sum of two equal addends.	<i>This standard is addressed in depth in Grade 3.</i> See Grade 3: SE/TE-A: 224-226, 236 Workbook A: 226A, 263E	August/September TE: 18–20 December TE: 62–63 March TE: 102–103	
2.OA.4: Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.	Chapter 6 SE/TE-A: 156-160, 168, 171, 176-178, 187-188 Workbook A: 161A, 172A, 178A, 188A, 188D Chapter 15 SE/TE-B: 170-173, 179, 181-182, 191-192 Workbook B: 174, 174A, 183, 183A, 193, 247C	August/September TE: 20–22 October TE: 34–36 November TE: 48–49 December TE: 63–64 January TE: 74–75 February TE: 88–89	

Domain: Number and Operations in Base Ten (NBT)

Sub-domain: Understand place value.

<p>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:</p> <p>a. 100 can be thought of as a bundle of ten tens — called a “hundred.”</p>	<p>Chapter 1 SE/TE-A: 6-10, 11-12, 17, 18-21, 23, 33</p> <p>Chapter 2 SE/TE-A: 38-40, 42, 44, 46, 47, 49-50</p> <p>Chapter 3 SE/TE-A: 61-63, 67-68, 72-74, 76, 78-80, 84-85</p> <p>Workbook A: 10A, 17A, 33A, 283E</p>	<p>August/September TE: 24–25</p> <p>January TE: 75–77</p> <p>February TE: 94–96</p> <p>March TE: 109–110</p>	
<p>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:</p> <p>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).</p>	<p>Chapter 1 SE/TE-A: 6-10, 11-12, 17, 18-21, 23, 33</p> <p>Chapter 2 SE/TE-A: 38-40, 42, 44, 46, 47, 49-50</p> <p>Chapter 3 SE/TE-A: 61-63, 67-68, 72-74, 76, 78-80, 84-85</p> <p>Workbook A: 10A, 17A, 33A, 283E</p>	<p>January TE: 75–77</p> <p>February TE: 94–96</p>	
<p>2.NBT.2: Count within 1000; skip-count by 5s, 10s, and 100s.</p>	<p>Chapter 1 SE/TE-A: 6-10, 26-30, 31, 33</p> <p>Chapter 6 SE/TE-A: 153-155, 162-167, 174-175, 186-187</p> <p>Workbook A: 10A, 31A, 32A, 33A, 123C, 167A, 178A, 188A, 188C, 283E</p>	<p>August/September TE: 25–27</p> <p>October TE: 37–38, 39–41</p> <p>November TE: 50–52, 53–56, 57</p> <p>December TE: 63–69</p> <p>January TE: 72–73, 75–77, 81–83</p> <p>February TE: 91–92</p>	

		March TE: 110–111 April TE: 122–123 May/June TE: 128–129	
2.NBT.3: Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	Chapter 1 SE/TE-A: 6-10, 11-17, 33 Chapter 2 SE/TE-A: 40-41, 43-45, 47-48, 49-53, 55 Chapter 3 SE/TE-A: 61-65, 67-69, 71, 72-75, 77, 77A, 78-82, 84-88, 90-91 Workbook A: 10A, 17A, 17B, 33A, 41A, 45A, 48A, 54A, 55A, 66A, 71A, 77A, 83A, 91A, 283E	December TE: 66–68 January TE: 80–81 March TE: 109–111 April TE: 121–122	
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.	SE/TE-A: 18-21, 23, 33 Workbook A: 23A, 33A, 123C	December TE: 66–68 January TE: 80–81 February TE: 94–96 March TE: 109–110 April TE: 121–122	
Sub-domain: 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.	Chapter 2 SE/TE-A: 41 Chapter 3 SE/TE-A: 65 Chapter 4 SE/TE-A: 96-101, 106, 106, 108, 110, 112-114, 115, 117, 122	August/September TE: 20–22, 24–25 December TE: 66–68 January TE: 75–77	

	<p>Chapter 9 SE/TE-A: 278-281, 283</p> <p>Workbook A: 102A, 108A, 114A, 121C, 123A, 123D, 281A, 281B, 283A, 283E, 283G</p> <p>Chapter 10 SE/TE-B: 6-8, 13, 15, 16-19, 20, 26, 27, 34-35, 37, 39-40</p> <p>Chapter 13 SE/TE-B: 122-126, 129</p> <p>Workbook B: 15A, 19A, 26A, 126A, 305D</p>		
2.NBT.6: Add up to four two-digit numbers using strategies based on place value and properties of operations.	<p>Chapter 2 SE/TE-A: 38-41, 42-45, 46-48, 49-54, 55</p> <p>Chapter 3 SE/TE-A: 61-66, 67-71, 72-77, 78-83, 84-91</p> <p>Chapter 4 SE/TE-A: 96-102, 103-108, 109-114, 115-121, 122-123</p> <p>Chapter 9 SE/TE-A: 278-280, 283</p> <p>Workbook A: 41A, 41B, 45A, 48A, 54A, 54B, 55A, 66A, 71A, 77A, 83A, 91A, 102A, 108A, 114A, 121A, 121B, 121C, 123A, 123C, 123D, 281A, 281B, 283A, 283E, 283F, 283G</p> <p>Chapter 10 SE/TE-B: 6-15, 16-19, 20-26, 27, 34-35, 37, 39-41</p> <p>Chapter 13 SE/TE-B: 122-126, 129</p> <p>Workbook B: 15A, 19A, 26A, 41A, 126A, 129A, 305D, 305E</p>	<p>January TE: 70–78, 80</p> <p>February TE: 83–87, 99</p>	
2.NBT.7: Add and subtract within 1000, using concrete models or drawings and strategies based on place value,	<p>Chapter 2 SE/TE-A: 38-40, 42, 44, 46-47, 49-50, 52</p>	<p>January TE: 75–78, 80</p>	

<p>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.</p>	<p>Chapter 3 SE/TE-A: 61-63, 67-68, 72-74, 76, 78-80, 84-85, 89</p> <p>Chapter 4 SE/TE-A: 96-101, 103-107, 109-112, 115-119, 122-123</p> <p>Chapter 9 SE/TE-A: 278-280, 283</p> <p>Workbook A: 102A, 108A, 114A, 121A, 121B, 121C, 123A, 123C, 123D, 281A, 281B, 283A, 283D, 283F</p> <p>Chapter 10 SE/TE-B: 6-8, 10-14, 17-19, 20-25</p> <p>Chapter 13 SE/TE-B: 122-125, 129</p> <p>Workbook B: 15A, 19A, 26A, 126A, 127A, 129A</p>	<p>February TE: 83–87</p>	
<p>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.</p>	<p>Chapter 10 SE/TE-B: 8 -15, 17, 23-26, 27, 40</p> <p>Workbook B: 15A, 19A, 26A, 41A, 99C</p>	<p>November TE: 53–55</p>	
<p>2.NBT.9: Explain why addition and subtraction strategies work, using place value and the properties of operations. (Note: Explanations may be supported by drawings or objects.)</p>	<p>Chapter 2 SE/TE-A: 38-41, 42-45, 46-48, 49-54, 55</p> <p>Chapter 3 SE/TE-A: 61-66, 67-71, 72-77, 78-83, 84-91</p> <p>Chapter 4 SE/TE-A: 96-102, 103-108, 109-114, 115-121, 122-123</p> <p>Workbook A: 41A, 41B, 45A, 48A, 54A, 54B, 55A, 66A, 71A, 77A, 83A, 91A, 102A, 108A, 114A, 121A, 121B, 121C, 123A, 123C, 123D, 283E, 283F, 283G</p> <p>Chapter 10 SE/TE-B: 6-15, 16-19, 20-26, 27, 34-35, 37, 39-41</p> <p>Chapter 13 SE/TE-B: 122-126, 129</p>	<p>August/September TE: 20–22, 24–25</p> <p>January TE: 75–77</p> <p>February TE: 89–91</p>	

	Workbook B: 15A, 19A, 26A, 41A, 126A, 129A, 305D, 305E		
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Domain: Number and Operations – Fractions (NF)

None

Domain: Measurement and Data (MD)

Sub-domain: Measure and estimate lengths in standard units.

<p>2.MD.1: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.</p>	<p>Chapter 7 SE/TE-A: 192-195, 201-208, 210, 211-212, 214-215 Workbook A: 195A, 210A, 215A, 223A</p> <p>Chapter 13 SE/TE-B: 103-106, 109, 111-117, 118-121, 128 Workbook B: 106A, 117A, 121A, 129A</p>	<p>November TE: 50–52</p> <p>February TE: 92–94</p>	
<p>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.</p>	<p><i>This standard is covered to mastery in Grade 1, opportunities to review can be found on pages:</i></p> <p>Chapter 8 SE/TE-A: 243 Workbook A: 249D</p> <p>See Grade 1: SE/TE-A: 243, 247, 249 Workbook A: 246, 249A, 249D</p>	<p>November TE: 50–52</p> <p>February TE: 92–94</p>	
<p>2.MD.3: Estimate lengths using units of inches, feet, centimeters, and meters.</p>	<p>Chapter 7 SE/TE-A: 194-195, 204</p> <p>Workbook A: 195A, 223A</p> <p>Chapter 13 SE/TE-B: 104, 105-106, 114</p> <p>Workbook B: 106A, 129A</p>	<p>November TE: 50–52</p> <p>February TE: 92–94</p>	
<p>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.</p>	<p>Chapter 7 SE/TE-A: 196-200, 211-215, 222</p> <p>Workbook A: 215A, 221A, 223A, 283C</p> <p>Chapter 13 SE/TE-B: 107-110, 118-121, 128</p>	<p>February TE: 92–94</p>	

		Workbook B: 110A, 121A, 127A, 129A, 158C, 305D	
Sub-domain: 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.	<p>Chapter 4 SE/TE-A: 96-99, 100, 103-104, 106-107, 109-112, 115-119, 122-123</p> <p>Chapter 7 SE/TE-A: 216-219, 223</p> <p>Chapter 9 SE/TE-A: 278-280, 283</p> <p>Workbook A: 102A, 108A, 114A, 121A, 121B, 121C, 123A, 123D, 220A, 281A, 283A, 283D, 283F</p> <p>Chapter 13 SE/TE-B: 122-125, 127, 129</p> <p>Chapter 16 SE/TE-B: 198, 200, 201-204, 206-215, 218-219</p> <p>Workbook B: 126A, 127A, 129A, 200A, 200B, 205, 205A, 216A, 216B, 219A, 305F</p>	<p>February TE: 92–94</p>
2.MD.6:	Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.	<p>Chapter 1 SE/TE-A: 26, 27</p> <p>Chapter 3 SE/TE-A: 89</p> <p>Chapter 4 SE/TE-A: 96-99, 100, 103-104, 106-107, 109-112, 115-119, 122-123</p> <p>Chapter 7 SE/TE-A: 216-219, 223</p> <p>Chapter 9 SE/TE-A: 278-280, 283</p> <p>Workbook A: 102A, 108A, 114A, 121A, 121B, 121C, 123A, 123D, 220A, 281A, 283A, 283D, 283F</p>	<p>August/September TE: 23–25</p> <p>October TE: 36–37</p> <p>November TE: 53–55</p> <p>December TE: 66–67</p> <p>January TE: 80–81</p> <p>February TE: 94–96</p> <p>March TE: 109–111</p>

	<p>Chapter 10 SE/TE-B: 28-33, 36</p> <p>Chapter 13 SE/TE-B: 122-125, 127, 129</p> <p>Chapter 16 SE/TE-B: 198, 200, 201-204, 206-215, 218-219</p> <p>Workbook B: 36A, 126A, 127A, 129A, 200A, 200B, 205, 205A, 216A, 216B, 219A, 305F</p>	<p>April TE: 121–123</p> <p>May/June TE: 127–128</p>		
Sub-domain: Work with time and money.				
2.MD.7:	<p>Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.</p>	<p>Chapter 14 SE/TE-B: 133-136, 137-141, 142, 149, 150-156, 157-158</p> <p>Workbook B: 136A, 141A, 149A, 156A, 158A, 158C, 158D, 305D, 305E</p>	<p>October TE: 39–41, 57</p> <p>December TE: 68–69</p> <p>January TE: 82–83</p> <p>February TE: 91–92</p> <p>March TE: 105–106</p>	
2.MD.8:	<p>Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. <i>Example: If you have 2 dimes and 3 pennies, how many cents do you have?</i></p>	<p>Chapter 11 SE/TE-B: 49, 51, 62, 66-70, 71-72</p> <p>Workbook B: 70A, 72A, 99D, 99E, 305D, 305F</p> <p><i>This standard is also covered to mastery in Grade 1</i></p> <p>See Grade 1: SE/TE-B: 274-279, 284-289, 290-291, 293 Workbook B: 289A, 289B, 289C, 291A, 291B, 293A, 293D, 293E</p>	<p>August/September TE: 25–27</p> <p>October TE: 37–38</p> <p>November TE: 55–56</p> <p>December TE: 68</p> <p>January TE: 81–82</p> <p>February TE: 96–97</p> <p>March</p>	

		TE: 110–111 April TE: 122–123 May/June TE: 128–129	
Sub-domain: Represent and interpret data.			
2.MD.9:	<p>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.</p>	<p><i>This standard is addressed in depth in Grade 3.</i></p> <p>See Grade 3: SE/TE-B: 97-104, 106, 110-111 Workbook B: 104A, 104B, 104C, 105A, 218D</p>	<p><i>This standard is outside the scope of Every Day Counts: Calendar Math</i></p>
2.MD.10:	<p>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. (Note: See Glossary, Table 1.)</p>	<p>Chapter 17 SE/TE-B: 224-231, 233-235, 237, 238-242, 243, 245-247</p> <p>Workbook B: 231A, 237A, 237B, 242B, 247A, 247C, 247D, 305F</p>	<p>August/September TE: 27–29</p> <p>October TE: 41–43</p> <p>November TE: 58–59</p> <p>January TE: 78–79</p> <p>February TE: 87, 98–99</p> <p>March TE: 111–113</p> <p>May/June TE: 130–131</p>
Domain: Geometry (G)			
Sub-domain: 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	<p>Chapter 18 SE/TE-B: 262, 264</p>	<p>August/September TE: 18–20</p>	

<p>equal faces. (Note: Sizes are compared directly or visually, not compared by measuring.) Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.</p>	<p>Chapter 19 SE/TE-B: 271-286, 287, 289-291, 303, 304-305</p> <p>Workbook B: 264A, 286A, 286B, 286C, 305A, 305E</p> <p>Pentagons and quadrilaterals are fully covered in Grade 3. See Grade 3: SE/TE-B: 306-315, 317-318, 338, 340-341 Workbook B: 318A, 318B</p>	<p>October TE: 32–34</p> <p>November TE: 46–47</p> <p>December TE: 62–63</p> <p>January TE: 72–73</p> <p>March TE: 102–103</p> <p>April TE: 116</p> <p>May/June TE: 130–131</p>	
<p>2.G.2: Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.</p>	<p>Chapter 12 SE/TE-B: 75, 78, 79, 82, 83-88, 91-94, 96, 98-99</p> <p>Workbook B: 82A, 82B, 89, 96A, 97, 99A, 99D, 305E</p>	<p><i>This standard is outside the scope of Every Day Counts: Calendar Math</i></p>	
<p>2.G.3: Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words <i>halves, thirds, half of, a third of, etc.</i>, and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.</p>	<p>Chapter 12 SE/TE-B: 77-79, 81-82, 83-89, 90-94, 96, 98</p> <p>Workbook B: 82A, 82B, 96A, 99A, 99D, 305E</p>	<p>February TE: 87</p>	

KCAS	Math In Focus	Everyday Counts	Gap
Domain: Operations and Algebraic Thinking (OA)			
Sub-domain: Represent and solve problems involving multiplication and division.			
<p>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.</p>	<p>Chapter 6 SE/TE-A: 157-159, 162, 167</p> <p>Workbook A: 175A, 213B, 263D</p>	<p>August/September TE: 40</p> <p>December TE: 63, 66–68</p> <p>January TE: 73, 76–78</p> <p>February TE: 87, 90–91</p> <p>April TE: 114, 118–119</p>	
<p>3.OA.2: Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ 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.</p>	<p><i>This standard is covered to mastery in grade 2, opportunities to review can be found on pages:</i></p> <p>Chapter 6 SE/TE-A: 176, 178-179</p> <p>See Grade 2: SE/TE-A: 179-183, 185</p> <p>Workbook A: 185A, 185B, 186A, 188A, 188C, 188D</p>	<p>March TE: 101, 103–105</p> <p>May/June TE: 127, 130–131</p>	
<p>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.1</p>	<p>Chapter 6 SE/TE-A: 152, 158-159, 163-165, 168, 172, 177, 179-181, 183, 186</p> <p>Chapter 7 SE/TE-A: 213</p> <p>Chapter 8 SE/TE-A: 219-221, 227-228, 230-234, 239</p>	<p><i>This standard is outside the scope of Every Day Counts: Calendar Math</i></p>	

	<p>Chapter 9 SE/TE-A: 243-263 Workbook A: 157A, 162A, 167A, 177A, 198A, 198B, 209B, 209C, 213C, 245A, 249A, 249B, 253A, 258A, 258B, 263B, 263C, 263D, 263F, 263G</p> <p>Chapter 12 SE/TE B: 66-74, 76-78</p> <p>Workbook B: 68A, 74A, 78C, 387G</p>		
3.OA.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers.	<p>Chapter 6 SE/TE-A: 138-186</p> <p>Chapter 7 SE/TE-A: 191, 194, 198, 201, 210-212</p> <p>Chapter 8 SE/TE-A: 216-223, 225-235, 237-239</p> <p>Chapter 9 SE/TE-A: 243-249, 251-256, 258-263</p> <p>Workbook A: 150A, 157A, 162A, 167A, 175A, 177A, 193A, 213B, 226A, 230A, 234A, 245A, 249A, 249B, 253A, 258A, 258B, 263B, 263C, 263D, 263F, 263G</p> <p>Chapter 12 SE/TE B: 66-74, 76-78</p> <p>Workbook B: 68A, 74A, 78C, 387G</p>	<i>This standard is outside the scope of Every Day Counts: Calendar Math</i>	
Sub-domain: Understand properties of multiplication and the relationship between multiplication and division.			
3.OA.5: Apply properties of operations as strategies to multiply and divide.	<p>Chapter 6 SE/TE-A: 138-186</p> <p>Chapter 7 SE/TE-A: 191, 194, 198, 201, 210-212</p> <p>Chapter 8 SE/TE-A: 216-223, 225-235, 237-239</p> <p>Chapter 9 SE/TE-A: 243-249, 251-256, 258-263</p> <p>Workbook A: 150A, 157A, 162A, 167A, 175A, 177A, 193A, 213B, 226A, 230A,</p>	<p>January TE: 76–78</p> <p>February TE: 90–91</p> <p>April TE: 115, 118–119</p> <p>May/June TE: 130–131</p>	

	234A, 245A, 249A, 249B, 253A, 258A, 258B, 263B, 263C, 263D, 263F, 263G Chapter 12 SE/TE-B: 66-74, 76-78 Workbook B: 68A, 74A, 78C, 387G		
3.OA.6: Understand division as an unknown-factor problem.	Chapter 6 SE/TE-A: 176-181, 183, 186 Chapter 8 SE/TE-A: 216-223, 225-235, 237-239 Chapter 9 SE/TE-A: 251-256, 258-263 Workbook A: 177A, 230A, 234A, 253A, 258A, 258B, 263B, 263C, 263D, 263F, 263G Chapter 12 SE/TE-B: 67-68, 72-73, 76-78 Workbook B: 74A, 78C, 387G	May/June TE: 130–131	
Sub-domain: 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 $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	Chapter 6 SE/TE-A: 138-186 Chapter 7 SE/TE-A: 191, 194, 198, 201, 210-212 Chapter 8 SE/TE-A: 216-223, 225-235, 237-239 Chapter 9 SE/TE-A: 243-249, 251-256, 258-263 Workbook A: 150A, 157A, 162A, 167A, 175A, 177A, 193A, 213B, 226A, 230A, 234A, 245A, 249A, 249B, 253A, 258A, 258B, 263B, 263C, 263D, 263F, 263G Chapter 12 SE/TE-B: 66-68, 69-74, 76-78 Workbook B: 68A, 74A, 78C, 387G	January TE: 76–78 February TE: 90–91 April TE: 115, 118–119 May/June TE: 130–131, TR21	
Sub-domain: Solve problems involving the four operations, and identify and explain patterns in arithmetic.			

<p>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.3</p>	<p>Chapter 2 SE/TE-A: 60-63</p> <p>Chapter 5 SE/TE-A: 122-131</p> <p>Chapter 9 SE/TE-A: 246-249, 254-256, 258-259, 261, 263</p> <p>Workbook A: 63A, 73B, 126A, 126B, 126C, 127A, 131B, 249A, 249B, 258A, 258B, 263C, 263F, 263G</p>	<p><i>This standard is outside the scope of Every Day Counts: Calendar Math</i></p>	
<p>3.OA.9: Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.</p>	<p>Chapter 1 SE/TE-A: 5-11, 27-29</p> <p>Chapter 6 SE/TE-A: 138-143, 145-149, 151, 155-156, 160-161, 163-166, 170-171</p> <p>Chapter 7 SE/TE-A: 189, 191-193</p> <p>Chapter 8 SE/TE-A: 223-226</p> <p>Workbook A: 11A, 29A, 73A, 150A, 226A</p>	<p><i>This standard is outside the scope of Every Day Counts: Calendar Math</i></p>	
Domain: Number and Operations in Base Ten			
Sub-domain: Use place value understanding and properties of operations to perform multi-digit arithmetic.			
<p>3.NBT.1: Use place value understanding to round whole numbers to the nearest 10 or 100.</p>	<p>Chapter 2 SE/TE-A: 53-59, 61-63, 71, 73</p> <p>Workbook A: 63A, 69, 69A, 73B</p>	<p>November TE: 55–57</p> <p>December TE: 69–70</p> <p>January TE: 80–82</p> <p>February TE: 88, 95, 97</p> <p>March 109</p> <p>April TE: 122</p>	

<p>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.</p>	<p>Chapter 2 SE/TE-A: 41-52, 58-63, 65-73</p> <p>Chapter 3 SE/TE-A: 77-91</p> <p>Chapter 4 SE/TE-A: 94-97, 98-116</p> <p>Chapter 5 SE/TE-A: 122-131</p> <p>Workbook A: 44A, 48A, 52A, 63A, 68A, 69A, 73B, 78A, 87A, 89A, 97A, 101A, 106A, 113A, 114A, 126A, 126B, 126C, 127A, 131B, 263D, 263E, 263F</p> <p>Chapter 10 SE/TE-B: 4-30</p> <p>Chapter 12 SE/TE-B: 63-66, 68-74, 76-78</p> <p>Chapter 19 SE/TE-B: 371, 375-378, 381</p> <p>Workbook B: 14A, 23A, 26A, 26B, 27A, 68A, 74A, 75A, 78C, 380A, 380B, 387E, 387G</p>	<p>August/September TE: 20–23</p> <p>October TE: 33–35, 39–40</p> <p>November TE: 49–51, 55–57</p> <p>December TE: 71</p> <p>January TE: 80–83</p> <p>February TE: 93–97</p> <p>March TE: 108–111</p>	
<p>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.</p>	<p>Chapter 6 SE/TE-A: 152, 154-155, 157, 160-162, 167, 170-171, 175, 186</p> <p>Chapter 7 SE/TE-A: 191-193, 201, 210-212</p> <p>Chapter 9 SE/TE-A: 261</p> <p>Workbook A: 150A, 157A, 162A, 175A, 193A, 213B, 249A, 249B, 263E</p>	<p>August/September TE: 18–20, 23–25</p> <p>October TE: 32–33, 39–40</p> <p>November TE: 48–49, 55-57</p> <p>December TE: 66–68</p> <p>January TE: 76–78, 80–82</p> <p>February TE: 93–95</p> <p>March</p>	

		TE: 108–109 April TE: 118–119 May/June TE: 132–133	
Domain: Number and Operations - Fractions			
Sub-domain: 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 $1/b$.	Chapter 14 SE/TE B: 117-123, 125-127, 129, 156-157, 161 Workbook B: 120A, 125A, 129A, 218B	November TE: 51–53 February TE: 88–89, 93 April TE: 116–117	
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.	Chapter 14 SE/TE-B: 124-125, 131, 139-142, 144, 146, 157, 159 Workbook B: 125A, 146A, 147, 156A, 218B	October TE: 35–37 November TE: 51–53	
3.NF.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram. 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.	Chapter 14 SE/TE-B: 124-125, 131, 139-142, 144, 146, 157, 159 Workbook B: 125A, 146A, 147, 156A, 218B	October TE: 35–37 November TE: 51–53	
3.NF.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about	Chapter 14 SE/TE-B: 121-129, 138-139, 143, 147, 157-158, 160-161	February TE: 93	

their size. a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.	Workbook B: 125A, 129A, 387E	April TE: 117	
3.NF.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 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.	Chapter 14 SE/TE-B: 121-129, 138-139, 143, 147, 157-158, 160-161 Workbook B: 125A, 129A, 387E	February TE: 92–93	
3.NF.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. c. Express whole numbers as fractions that are equivalent to whole numbers.	<i>This standard is covered to mastery in grade 2, opportunities to review can be found on pages:</i> Chapter 14 SE/TE-B: 113, 117, 159 Workbook B: 120A See Grade 2: SE/TE-B: 76, 79, 87, 90, 95	<i>This standard is outside the scope of Every Day Counts: Calendar Math</i>	
3.NF.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.	Chapter 14 SE/TE-B: 130-134, 136-144, 147, 158-159 Workbook B: 146A, 147, 156A, 218B	February TE: 88–89, 92–93	
Domain: Measurement and Data (MD)			
Sub-domain: 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	Chapter 16 SE/TE-B: 223-247, 251-253, 255-256, 258-260, 262-263	???? TE: 14	

<p>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.</p>	<p>Workbook B: 227A, 232A, 236A, 247A, 240A, 258A, 258B, 259A, 387F, 387G</p>	<p>October TE: 42</p> <p>November TE: 48, 53–54, 58</p> <p>December TE: 63, 68</p> <p>March TE: 107–108</p>	
<p>3.MD.2: Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).6 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.7</p>	<p>Chapter 11 SE/TE-B: 42-58</p> <p>Chapter 12 SE/TE-B: 64, 66-68, 71-78</p> <p>Workbook B: 47A, 55A, 56A, 68A, 74A, 75A, 78B, 78C, 387E, 387G</p>	<p>February TE: 91–93</p> <p>March TE: 105–106</p> <p>April TE: 120–121</p>	
<p>Sub-domain: Represent and interpret data.</p>			
<p>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.</p>	<p>Chapter 13 SE/TE-B: 84-87, 90-96, 105, 107, 109</p> <p>Workbook B: 90A, 90B, 96A, 96B, 105A, 218B, 218D, 387F</p>	<p>August/September TE: 28–29</p> <p>October TE: 44–45</p> <p>January TE: 84–85</p> <p>March TE: 112–113</p> <p>May/June TE: 134–135</p>	
<p>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.</p>	<p>Chapter 13 SE/TE-B: 97-104, 110-111</p> <p>Chapter 14 SE/TE-B: 122, 124-125, 130-136, 139-145</p> <p>Chapter 15 SE/TE-B: 164-165, 169, 171-175, 184</p> <p>Workbook B: 104A, 104B, 104C, 185A</p>	<p>October TE: 41–42</p>	

Sub-domain: 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.	Chapter 19 SE/TE-B: 347-349, 351-361, 363-364, 366, 368-370, 372-374, 383-387 Workbook B: 352A, 361A, 370A, 374A, 374B, 387C, 387F	January TE: 78–80	
3.MD.5: Recognize area as an attribute of plane figures and understand concepts of area measurement. 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.	Chapter 19 SE/TE-B: 347-361, 363-364, 366, 368-370, 372-374, 385-386 Workbook B: 352A, 361A, 370A, 374A, 374B, 381A, 387F	January TE: 78–80	
3.MD.6: Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	Chapter 19 SE/TE-B: 347-361, 363-364, 366, 368-370, 372-374, 385-386 Workbook B: 352A, 361A, 370A, 374A, 374B, 381A, 387F	January TE: 78–80	
3.MD.7: Relate area to the operations of multiplication and addition. 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.	Chapter 14 SE/TE-B: 158-161 Chapter 15 SE/TE-B: 164-165, 167, 170-172, 180, 183, 185 Workbook B: 162, 175A	January TE: 78–80	
3.MD.7: Relate area to the operations of multiplication and addition. 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.	Chapter 14 SE/TE-B: 158-159 Chapter 15 SE/TE-B: 164-165, 172	<i>This standard is outside the scope of Every Day Counts: Calendar Math</i>	
3.MD.7: Relate area to the operations of multiplication and addition. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number	Chapter 14 SE/TE-B: 160-161 Chapter 15 SE/TE-B: 164-165, 167, 170-172	<i>This standard is outside the scope of Every Day Counts: Calendar Math</i>	

side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.	Workbook B: 175A		
3.MD.7: Relate area to the operations of multiplication and addition. 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.	Chapter 19 SE/TE-B: 355, 358-361, 364, 368-369, 373-374, 385-386 Workbook B: 361A, 370A, 374A, 374B, 387C, 387F	<i>This standard is outside the scope of Every Day Counts: Calendar Math</i>	
Sub-domain: 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.	Chapter 19 SE/TE-B: 371-380, 385-387 Workbook B: 374A, 374B, 380A, 380B, 381A, 387C, 387D	January TE: 78–80	
Domain: Geometry (G)			
Sub-domain: 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	Chapter 17 SE/TE-B: 272, 274, 277-278 Chapter 18 SE/TE-B: 306-308, 310-319, 337-338, 340-342 Workbook B: 274A, 318A, 318B, 387B	August/September TE: 18–20 October TE: 32–33 November TE: 48–49 December TE: 64–65 April	

subcategories.		TE: 116–117	
3.G.2: Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.	<p>Chapter 14 SE/TE-B: 117-123, 125-127, 129-137, 139, 143-145, 147-150, 153-161</p> <p>Workbook B: 120A, 125A, 129A, 146A, 150A, 150B, 155A, 156A, 218B</p>	<p>February TE: 88–89</p>	

KCAS	Math In Focus	Everyday Counts	Gap
Domain: Operations and Algebraic Thinking (OA)			
Sub-domain: Use the four operations with whole numbers to solve problems.			
<p>4.OA.1: Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.</p>	<p>SE/TE-A: Chapter 3 Pages 77-85, 86-88, 115, 116, 117 Workbook A: 85A, 115A, 115B</p>	<p>October TE: 40–41 November TE: 56–57 December TE: 70–71 January TE: 84–86 February TE: 97–98 March. TE: 111–112 April TE: 128–130 May/June TE: 137–139</p>	
<p>4.OA.2: Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. (Note: See Glossary, Table 2.)</p>	<p>SE/TE-A: Chapter 3 Pages 80-81, 86, 90, 109-116 Chapter 6 Pages 263-267 Workbook A: 115A-115B, 267A</p>		
<p>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.</p>	<p>SE/TE-A: Chapter 2 Pages 41-43 Chapter 2 Pages 62-63 Chapter 3 Pages 109-116, 119 Chapter 5 Pages 204-214 Chapter 6 Pages 263-267 Workbook A: 43B, 63A, 115A-115B, 117, 119A, 214-214C, 267A SE/TE-B: Chapter 8 Pages 72-75 Chapter 11 Pages 139-143 Chapter 12 Pages 176-187 Workbook B: 76, 143A-143B, 187A</p>	<p>January TE: 84–86 February TE: 94–95 March TE: 108–109 May/June TE: 136–137</p>	

Sub-domain: Gain familiarity with factors and multiples.			
4.OA.4:	Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	SE/TE-A: Chapter 2 Pages 44, 50-51, 53-54, 55, 56-57,65, 67-68 Workbook A: 54A, 61A, 68B, 68C, 273D	August/September TE: 18–20, TE: 23–26 October TE: 40–41 November TE: 56–57 December TE: 70–71 January TE: 84–86 February TE: 97–98 March TE: 111–112 April TE: 128–130 May/June TE: 137–139
Sub-domain: Generate and analyze patterns.			
4.OA.5:	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. <i>For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.</i>	SE/TE-A:Chapter 1 Pages 6, 8, 14-17, 19, 26 Workbook A: 9A, 20A, 20B, 63A, 63B SE/TE-B: Chapter 7 Pages 26-30, 34, 52 Chapter 13 Page 208 Chapter 14 Pages 210-215, 217, 220. 221-227, 228-235 Workbook B: 34A, 50, 227-227A, 235A-235C	August/September TE: 18–20 October TE: 32–36 November TE: 48–50 December TE: 62–63,TE: 70–71 January TE: 76–78, TE: 79–80, TE: 84–86, TE: 87–88 February TE: 92–94 March TE: 106–108, TE: 111–112 April TE: 120–122, TE: 128–130 May/June TE: 134–136,TE: 137–139
Domain: Number and Operations in Base Ten			
(Note: Grade 4 – expectations in this domain are limited to whole numbers less than or equal to 1,000,000)			
Sub-domain: 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. <i>For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.</i>	SE/TE-A: Chapter 1 Pages 5-9, 10-13, 14-20, 21-22, 22A Chapter 2 Pages 23-26, 32-34, 62 Chapter 3 77-79, 81-82, 86, 96-99 Workbook A: 13A, 20A, 20B, 22A, 68B, 273D SE/TE-B: Chapter 7 Pages 6-9, 11-12, 14-19, 22-23, 28-29, 32, 34 Chapter 8 Pages 54-57, 59, 61-62, 65-66, 69 Workbook B: 12A, 23A, 34A	October TE: 42 November TE: 50–52 December TE: 66–70
4.NBT.2:	Read and write multi-digit whole numbers using base-ten numerals,	SE/TE-A: Chapter 1 Pages 5-9, 10-13, 14-20, 21-22, 23-26	October TE: 34–36 November TE: 50–52

<p>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.</p>	<p>Chapter 2 Pages 32-34, 62 Chapter 3 Pages 77-79, 81-82, 86, 96-99 Workbook A: 9A, 13A, 20A, 20B, 22A, 68B, 273D SE/TE-B: Chapter 7 Pages 6-9, 11-12, 14-19, 22-23, 28-29, 32, 34 Chapter 8 Pages 54-57, 59,61-62, 65-66, 69 Workbook B: 12A, 23A, 34A</p>	<p>January TE: 79–80 March TE: 108–109</p>	
<p>4.NBT.3: Use place value understanding to round multi-digit whole numbers to any place.</p>	<p>SE/TE-A: Chapter 2 Pages 32-33, 35-36, 43, 63, 64, 66-67 Chapter 3 Pages 93, 95, 116 Workbook A: 43A, 63A, 68B, 95A, 273F</p>	<p>November TE: 50–52 December TE: 63–66 February TE: 94–95 March TE: 108–109</p>	
<p>Sub-domain: Use place value understanding and properties of operations to perform multi-digit arithmetic.</p>			
<p>4.NBT.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.</p>	<p>SE/TE-A: Chapter 2 Pages 32-35, 41-43, 64, 66-67, 68 Chapter 3 Pages 88-95 Workbook A: 43A, 43B, 68B, 95A, 100A-100B, 273D, 273F SE/TE-B: Chapter 8 Pages 56-64, 64A-64B, 65-71, 71A-71B Chapter 12 Pages 170-175, 175A</p>	<p>August/September TE: 21–23 October TE: 34–36 November TE: 50–52 December TE: 63–66, TE: 72, January TE: 79–80 February TE: 94–95 March TE: 108–109 April TE: 122–124 May/June TE: 136–137</p>	
<p>4.NBT.5: Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</p>	<p>SE/TE-A: Chapter 3 Pages 78-85, 87-89, 91-95, 109, 116-119 Workbook A: 85A, 95A, 115A, 115B, 158B, 158D, 273B, 273C, 273G SE/TE-B: Chapter 12 Pages 149-150</p>	<p>December TE: 63–66, TE: 70–71 January TE: 79–80 February TE: 99–100 March TE: 108–109 TE: 113 April TE: 120–122 May/June TE: 136–137</p>	
<p>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,</p>	<p>SE/TE-A: Chapter 3 Pages 96-100, 101-108, 109-113, 115, 117-119 Workbook A: 100A, 100B, 108A, 115A, 115B, 158B, 158D, 273D, 273F, 273G</p>	<p>August/September TE: 23–26 October TE: 40–41 November TE: 54–56 December TE: 70–71 January TE: 82–86</p>	

rectangular arrays, and/or area models.			
Domain: Number and Operations Fractions			
(Note: Grade 4 expectations in this domain are limited to fractions with denominators 2,3,4,5,6,8,10,12,& 100)			
Sub-domain: Extend understanding of fraction equivalence and ordering.			
4.NF.1: Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	SE/TE-A: Chapter 5 Pages 199, 202-203, 210-211 Chapter 6 Pages 224-229, 236, 250-254, 259-262, 269-270, 273 Workbook A: 203A, 214C, 249A, 267, 267A, 267B, 273B, 273C SE/TE-B: Chapter 7 Pages 42-44, 47 Workbook B: 47, 239D	October TE: 36–37, TE: 38–40 November TE: 52–56 December TE: 66–70 January TE: 81–84 April TE: 126–128	
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 $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.	<i>This standard covered to mastery in grade 3</i> See Grade 3: Chapter 4 SE/TE-B: 130-146 Workbook B: 146A, 147, 156A, 218B	October TE: 38–40 November TE: 54–56 December TE: 68–70 January TE: 82–84 April TE: 126–128	
Sub-domain: 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 $1/b$. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	SE/TE-A: Chapter 6 Pages 224-229, 230, 232, 237-238, 250-251-253 259-260, 269 Workbook A: 236, 236A, 242A, 269A SE/TE-B: Chapter 7 Pages 43-45	October TE: 36–40 November TE: 52–56 December TE: 68–70 January TE: 82–84 March TE: 109–112 April TE: 126–128	
4.NF.3: Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation.	SE/TE-A: Chapter 6 Pages 237-238, 243-248, 270 Workbook A: 242A, 249A	April TE: 126–128	

<p>Justify decompositions, e.g., by using a visual fraction model. <i>Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.</i></p>			
<p>4.NF.3: Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.</p>	<p><i>The skills and concepts presented on these pages prepare students to address the state standard in more depth at grade 5:</i> SE/TE-A: Chapter 4 Pages 140-144, 145-149, 151-153, 156 Chapter 5 Pages 159 Chapter 6 Pages 250-254 Workbook A: 144A, 149A, 153B, 153C, 153D, 155A, 203C, 203D, 315F, 315G</p>	<p>December TE: 68–70 January TE: 82–84</p>	
<p>4.NF.3: Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.</p>	<p>SE/TE-A: Chapter 6 Pages 259-260 Workbook A: 267, 267A, 273D</p>	<p>November TE: 54–56 April TE: 126–128</p>	
<p>4.NF.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of $1/b$. <i>For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.</i></p>	<p>SE/TE-A: Chapter 6 Pages 237-238, 243-248, 270 Workbook A: 242A, 249A</p>		
<p>4.NF.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. b. Understand a multiple of a/b as a multiple of $1/b$, and use this</p>	<p>SE/TE-A: Chapter 6 Pages 255-258, 263-267, 271, 273 Workbook A: 258A, 267A, 267B, 269A</p>		

<p>understanding to multiply a fraction by a whole number. <i>For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)</i></p>			
<p>4.NF.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <p>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. <i>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?</i></p>	<p>SE/TE-A: Chapter 6 Pages 255, 263-267, 271, 273 Workbook A: 267A, 267B</p>		
<p>Sub-domain: Understand decimal notation for fractions, and compare decimal fractions.</p>			
<p>4.NF.5: Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. <i>For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$. (Note: Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.)</i></p>	<p>SE/TE-B: Chapter 7 Pages 13–19 Chapter 8 Page 62</p>		
<p>4.NF.6: Use decimal notation for fractions with denominators 10 or 100. <i>For</i></p>	<p>SE/TE-B: Chapter 7 Pages 4-9, 11, 12, 13-19, 22-23, 42-45,</p>	<p>August/September TE: 26–28 November TE: 57–59</p>	

<p><i>example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.</i></p>	<p>47, 50-52 Workbook B: 12A, 23A, 79A, 239D</p>	<p>December TE: 66–67</p>	
<p>4.NF.7: Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.</p>	<p>SE/TE-B: Chapter 7 Pages 14-19, 25-26, 28-29, 32, 34, 50, 52 Workbook B: 34A, 79B</p>		
Domain: Measurement and Data			
Sub-domain: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.			
<p>4.MD.1: Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. <i>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), ...</i></p>	<p>SE/TE-A: Chapter 6 Pages 235, 261-262, 264, 267, 270 Workbook A: 236A, 267A, 269A, 273C, 273F SE/TE-B: Chapter 7 Pages 9, 35, 37, 41 Chapter 8 Pages 76, 79 Chapter 11 Pages 129-130, 134, 137, 140-143, 144, 145, 147 Chapter 12 Pages 152-162, 163-165, 166-169, 170-173, 175, 176-187, 188-189, 191-193 Workbook B: 12A, 138A, 143B, 144A, 147B, 162A, 165A, 169A, 169B, 175A, 187A, 189A, 189B, 239B, 239C, 239D, 239E, 239G</p>	<p>October TE: 36–37 December TE: 66–67 January TE: 81–82 March TE: 109–111</p>	
<p>4.MD.2: Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities</p>	<p>SE/TE-A: Chapter 6 Pages 261-262, 264, 267, 270 Workbook A: 267A, 269A, 273C, 273F SE/TE-B: Chapter 8 Pages 76, 78-79 Chapter 11 Pages 129-130, 134, 137, 140-143, 144, 145,147 Chapter 12 Pages 152-162, 163-165, 166-169, 170-173, 175, 176-187, 188-189, 191-193</p>	<p>January TE: 81–82 February TE: 100–101 March TE: 109–111, TE: 113–115 April TE: 130–131</p>	

<p>using diagrams such as number line diagrams that feature a measurement scale.</p>	<p>Workbook B: 12A, 76A, 79B, 138A, 143B, 144A, 147B, 162A, 165A, 169A, 169B, 175A, 187A, 189A, 189B, 239B, 239C, 239D, 239E, 239G</p>		
<p>4.MD.3: Apply the area and perimeter formulas for rectangles in real world and mathematical problems. <i>For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.</i></p>	<p>SE/TE-B: Chapter 12 Pages 152-157, 160-162, 163-165, 166-169, 170-175, 176, 178-187, 189, 191-193 Workbook B: 162A, 165A, 169A, 169B, 175A, 187A, 188, 189A, 189B, 239B, 239C, 239E, 239G</p>	<p>February TE: 95–98 April TE: 124–126</p>	
<p>Sub-domain: Represent and interpret data.</p>			
<p>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. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i></p>	<p>See Grade 3: Chapter 4 SE/TE-B: 97-104, 106, 110, 111 Workbook B: 104A, 104B, 104C, 105A, 387F</p>		
<p>Sub-domain: Geometric measurement: understand concepts of angle and measure angles.</p>			
<p>4.MD.5: Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:</p> <p>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. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles.</p>	<p>SE/TE-B: Chapter 9 Pages 88, 98, 100, 102, 104</p>	<p>February TE: 92–94</p>	
<p>4.MD.5: Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint,</p>	<p>SE/TE-B: Chapter 9 Pages 98-102, 104 Workbook B: 147B</p>		

<p>and understand concepts of angle measurement:</p> <p>b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.</p>			
<p>4.MD.6: Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.</p>	<p>SE/TE-B: Chapter 9 Pages 88-93, 94-97, 99, 102, 104 Workbook B: 93A, 97A</p>		
<p>4.MD.7: Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.</p>	<p>SE/TE-B: Chapter 9 Pages 97, 98, 139-140 Chapter 10 Page 147 Workbook B: 97A, 143A-143B, 147-147A</p>		
Domain: Geometry			
Sub-domain: Draw and identify lines and angles, and classify shapes by properties of their lines and angles			
<p>4.G.1: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.</p>	<p>SE/TE-B: Chapter 9 Pages 87-93, 94-97, 99-100, 104 Chapter 10 Pages 111-114, 115-118, 121, 122, 124 Workbook B: 93A, 97A, 114A, 118A, 121A, 121B, 147A, 147B, 239D, 239E, 239F</p>	<p>December TE: 62–63</p>	
<p>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.</p>	<p>SE/TE-B: Chapter 10 Pages 114, 116 Chapter 11 Pages 129-132, 137-138, 145-147 Workbook B: 121B, 138A, 143B</p>	<p>August/September TE: 18–20 October TE: 32–34 March TE: 106–108 May/June TE: 134–136</p>	
<p>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</p>	<p>SE/TE-B: Chapter 12 Pages 197-202, 209, 212-213, 215-216 Workbook B: 202A, 239B</p>	<p>October TE: 32–34 March TE: 106–108</p>	

symmetry.			
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KCAS	Math In Focus	Everyday Counts	Gap
Domain: Operations and Algebraic Thinking (OA)			
Sub-domain: Write and interpret numerical expressions.			
5.OA.1: Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	SE/TE-A: Chapter 2 Pages: 55, 60-63, 64-66, 68, 73-74, 77-80, 92-95, 109, 113 Chapter 5 Pages 216-217, 227-228, 230, 235, 237-240, 242, 245 Workbook A: 63A, 81A, 81B, 95B, 108A, 108B, 109A, 113D, 225A, 240A, 241A, 315B, 315C, 315F, 315H	November TE: 49, 55 December TE: 62 January TE: 83 February TE: 97 April TE: 117	
5.OA.2: Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. <i>For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.</i>	SE/TE-A: Chapter 2 Pages 90-93, 95, 99-101, 111, 113 Chapter 5 Pages 208-210 Workbook A: 95A, 95B, 218A, 315E	January TE: 82–83 February TE: 90–91 April TE: 116–118	
Sub-domain: 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. <i>For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting</i>	SE/TE-A: Chapter 2 Pages 51-54, 56-59, 70-72, 74-77, 81 SE/TE-B: Chapter 11 Pages 131- 135, 136, 138, 156 Workbook B: 138A, 153A	January TE: 82–83 April TE: 116–118	

<p><i>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.</i></p>			
Domain: Number and Operations in Base Ten			
Sub-domain: Understand the place value system.			
<p>5.NBT.1: Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.</p>	<p>SE/TE-A: Chapter 1 Pages 5-8, 9-10, 12-13, 16, 18, 20-21, 36, 38-39 Chapter 2 Pages 52-53, 57-58, 71-72, 75-76, 81 Workbook A: 15A, 15B, 19A, 24A SE/TE-B: Chapter 8 Pages 7-14, 16-17, 18-19, 20-22, 23, 27-29, Chapter 9 Pages 36-39, 42, 43-44, 46-47, 51, 53-58, 60-61, 63-64 Workbook B: 17A, 22A, 42A, 50A, 59A, 59B, 67A</p>	<p>August/September TE: 21–28 October TE: 37–38</p>	
<p>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.</p>	<p>SE/TE-A: Chapter 2 Pages 51-54, 56-59, 70-72, 74-77, 81 SE/TE-B: Chapter 9 Pages 43-48, 50A, 60-65, 67A, Chapter 10 Page 82-83, 118C Workbook B: 50A, 67A, 118C</p>	<p>May/June TE: 132</p>	
<p>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., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.</p>	<p>SE/TE-B: Chapter 8 Pages 7-17, 17A, 23-25, 26-29 Workbook B: 17A, 25A, 25B, 118B</p>	<p>August/September TE: 25–28 October TE: 45 April TE: 119–120</p>	
<p>5.NBT.3: Read, write, and compare decimals to thousandths. b. Compare two decimals to thousandths based on meanings of the digits in each</p>	<p>SE/TE-B: Chapter 8 Pages 18-22, 27 Workbook B: 22A, 118B</p>	<p>August/September TE: 28 October TE: 45 December TE: 71 January TE: 81 February TE: 98–99</p>	

	place, using $>$, $=$, and $<$ symbols to record the results of comparisons.		April TE: 121	
5.NBT.4:	Use place value understanding to round decimals to any place.	SE/TE-B: Chapter 8 Pages 20-22, 27, 29, Chapter 9 Pages 56-58, 68-74, 75-80, 82-83 Workbook B: 22A, 25B, 74A, 80A, 118B, 118C	April TE: 124	
Sub-domain: 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.	SE/TE-A: Chapter 2 Pages 49, 51-63, 64-69, 91-95, 98-102, 103-104, 108, 109, 110, 112-113 Workbook A: 50A, 63A, 63B, 69A, 69B, 95A, 95B, 102A, 102B, 108A, 108B, 109A, 113C, 113D, 113E SE/TE-B: Chapter 15 Pages 269-270, 272, 274, 287-295, 299, 301-302 Workbook B: 247A, 297, 297A, 297B, 297C, 302B, 302C, 302D, 302E, 302G	October TE: 34, 37-38 November TE: 48-49, 51, 54-55 December TE: 62, 66-67 January TE: 83 February TE: 90-91	
5.NBT.6:	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	SE/TE-A: Chapter 2 Pages 50, 70, 72-74, 77-81, 82-89, 92-94, 96-97, 100, 102, 104-105, 108, 111-113 Workbook A: 50A, 81A, 81B, 89A, 95A, 95B, 102A, 108B, 113C, 113E, 315E, 315G	October TE: 37-38 December TE: 62 April TE: 124	
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.	SE/TE-B: Chapter 8 Pages 13, 17, 26 Chapter 9 Pages 36-42, 43-50, 51-59, 60-67, 68-74, 75-80, 81, 82-84 Workbook B: 17A, 25B, 42A, 50A, 59A, 59B, 67A, 74A, 80A, 80B, 81A, 118B, 118C, 302G	October TE: 44-45 November TE: 58-59 December TE: 62, 70-71 February TE: 98-99 April TE: 119, 124	
Domain: Number and Operations Fractions				
Sub-domain: Use equivalent fractions as a strategy to add and subtract fractions.				
5.NF.1:	Add and subtract fractions with unlike denominators (including	SE/TE-A: Chapter 3 Pages 122-126, 127-130, 140-144, 145-	October TE: 40-41 November TE: 53	

<p>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. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)</i></p>	<p>149, 151-153, 154, 156, 158-159 Workbook A: 126A, 126B, 130A, 144A, 149A, 153A, 153B, 153C, 153D, 155A, 203B, 203C, 203D, 315E, 315F, 315G</p>	<p>December TE: 65, 70–71 February TE: 86, 94, 98 March TE: 110</p>	
<p>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. <i>For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.</i></p>	<p>SE/TE-A: Chapter 3 Pages 122, 127, 129, 131-132, 134-135, 139, 140-141, 145-146, 150-153, 154-155, 159 Workbook A: 130A, 139A, 153A, 153B, 153C, 153D, 155A, 203D, 315F, 315G</p>		
Sub-domain: Apply and extend previous understanding of multiplication and division to multiply and divide fractions.			
<p>5.NF.3: Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. <i>For example, interpret $3/4$ as the result of dividing 3 by 4, noting that $3/4$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?</i></p>	<p>SE/TE-A: Chapter 3 Pages 131-136, 138, 150, 157, 159 Workbook A: 136A, 139A, 153A, 153B, 203B</p>		
<p>5.NF.4: Apply and extend previous understandings of multiplication to</p>	<p>SE/TE-A: Chapter 4 Pages 165-168, 169-174, 175-176, 177-</p>		

<p>multiply a fraction or whole number by a fraction.</p> <p>a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)</p>	<p>180, 181-184, 191, 193-194, 196, 198, 200-203</p> <p>Workbook A: 168A, 174A, 176A, 180A, 184A, 198A, 199A, 203C, 203D, 203E, 315E, 315F</p>		
<p>5.NF.4: Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.</p> <p>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.</p>	<p>SE/TE-A: Chapter 4 Pages 165, 175, 203 Workbook A: 168A, 176A</p>		
<p>5.NF.5: Interpret multiplication as scaling (resizing), by:</p> <p>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.</p>	<p>SE/TE-A: Chapter 4 Pages 168 Chapter 7 Pages 280-281, 299, 301, 304, 313 Workbook A: 282, 301A</p>		
<p>5.NF.5: Interpret multiplication as scaling (resizing), by:</p> <p>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</p>	<p>SE/TE-A: Chapter 4 Pages 165-168, 175-176, 177-180 Workbook A: 168A, 176A SE/TE-B: 36-50 Workbook B: 42A, 50A</p>		

<p>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 $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.</p>			
<p>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.</p>	<p>SE/TE-A: Chapter 4 Pages 165, 167, 169-174, 177, 181-184, 192-197, 203 Workbook A: 174A, 184A, 199A, 203D, 203E</p>		
<p>5.NF.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (Note: Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.)</p> <p>a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.</p>	<p>SE/TE-A: Chapter 4 Pages 185-189, 196-198, 201, 203 Workbook A: 189A, 199A, 203C, 203D, 203E, 315E</p>		
<p>5.NF.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (Note: Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But</p>		<p>November TE: 51–53</p>	<p>This standard is neither introduced nor taught to mastery in MIF or ECC for 5th grade.</p>

<p>division of a fraction by a fraction is not a requirement at this grade.)</p> <p>b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.</p>			
<p>5.NF.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (Note: Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.)</p> <p>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 $1/2$ lb of chocolate equally? How many $1/3$-cup servings are in 2 cups of raisins?</p>	<p>SE/TE-A: Chapter 4 Pages 185-189, 196-198, 203 Workbook A: 189A, 199A, 203D, 203E</p>		
Domain: Measurement and Data			
Sub-domain: Convert like measurement units within a given measurement system.			
<p>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-</p>	<p>SE/TE-B: Chapter 11 Page 134 Chapter 15 Pages 290-296, 299, 301-302 Workbook B: 153A, 228B, 228D, 297A,</p>	<p>November TE: 59 February TE: 96–98 April TE: 118–120</p>	

step, real world problems.	297B, 297C, 302C, 302D, 302E		
Sub-domain: Represent and interpret data.			
<p>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. <i>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.</i></p>	<p><i>Line Plots are covered to mastery in grades 3 and 4, opportunity to review can be found on page:</i> SE/TE-B: Chapter 11 Page 153</p> <p>Grade 3: Chapter 13 Pages 97-104, 110-111 Workbook B: 76, 77,78,79,81,82,84,85</p> <p>Grade 4: Chapter 5 Pages 174-186 Workbook A: 104, 106</p>	November TE: 59	This standard is neither introduced nor taught to mastery in MIF or ECC for 5 th grade.
Sub-domain: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.			
<p>5.MD.3: Recognize volume as an attribute of solid figures and understand concepts of volume measurement.</p> <p>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.</p>	<p>SE/TE-B: Chapter 15 Pages 277-285, 287-290, 297, 299-301 Workbook B: 285A, 297A, 302C</p>		
<p>5.MD.3: Recognize volume as an attribute of solid figures and understand concepts of volume measurement.</p> <p>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.</p>	<p>SE/TE-B: Chapter 15 Pages 277-285, 287-288, 297, 299-300 Workbook B: 285A, 302C</p>		
<p>5.MD.4: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.</p>	<p>SE/TE-B: Chapter 15 Pages 277-285, 287-288, 297, 299-300 Workbook B: 285A, 302C</p>		
<p>5.MD.5: Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>a. Find the volume of a right rectangular prism with whole-number side lengths by packing</p>	<p>SE/TE-B: Chapter 15 Pages 277, 279, 280-283, 285, 287-288, 299 Workbook B: 285A, 302C</p>		

	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.			
5.MD.5:	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ 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.	SE/TE-B: Chapter 15 Pages 286-297, 297A, 297B, 297C, 299, 301-302 Workbook B: 297A, 297B, 297C, 302C, 302D, 302G		
5.MD.5:	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. 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.	SE/TE-B: Chapter 15 Pages 278, 279, 281, 282, 284		
Domain: Geometry				
Sub-domain: 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	SE/TE-B: Chapter 11 Pages 131-138, 156 Workbook B: 138A, 153A, 228B, 228D, 302E	January TE: 83 April TE: 118	

	<p>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).</p>			
5.G.2:	<p>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.</p>	<p>SE/TE-B: Chapter 11 Pages 131-138, 156 Workbook B: 138A, 153A, 228B, 228D, 302E</p>		
Sub-domain: Classify two-dimensional figures into categories based on their properties.				
5.G.3:	<p>Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. <i>For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.</i></p>	<p>SE/TE-A: Chapter 6 Page 257 SE/TE-B: Chapter 13 Pages 186-190, 195-199, 201-204, 211-214, 216-223, 224-228 Workbook B: 190A, 204A, 204B, 223A, 223B, 228C, 228D, 302F</p>	<p>January TE: 74–75</p>	
5.G.4:	<p>Classify two-dimensional figures in a hierarchy based on properties.</p>	<p>SE/TE-A: Chapter 7 Page 257 SE/TE-B: Chapter 13 Pages 186-190, 195-199, 201-204, 211-214, 216-223, 224-228 Workbook B: 190A, 204A, 204B, 223A, 223B, 228C, 228D, 302F</p>	<p>January TE: 74–75</p>	

	Current Unit	KY Common Core Standard	ADP	ADP STANDARDS
1-1	ALG 2 – unit 1	<p>8.EE.1,2,3,4</p> <p>8.EE.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions. <i>For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.</i></p> <p>8.EE.2: Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is crazy.</p> <p>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. <i>For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.</i></p> <p>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.</p> <p>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.</p> <p>8.G.8: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</p> <p>N.RN.2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.</p>	<p>Lesson</p> <p>1-6</p>	<p>O1.a,c,d;O2.a,d</p> <p>O1.a : Use properties of number systems within the set of real numbers to verify or refute conjectures or justify reasoning and to classify, order, and compare real numbers</p> <p>O1.c : Apply the laws of exponents to numerical expressions with integral exponents to rewrite them in different but equivalent forms or to solve problems.</p> <p>O1.d: Use the properties of radicals to rewrite numerical expressions containing square roots in different but equivalent forms or to solve problems.</p> <p>O2. A: Apply the laws of exponents to algebraic expressions with integral exponents to rewrite them in different but equivalent forms or to solve problems.</p> <p>O2. d: Use the properties of radicals to convert algebraic expressions containing square roots into different but equivalent forms or to solve problems.</p>

		<p>Use properties of rational and irrational numbers.</p> <p>N.RN.3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.</p>		
1-2	Need to create	<p>A.APR.1: Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</p> <p>Understand the relationship between zeros and factors of polynomials</p> <p>A-SSE-1A. Interpret expressions that represent a quantity in terms of its context. ★</p> <p>Interpret parts of an expression, such as terms, factors, and coefficients.</p> <p>A-SSE-2. Use the structure of an expression to identify ways to rewrite it. <i>For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</i></p> <p>Write expressions in equivalent forms to solve problems</p> <p>7.RP12A,2B,2C,3</p> <p>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. <i>For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $(\frac{1}{2})/(\frac{1}{4})$ miles per hour, equivalently 2 miles per hour.</i></p> <p>7.RP.2: Recognize and represent proportional relationships between quantities.</p> <p>a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a</p>	Lesson 7-10	<p>O1.B;O2.B,C</p> <p>O1.b: Use rates, ratios and proportions to solve problems, including measurement problems.</p> <p>O2.b) Add, subtract and multiply polynomial expressions with or without a context.</p> <p>O2.c: Factor simple polynomial expressions with or without a context.</p>

		<p>coordinate plane and observing whether the graph is a straight line through the origin.</p> <p>b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</p> <p>c. Represent proportional relationships by equations. <i>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 $t = pn$.</i></p> <p>7.RP.3: Use proportional relationships to solve multistep ratio and percent problems. <i>Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</i></p> <p>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.</p> <p>d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.</p> <p>NQ.1: Reason quantitatively and use units to solve problems.</p> <p>1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.</p>		
1-3	ALG 1 – unit 3	<p>A-REI.1, Reasoning with Equations and Inequalities A -RE I</p> <p>Understand solving equations as a process of reasoning and explain the reasoning</p> <p>1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.</p>	Lesson 11-12	<p>L1.A; L1.a) Recognize, describe and represent linear relationships using words, tables, numerical patterns, graphs and equations. Translate among these representations</p> <p>L2.E;</p> <p>L2.e) Recognize, express and solve problems that can be modeled using single-variable linear equations; one- or two-variable inequalities; or two-variable systems of linear equations. Interpret their solutions in terms of the context of the</p>

				<p>problem.</p> <p>L2.A</p> <p>L2.a) Solve single-variable linear equations and inequalities with rational coefficients.</p>
1-4	ALG 1 – unit 5	<p>F.1F.1,2,7A</p> <p>1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.</p> <p>2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.</p> <p>7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★</p> <p>a. Graph linear and quadratic functions and show intercepts, maxima, and minima</p> <p>A.REI.10</p> <p>10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).</p> <p>8.ee.8A,B,C</p> <p>8.EE.8: Analyze and solve pairs of simultaneous linear equations.</p> <p>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.</p>	<p>Lesson</p> <p>13-17</p>	<p>L1.A,L1.B, L1.D</p> <p>L1.a) Recognize, describe and represent linear relationships using words, tables, numerical patterns, graphs and equations. Translate among these representations</p> <p>L1.b) Describe, analyze and use key characteristics of linear functions and their graphs.</p> <p>L1.d) Recognize, express and solve problems that can be modeled using linear functions. Interpret their solutions in terms of the context of the problem.</p>

		<p>b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.</i></p> <p>c. Solve real-world and mathematical problems leading to two linear equations in two variables. <i>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</i></p> <p>G.PE.5 ??????</p> <p>A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</p> <p>F-BF.3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i></p>		
1-5	ALG 1 – unit 2	<p>F-BF-1A <u>Building Functions F-BF</u></p> <p>Build a function that models a relationship between two quantities</p> <p>1. Write a function that describes a relationship between two quantities. ★</p> <p>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.</p> <p>F-LE-1A,1B <u>Linear, Quadratic, and Exponential Models</u> ★F -LE</p> <p>Construct and compare linear, quadratic, and exponential models and solve problems</p>	Lesson 18-19	<p>L1.a) Recognize, describe and represent linear relationships using words, tables, numerical patterns, graphs and equations. Translate among these representations</p> <p>L2.d) Solve systems of linear equations in two variables using algebraic and graphic procedures.</p>

		<p>1. Distinguish between situations that can be modeled with linear functions and with exponential functions.</p> <p>a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.</p> <p>b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</p>		
1-6	ALG 1 – unit 6	<p>A-REI-5</p> <p>5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.</p> <p>A-RE1.6</p> <p>6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.</p> <p>A-REI-11</p> <p>11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. ★</p>	<p>Lesson</p> <p>20-22</p>	<p>L2.D,L2.E</p> <p>L2.d) Solve systems of linear equations in two variables using algebraic and graphic procedures.</p> <p>L2.e) Recognize, express and solve problems that can be modeled using single-variable linear equations; one- or two-variable inequalities; or two-variable systems of linear equations. Interpret their solutions in terms of the context of the problem.</p>
1-7	ALG 1 – unit 4	<p>F.IF.7B7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★</p> <p>a. Graph linear and quadratic functions and show intercepts, maxima, and minima.</p> <p>b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</p>	<p>Lesson</p> <p>23-25</p>	<p>L1.C,L2.B</p> <p>L1.c) Graph the absolute value of a linear function and determine and analyze its key characteristics.</p> <p>L2.b) Solve equations involving the absolute value of a linear expression.</p>

		<p>F.BF.3</p> <p>3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i></p> <p>A.CED.1</p> <p>1. Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</i></p>		
1-8	ALG 1 – unit 4	<p>A-REI.3</p> <p>3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</p> <p>A-REI.12</p> <p>12. Graph the solutions to a linear inequality in two variables as a halfplane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.</p> <p>A-REI.1</p> <p>1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.</p>	<p>Lesson 26-28</p>	<p>L2.A,L2.C,L2.E</p> <p>L2.a) Solve single-variable linear equations and inequalities with rational coefficients.</p> <p>L2.c) Graph and analyze the graph of the solution set of a two-variable linear inequality.</p> <p>L2.e) Recognize, express and solve problems that can be modeled using single-variable linear equations; one- or two-variable inequalities; or two-variable systems of linear equations. Interpret their solutions in terms of the context of the problem.</p>
1-9	ALG 1 – unit 11-12	<p>S.ID.2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.</p> <p>S.IC.1: Understand statistics as a process for making inferences</p>	<p>Lesson 36-41</p>	<p>D1.C</p> <p>D1.c) Evaluate the reliability of reports based on data published in the media.</p> <p>D1.B</p>

		<p>about population parameters based on a random sample from that population.</p> <p>S.ID.3: Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</p> <p>S.ID.7,8</p> <p>7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.</p> <p>8. Compute (using technology) and interpret the correlation coefficient of a linear fit.</p> <p>S.CP.1: Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").</p>	<p>D1.b) Use measures of center and spread to compare and analyze data sets.</p> <p>D1.A</p> <p>D1.a) Interpret and compare linear models for data that exhibit a linear trend including contextual problems.</p> <p>problem.</p> <p>D2.A</p> <p>D2.a) Use counting principles to determine the number of ways an event can occur. Interpret and justify solutions.</p>
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HS Math 2 – ALG 1

	Current Unit	KY Common Core Standard	ADP	ADP STANDARDS
2-1	ALG 2 unit 4 A	<p>F.IF.4,7A 4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i> ★ 7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★ a. Graph linear and quadratic functions and show intercepts, maxima, and minima.</p> <p>A.REI.1 1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.</p> <p>A.REI.4B 4. Solve quadratic equations in one variable. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.</p> <p>A.SSE.3A3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★ a. Factor a quadratic expression to reveal the zeros of the function it defines.</p> <p>A.GED.4A</p>	Lesson 29-32	<p>N1.A;N1.B;N1.C N1.a) Recognize, describe, represent and analyze a quadratic function using words, tables, graphs or equations</p> <p>N1.b) Analyze a table, numerical pattern, graph, equation or context to determine whether a linear, quadratic or exponential relationship could be represented. Or, given the type of relationship, determine elements of the table, numerical pattern or graph.</p> <p>N1c) Recognize and solve problems that can be modeled using a quadratic function. Interpret the solution in terms of the context of the original problem.</p> <p>N2.B N2.b) Solve single-variable quadratic equations.</p>
2-2	Need to create	A.SSE.1B	Lesson	N1.B

	<p>1. Interpret expressions that represent a quantity in terms of its context. ★</p> <p>b. Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i></p> <p>F.IF.7E</p> <p>7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★</p> <p>e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</p> <p>F.IF.4</p> <p>4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i> ★</p> <p>F.IF.1</p> <p>1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.</p> <p>F.LE.1A</p> <p>Linear, Quadratic, and Exponential Models ★F -LE</p> <p>Construct and compare linear, quadratic, and exponential models and solve problems</p> <p>1. Distinguish between situations that can be modeled with linear functions and with exponential functions.</p> <p>a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.</p> <p>A.REI.3</p> <p>3. Solve linear equations and inequalities in one variable, including</p>	<p>33-35</p>	<p>N1.b) Analyze a table, numerical pattern, graph, equation or context to determine whether a linear, quadratic or exponential relationship could be represented. Or, given the type of relationship, determine elements of the table, numerical pattern or graph.</p> <p>N2.A</p> <p>N2.a) Solve equations involving several variables for one variable in terms of the others.</p>
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		equations with coefficients represented by letters.		
2-3	ALG 2 unit 1 or Alg 1 9-10	<p>N.RN.1,2; Extend the properties of exponents to rational exponents. 1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. <i>For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5(1/3)^3$ to hold, so $(5^{1/3})^3$ must equal 5.</i> 2. Rewrite expressions involving radicals and rational exponents using the properties of exponents. Use properties of rational and irrational numbers.</p> <p>N.CN.1,2; Perform arithmetic operations with complex numbers. 1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real. 2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.</p> <p>A.APR.1,2,4,6 Perform arithmetic operations on polynomials 1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. Understand the relationship between zeros and factors of polynomials 2. Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$. Use polynomial identities to solve problems 4. Prove polynomial identities and use them to describe numerical relationships. <i>For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.</i> Rewrite rational expressions 6. Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a</p>	Lesson 1-9	<p>O1.a,B,C</p> <p>O1.a Convert between and among radical and exponential forms of numerical expressions.</p> <p>O1.b. Simplify and perform operations on numerical expressions containing radicals.</p> <p>O1.c. Apply the laws of exponents to numerical expressions with rational and negative exponents to order and rewrite them in alternative forms.</p> <p>O2.A;O2.B</p> <p>O2.a. Convert between and among radical and exponential forms of algebraic expressions. O2.b. Simplify and perform operations on radical algebraic expressions.</p> <p>O3.A-f</p> <p>O3.a. Convert between and among radical and exponential forms of algebraic expressions.</p> <p>O3.b. Simplify and perform operations on radical algebraic expressions.</p> <p>O3.c. Apply the laws of exponents to algebraic expressions, including those involving rational and negative exponents, to order and rewrite them in alternative forms.</p> <p>O3.d. Perform operations on polynomial expressions.</p> <p>O3.e Perform operations on rational expressions, including complex</p> <p>O3.f Identify or write equivalent algebraic expressions in one or more variables to extract information.</p>

		computer algebra system.		E2.E E2.e Rewrite nonlinear equations and inequalities to express them in multiple forms in order to facilitate finding a solution set or to extract information about the relationships or graphs indicated.
2-4	ALG 2 unit 2 or Alg 1 8	A.REI.1,3,12 Understand solving equations as a process of reasoning and explain the reasoning 1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. 3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. 12. Graph the solutions to a linear inequality in two variables as a halfplane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. A.CED.3 3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i>	Lesson 10-13	E1.A-D E1.a. Solve equations and inequalities involving the absolute value of a linear expression. E1.b. Express and solve systems of linear equations in three variables with and without the use of technology. E1.c. Solve systems of linear inequalities in two variables and graph the solution set. E1.d. Recognize and solve problems that can be represented by single variable linear equations or inequalities or systems of linear equations or inequalities involving two or more variables. Interpret the solution(s) in terms of the context of the problem.
2-5	Need to Create	N.CN.7; 7. Solve quadratic equations with real coefficients that have complex solutions. A.REI.4B; 4. Solve quadratic equations in one variable. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b . A.SSE.3B,	Lesson 14-16	E2.A-C,E E2.a. Solve single-variable quadratic, exponential, rational, radical, and factorable higher-order polynomial equations over the set of real numbers, including quadratic equations involving absolute value. E2.b. Solve single variable quadratic equations and inequalities over the complex numbers; graph real solution sets on a number line. E2.c. Use the discriminant, $D = b^2 - 4ac$, to determine the nature of the solutions of the equation $ax^2 + bx + c = 0$. E2.d. Graph the solution set of a two-variable quadratic inequality in the coordinate plane.

		<p>3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★</p> <p>b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.</p> <p>A.REI.4A;</p> <p>4. Solve quadratic equations in one variable.</p> <p>a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.</p>		<p>E2.e Rewrite nonlinear equations and inequalities to express them in multiple forms in order to facilitate finding a solution set or to extract information about the relationships or graphs indicated.</p>
2-6	Need to Create	<p>A.REI.2;</p> <p>2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. Solve equations and inequalities in one variable</p> <p>A.APR.3</p> <p>3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. Use polynomial identities to solve problems</p>	Lesson 18-19	<p>E2.A</p> <p>E2.a. Solve single-variable quadratic, exponential, rational, radical, and factorable higher-order polynomial equations over the set of real numbers, including quadratic equations involving absolute value.</p> <p>E2.E</p> <p>Rewrite nonlinear equations and inequalities to express them in multiple forms in order to facilitate finding a solution set or to extract information about the relationships or graphs indicated.</p>
2-7	ALG 2 Unit 5-6	<p>F.1F.8B;</p> <p>8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p> <p>b. Use the properties of exponents to interpret expressions for exponential functions. <i>For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, and classify them as representing exponential growth or decay.</i></p> <p>9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i></p> <p>F.IF.7E;</p> <p>7. Graph functions expressed symbolically and show key features of the graph,</p>	Lesson 17 and 30-33	<p>E2.A</p> <p>Solve single-variable quadratic, exponential, rational, radical, and factorable higher-order polynomial equations over the set of real numbers, including quadratic equations involving absolute value.</p> <p>E2.E;</p> <p>E2.e Rewrite nonlinear equations and inequalities to express them in multiple forms in order to facilitate finding a solution set or to extract information about the relationships or graphs indicated.</p> <p>X1.A-D</p> <p>X1.a. Determine key characteristics of</p>

		<p>by hand in simple cases and using technology for more complicated cases.★</p> <p>e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</p> <p>F.BF.3;</p> <p>F.LE.1c,4,5;</p> <p>1. Distinguish between situations that can be modeled with linear functions and with exponential functions.</p> <p>c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.</p> <p>4. For exponential models, express as a logarithm the solution to $abct = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.</p> <p>Interpret expressions for functions in terms of the situation they model</p> <p>5. Interpret the parameters in a linear or exponential function in terms of a context.</p> <p>A.SSE.3C; 4</p> <p>c. Use the properties of exponents to transform expressions for exponential functions. <i>For example the expression $1.15t$ can be rewritten as $(1.151/12)^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.</i></p> <p>4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. <i>For example, calculate mortgage payments.</i>★</p>		<p>exponential functions and their graphs.</p> <p>X1.b. Represent exponential functions using tables, graphs, verbal statements, and equations. Represent exponential equations in multiple forms. Translate among these representations.</p> <p>X1.c. Describe and represent the effect that changes in the parameters of an exponential function have on the shape and position of its graph.</p> <p>X1.d. Recognize, express, and solve problems that can be modeled using exponential functions, including those where logarithms provide an efficient method of solution. Interpret their solutions in terms of the context.</p>
2-8	Need to create (Jill Springer)		Supplement	
2-9				

HS Math 3 – ALG 2

	Current Unit	KY Common Core Standard	ADP	ADP STANDARDS
3-1	ALG 2 unit 4A	F.IF.4,5,7A,9	Lesson	P1.A-D

		<p>4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i> ★</p> <p>5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function</i>★</p> <p>Analyze functions using different representations</p> <p>7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★</p> <p>a. Graph linear and quadratic functions and show intercepts, maxima, and minima.</p> <p>9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum</i></p> <p>F.BF.3</p> <p>3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i></p>	<p>20-23</p>	<p>P1.a. Determine key characteristics of quadratic functions and their graphs.</p> <p>P1.b. Represent quadratic functions using tables, graphs, verbal statements, and equations. Translate among these representations.</p> <p>P1.c. Describe and represent the effect that changes in the parameters of a quadratic function have on the shape and position of its graph.</p> <p>P1.d. Recognize, express, and solve problems that can be modeled using quadratic functions. Interpret their solutions in terms of the context.</p>
<p>3-2</p>	<p>ALG 2 unit 4b</p>	<p>F.IF.4,7C</p> <p>4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums;</i></p>	<p>Lesson</p> <p>24-26</p>	<p>P2.A-C</p> <p>P2.a. Determine key characteristics of power functions in the form $f(x) = ax^n$, $a \neq 0$, for positive integral values of n and their graphs.</p> <p>P2.b. Determine key characteristics of polynomial</p>

		<p><i>symmetries; end behavior; and periodicity.</i> ★</p> <p>7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★</p> <p>c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.</p> <p>F.BF.3</p> <p>3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i></p>		<p>functions and their graphs.</p> <p>P2.c. Represent polynomial functions using tables, graphs, verbal statements, and equations. Translate among these representations.</p>
3-3	Needs to be created		<p>Lesson</p> <p>27-29</p>	<p>P2.D-F</p> <p>P2. d. Determine key characteristics of simple rational functions and their graphs.</p> <p>P2.e. Represent simple rational functions using tables, graphs, verbal statements, and equations. Translate among these representations.</p> <p>P2.f. Recognize, express, and solve problems that can be modeled using polynomial and simple rational functions. Interpret their solutions in terms of the context.</p>
3-4	ALG 2 unit 7	<p>F.BF.1B;4a,</p> <p>1. Write a function that describes a relationship between two quantities. ★</p> <p>b. Combine standard function types using arithmetic operations. <i>For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.</i></p>	<p>Lesson</p> <p>34-37</p>	<p>F1.A,B;</p> <p>F1.a. Combine functions by addition, subtraction, multiplication, and division.</p> <p>F1.b. Determine the composition of two functions, including any necessary restrictions on the domain.</p>

		<p>4. Find inverse functions.</p> <p>a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. <i>For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.</i></p> <p>F.IF.6,7B</p> <p>6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ★</p> <p>Analyze functions using different representations</p> <p>7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★</p> <p>b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</p>		<p>F2.A,B</p> <p>F2.a. Describe the conditions under which an inverse relation is a function.</p> <p>F2.b. Determine and graph the inverse relation of a function.</p>
3-5	Needs to be create (LTF)		Lesson 38-40	<p>F3.A-C</p> <p>F.3. a. Determine key characteristics of absolute value, step, and other piecewise-defined functions.</p> <p>F3. b. Represent piecewise-defined functions using tables, graphs, verbal statements, and equations. Translate among these representations.</p> <p>F3. c. Recognize, express, and solve problems that can be modeled using absolute value, step, and other piecewise-defined functions. Interpret their solutions in terms of the</p>

				context.
3-6	ALG 2 unit 10 (sequence and series)			
3-7	ALG 2 unit 11 (trig)			
3-8	STEM (matrices)			
3-9	STEM (vectors)			