Los Angeles Unified School District
Office of Curriculum Instruction and School Support
2013-2014 Grade 6 Common Core Curriculum Map

Overview of the Common Core Mathematics Instructional Guide

Introduction to the Document:

Welcome to the Los Angeles Unified School District's Common Core Mathematics Instructional Guide (MIG). The mathematics instructional guide for Los Angeles Unified School District is developed as a tool for direction and clarification. It is a living document that is interactive and web-based. There are specific, precise links to provide readily accessible resources needed to appropriately meet the rigors of the common core state standards. The MIG is intended to be a one-stop tool for teachers, administrators, parents, and other school support personnel. It provides information on the Common Core Standards for Mathematics, assessment sample items, and suggested instructional tools organized into units providing one easy-to-read resource.

Components of the Mathematics Instructional Guide:

The curriculum map is designed around the standards for mathematics k – 12 which are divided into two sets: Practice Standards and Content standards. The Standards for Mathematical Practice are identical for each grade level. They are the expertise and understanding which the mathematics educators will seek to develop in their students. These practices are also the "processes and proficiencies" to be used as instructional "habits of mind" to be developed at all grade levels. It is critical that mathematical literacy is emphasized throughout the instructional process.

The MIG is grouped into four coherent units by grade level. Each unit clarifies the cluster and specific standards students are to master. In addition, the relevant Mathematical Practices and learning progressions are correlated. These sections of the MIG define the big idea of the unit. These four units are summarized in the **Unit Organizer** which provides the overview for the year.

Instructional components are specified in:

- **Enduring Understandings** which are the key understandings/big ideas that the students will learn from the unit of study. These are statements that communicate the learning in a way that engages students.
- **Essential Questions** which are based on enduring understandings. They are used to gain student interest in learning and are limited in number. They promote critical or abstract thinking and have the potential of more than one "right" answer. They are connected to targeted standards and are the framework and focus for the unit.
- **Standards**: Targeted (content and skills to be taught and assessed) and supporting (content that is relevant to the unit but may not be assessed; may include connections to other content areas). This includes what students have to know and be able to do (learning targets) in order to meet the standards.

Mathematical literacy is a critical part of the instructional process, which is addressed in:

- **Key Vocabulary** and **Language Goals** which clearly indicate strategies for meeting the needs of EL and SEL students

Planning tools provided are:

- **Instructional Strategies** lead to enduring understandings. They are varied and rigorous instructional strategies to teach content. They are plan experiences that reinforce and enrich the unit while connecting with the standards and assessments. Instructional strategies addresses individual student needs, learner perspectives, integration of technology, learning styles, and multiple intelligences.
- **Resources** and **Performance Tasks** offer concept lessons, tasks, and additional activities for learning.
- **Assessments:** This is also a listing of formative and summative Assessments to guide backwards planning. Student progress in achieving targeted standards/expected learning is evaluated. Entry-level (formative)-based on summative expectations, determine starting points for learning. Benchmark-determine progress of learning, misconceptions, strengths/weaknesses along the learning trajectory.
- **Differentiation** (📖) falls into three categories:
    - **Front Loading:** strategies to make the content more accessible to all students, including EL, SEL and students with special needs. This defines prerequisite skills needed to be successful.
    - **Enrichment:** activities to extend the content for all learners, as all learners can have their thinking advanced, and to support the needs of GATE students. These are ideas to deepen the conceptual understanding for advanced learners.
    - **Intervention:** alternative methods of teaching the standards, in which all students can have a second opportunity to connect to the learning, based on their own learning style. They guide teachers to resources appropriate for students needing additional assistance

Using the Mathematics Instructional Guide:

The guide can be thought of as a menu. It cannot be expected that one would do every lesson and activity from the instructional resources provided. To try to teach every lesson or use every activity would be like ordering everything on a menu for a single meal. It is not a logical option. Nor is it possible given the number of instructional days and the quantity of resources. That is why the document is called a "***Mathematics Instructional Guide or Curriculum Map***" and not a "*Mathematics Pacing Plan*." And, like a menu, teachers select, based on instructional data, which lessons best fit the needs of their students – sometimes students need more time with a concept and at other times, less.

An effective way to use this guide is to review and assess mathematical concepts taught in previous grades to identify potential learning gaps. From there, teachers would map out how much time they feel is needed to teach the concepts within the unit based on the data of their students' needs. For example, some classes may need more time devoted to developing expressions and equations, while another class in the same course may need more focused time on understanding the concept of functions.

The starting point for instructional planning is the standards and how they will be assessed. By first considering how the standards will be assessed, teachers can better select the instructional resources that best build mathematical understanding. There are hundreds of resources available, both publisher- and teacher-created, as well as web-based, that may be used to best teach a concept or skill. Collaborative planning, both within and among courses, is strongly encouraged in order to design effective instructional programs for students.

Learning Progressions:
The Common Core State Standards in mathematics were built on progressions: narrative documents describing the progression of a topic across a number of grade levels, informed both by research on children's cognitive development and by the logical structure of mathematics. The progressions documents can explain why standards are sequenced the way they are, point out cognitive difficulties and pedagogical solutions, and give more detail on particularly knotty areas of the mathematics. This would be useful in teacher preparation and professional development, organizing curriculum, and writing textbooks.

Standards for Mathematical Practice:
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the National Council of Teachers of Mathematics (NCTM) process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

The MIG is a living document—it is neither set in stone for all time nor is it perfect. Teachers and other users are encouraged to provide on-going feedback as to its accuracy, usability, and content. Please go to math.lausd.net and click on the **2013-2014 MIG** link, and share your comments and suggestions. Your participation in making this instructional guide a meaningful and useful tool for all is needed and appreciated.

The grade level Common Core State Standards-aligned Curriculum Maps of the courses in this 2013 edition of the *CCSS Mathematics Instructional Guide* are the result of the collective expertise of the LAUSD Secondary Mathematics Team.

The District extends its gratitude to the following:

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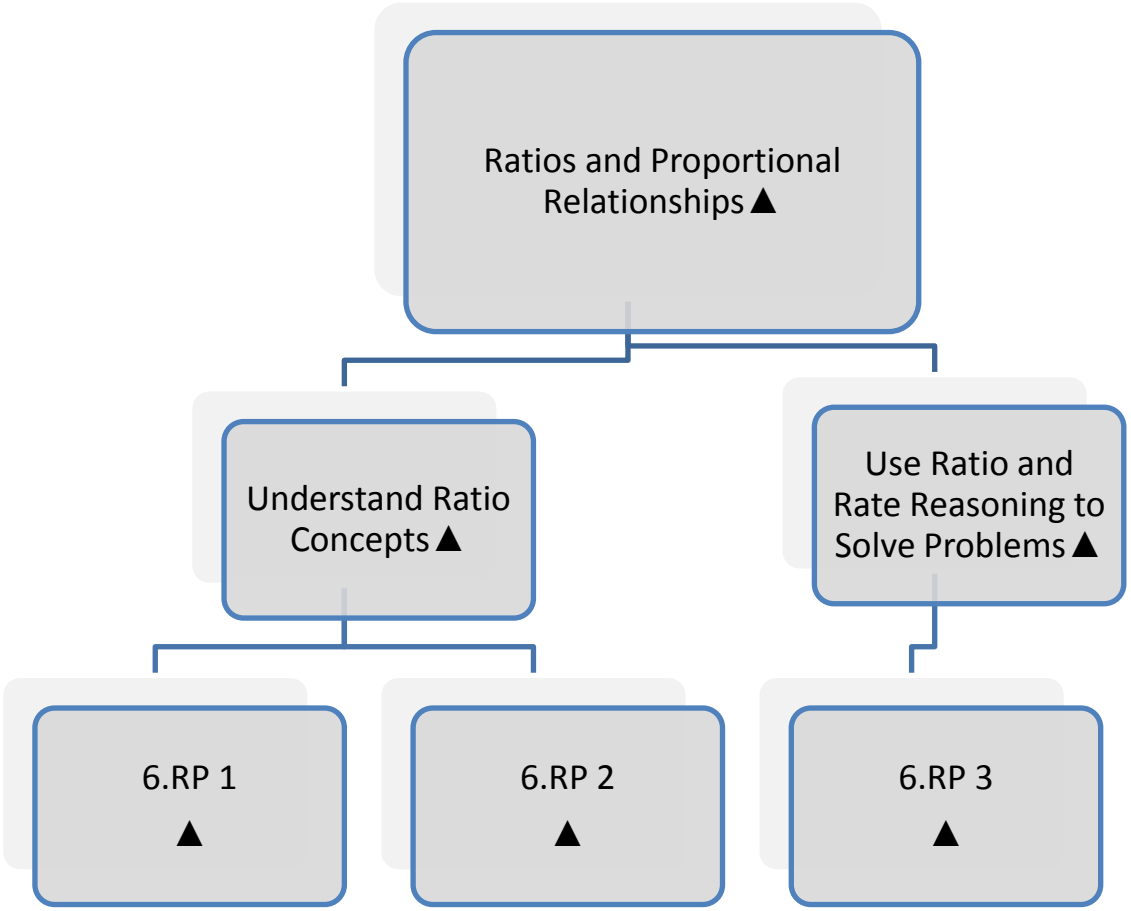
Los Angeles Unified School District

Grade 6

Unit 1



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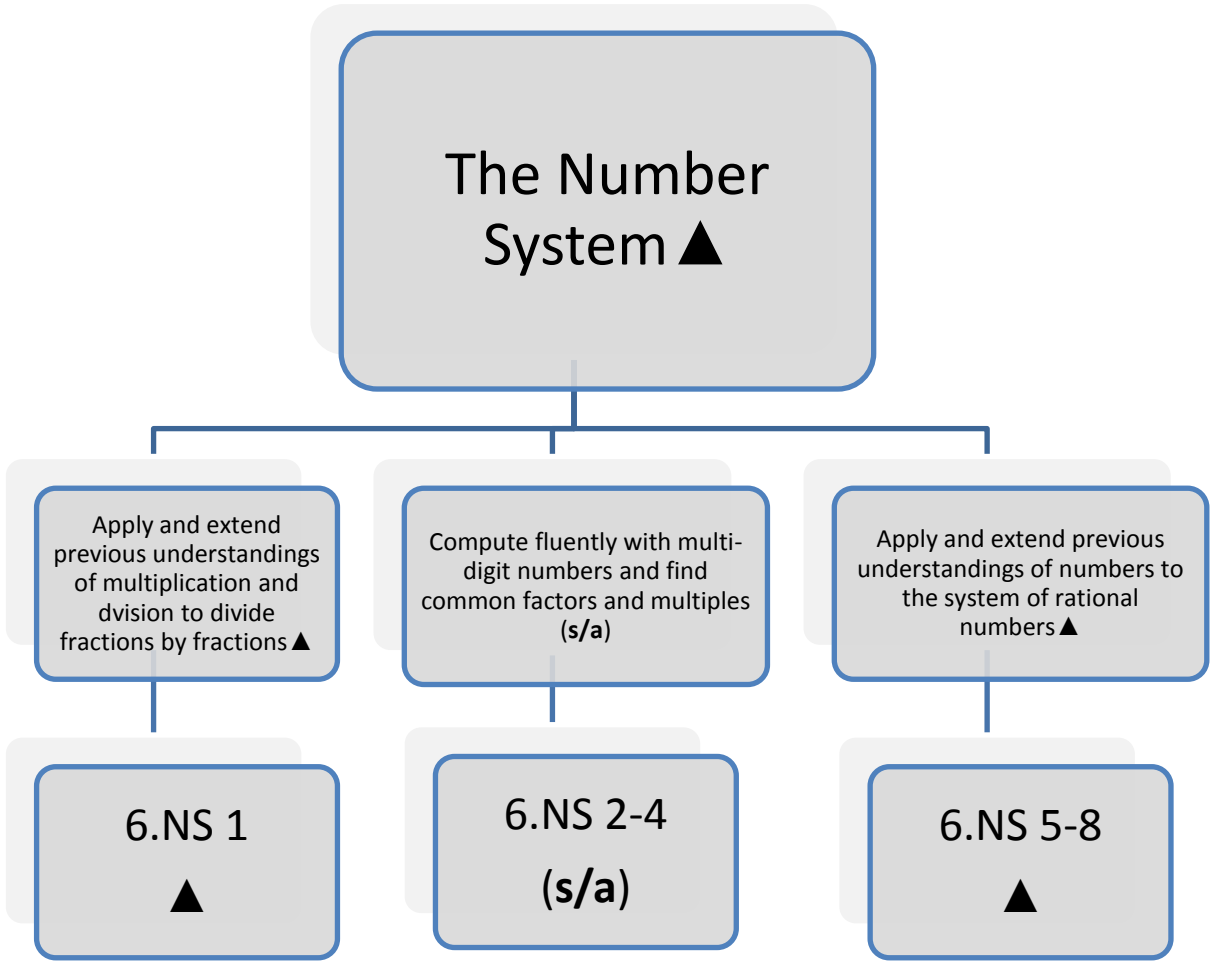
Los Angeles Unified School District

Grade 6

Unit 2



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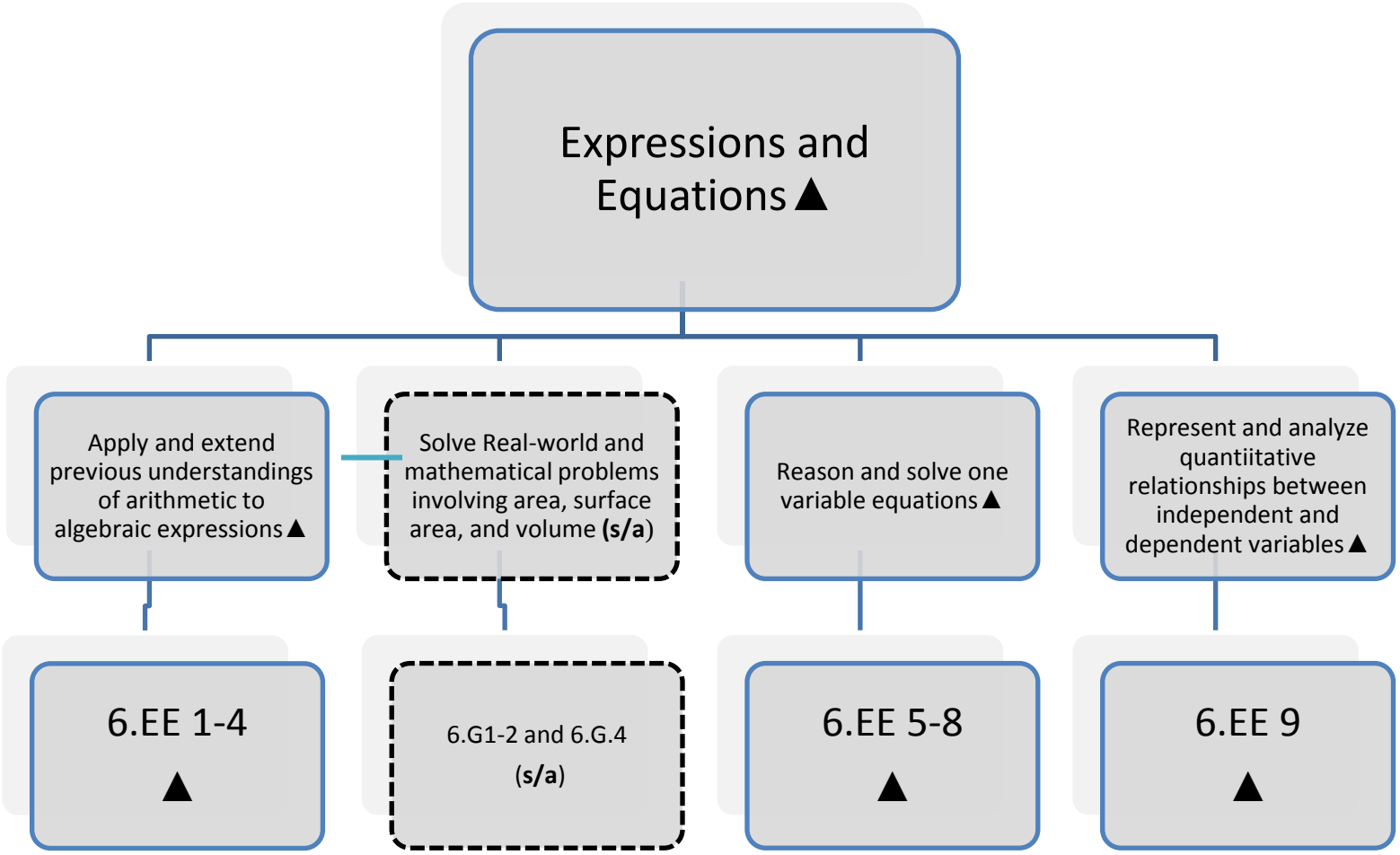

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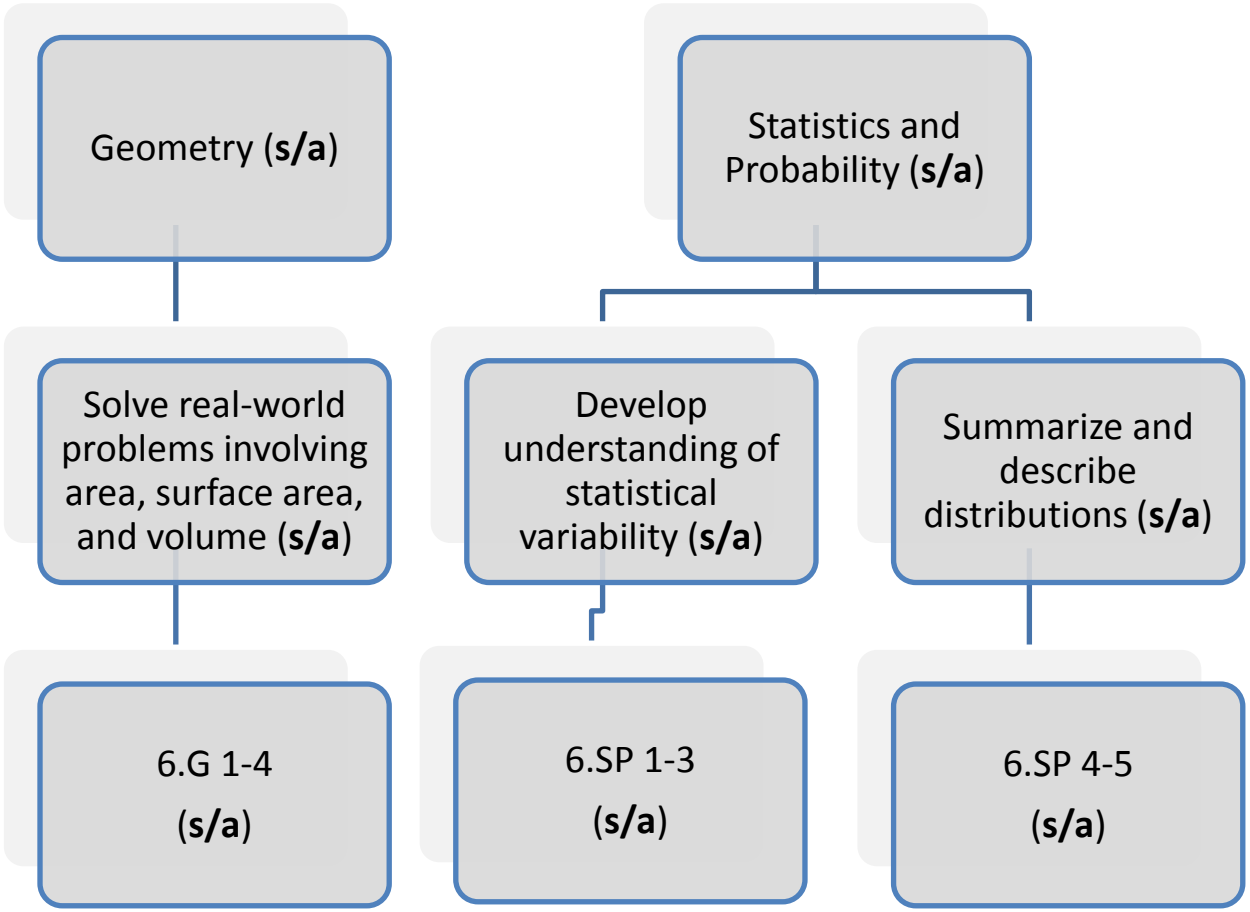
Los Angeles Unified School District

Grade 6

Unit 4



Key: ▲Major Clusters; **s/a** Supporting / Additional Clusters

GRADE 6 – UNIT 1
Understand the Concept of Ratio and Reason with Ratio

Critical Area: Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.

CLUSTERS	COMMON CORE STATE STANDARDS
(m)[1]Understand ratio concepts and use ratio reasoning to solve problems.	**6.RP.1**. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."* **6.RP.2**. Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*1 **6.RP.3**. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
(s/a)[2] Solve real-world and mathematical problems involving area, surface area, and volume.	6.G.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. 6.G.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. 6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the

	nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
MATHEMATICAL PRACTICES	
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. **3. Construct viable arguments and critique the arguments of others.** 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	As you begin the year, it is advised that you start with MP1 and MP 3 to set up your expectations of your classroom. This will help you and your students become proficient in the use of these practices. All other practices may be evident based on tasks and classroom activities.

LEARNING PROGRESSIONS

6-7, Ratios and Proportional Relationships
http://commoncoretools.files.wordpress.com/2012/02/ccss_progression_rp_67_2011_11_12_corrected.pdf

CDE Progress to Algebra K-8 www.cde.ca.gov/be/cc/cd/documents/updateditem12catt3.doc

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS	KEY VOCABULARY
• Relations between two quantities can often be expressed as ratios and can be explained using ratio language. • Multiplication and division can be used to solve ratio and rate problems. • Ratios and rates apply to real life situations. • Percent is a rate of the number of units per 100. • Multiplication and division can be used to generate equivalent ratios and rates.	1. What is a ratio and how does it describe a relationship between two quantities? 2. What is a unit rate and how do you use it in the context of a ratio relationship? 3. How would you use ratio and rate reasoning in real world situations? 4. How would you describe percent of a quantity as a rate per 100?	• Constant of proportionality • Equivalent • Part to part • Part to whole • Percent • Per • Proportional relationship • Quantity • Rate • Ratio • Relationship • Scale factor • Unit

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
Materials: **California Revised Mathematics Framework:** http://www.cde.ca.gov/be/cc/cd/draftmathfwchapters.asp. **Supporting Teachers with Deep Understanding of Math Content** NCTM, *Making Sense Fractions, Ratios and Proportions*, 64th Yearbook (2002) **Other Resources** Thinking Blocks: Ratios http://www.thinkingblocks.com/tb_ratios/ratios.html Enrich Math: Once Upon a Time http://nrich.maths.org/4783 **LAUSD Adopted Textbooks:** **Glencoe California Mathematics, Skills, Concepts and Problem Solving – Grade 6** Unit 3, Chapter 6, Lessons 1, 2, 7 and 8 **McDougal Littell California Mathematics, Course 1** Chapter 5, Lessons 1, 2, 3, 4 and 5 **Pearson EnVision Grade 6** Topics 11 and 12 **Illustrative Mathematics Resources**: • **6.RP Voting for Two, Variation 1** **http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/061/original/illustrative_mathematics_61.pdf?1343857022**	**Journal / Quick Write Prompts** Compare and contrast expressing a relationship between quantities as a ratio, fraction and percent. Create a ratio problem for your classmates using a different context (situation) than the ones you have worked on in class. The most important thing to remember when solving ratio and percent problems is…. Some good test questions for ratio and percent are… Use tape diagrams (bar model) to model problems where both quantities have the same units. Use double number lines to model problems where both quantities have different units. Use the multiplication table to help students find equivalent ratios Have students scale quantities up or down by using a rate table.	SBAC - http://www.smarterbalanced.org/ PARCC - http://parcconline.org/samples/mathematics/grade-6-slider-ruler

• **6.RP Voting for Two, Variation 2** **http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/062/original/illustrative_mathematics_62.pdf?1343857023** • **6.RP Voting for Two, Variation 3** **http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/063/original/illustrative_mathematics_63.pdf?1343857025** **NCTM Illuminations** • Highway Robbery: http://illuminations.nctm.org/LessonDetail.aspx?id=L838		

LANGUAGE GOALS

- Students will summarize the steps in setting up and solving a problem involving ratio relationships using conditional and sequence words such as *if-then, first, next, therefore.*

  Example: ".For every vote candidate A received, candidate C received nearly three votes. The ratio of candidate A to Candidate C is 1 to 3. Therefore, if candidate A received 1500 votes, how many votes will Candidate C receive.
  I solved for the variable by _____. This means that I will multiply 1500 by 3 to get the number of votes Candidate C received.
- Students will write a constructed response to a word problem using logically ordered reasons that are supported by facts and details and using the appropriate mathematic vocabulary.

  Example: The unknown variable is _____ because ___. This solution demonstrates that _____.
- Students will explain how they use a specific mathematical concept in their lives, using the following specific set of words: *miles per gallon*, miles per hour, feet per second, *cents/pound*, "*the ratio of a to b"*

  Example: "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger." For every ____ of ___ there are _____ of _____.

PERFORMANCE TASKS

ILLUSTRIVE MATHEMATICS

- 6.RP.1 Games at Recess. http://www.illustrativemathematics.org/illustrations/76
- **LAUSD Concept Lessons – math.lausd.net**
  - The Candy Bar Task: http://www.lausd.net/math/InstructionalGuides/Subjects/G6/PDF%20Documents/09.%20The%20Candy%20Jar.pdf
  - The Caterpillar Task Part 1: http://math.lausd.net/sites/math.lausd.net/files/Day%204%20Concept%20task.pdf
  - The Caterpillar Task Part 2: http://math.lausd.net/sites/math.lausd.net/files/Day%204%20caterpillars%20Pt2v1.pdf

MARS Tasks:

- 6.RP.3 : Sharing Costs http://map.mathshell.org/materials/lessons.php?taskid=489&subpage=problem
- 6.G.4 : Designing : Candy Cartons http://map.mathshell.org/materials/lessons.php?taskid=488&subpage=problem
- 6.RP.3 : Snail Pace http://www.insidemathematics.org/pdfs/sixth-grade/snail-pace/task.pdf
- 6.RP.1, 6.RP.3 : Candies http://www.insidemathematics.org/pdfs/fifth-grade/candies/task.pdf
- 6.RP.3c : Percent Cards http://www.insidemathematics.org/pdfs/sixth-grade/percent-cards/task.pdf

NCTM Illuminations Lessons

- Bean Counting and Ratios: http://illuminations.nctm.org/LessonDetail.aspx?id=L722
- Hay Bale Farmer: http://illuminations.nctm.org/LessonDetail.aspx?id=L783

DIFFERENTIATION

FRONT LOADING	ACCELERATION	INTERVENTION
Prerequisites: • Students apply their understanding of multiplication tables. Situations that give rise to columns or rows of a multiplication table can provide good initial context. • Students apply and extend their knowledge of common fractions, relationships and rules for multiplication and division of whole numbers as they apply to decimal fractions, Multiples and Factors and Divisibility Rules.	Provide students with opportunities to be recognized for their previous knowledge and to be allowed to avoid redundant learning by being encouraged to learn the sophisticated and advanced information and skills of the curriculum or related curriculums at their own rate. This also includes the opportunity for students to make personal meaning of the lesson. For example: Use ratio and rate reasoning, percent of quantity as a rate per 100, and solve problems involving finding the whole given a part and the percent to solve real-world and mathematical problems: Students apply their math knowledge of ratio and rate by surveying all the students at their school on a current issue, students record their results in a contingency table below and make conclusions based on their results.	• Small teacher to student ratio discussion • Emphasize think-pair-share • Make connections to real life Students understand that Part-to-part ratios are used to compare two parts. For example, the number of girls in the class (12) compared to the number of boys in the class (16) is the ratio the ratio 12 to 16. – illustrate the concept of ratios and proportions using real life examples. Continuing with the use of a table, students can investigate and reason about proportions. Example of a juice mixture of juice A and B of a 5 to 2 and you want to know how m any cups of juice A to mix with juice B. Students make a ratio table to find the juice A entry that pairs with 12 cups of juice B in the table. Emphasis should be made to the important role of the multiplication table and division in how entries are related to each other.

		• Making explicit the type of relationships that exist between two values will minimize confusion between multiplicative and additive situations. • Use concrete manipulatives

[1] **Major Clusters – area of intensive focus where students need fluent understanding and application of the core concepts.**

[2] **Supporting/Additional Clusters – designed to support and strengthen areas of major emphasis/expose students to other subjects.**

GRADE 6 – UNIT 2
The Number System

Critical Area: Description of the critical area: Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.

CLUSTERS	COMMON CORE STATE STANDARDS
(m)[1] Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	**6.NS.1**. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3.* *(In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*
(m)[1] Compute fluently with multi-digit numbers and find common factors and multiples.	**6.NS.2**. Fluently divide multi-digit numbers using the standard algorithm. **6.NS.3**. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. **6.NS.4**. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2).*
(m)[1] Apply and extend previous understandings of numbers to the system of rational numbers.	**6.NS.5**. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. **6.NS.6**. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,–(–3) = 3, and that 0 is its own opposite.

	b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. **6.NS.7**. Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.* b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3°C > –7°C to express the fact that –3°C is warmer than –7°C.* c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.* d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.* **6.NS.8**. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
(s/a)^2 Solve real-world and mathematical problems involving area, surface area, and volume.	6.G.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. 6.G.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
MATHEMATICAL PRACTICES	PROGRESSION
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. **3. Construct viable arguments and critique the arguments of others.** **4. Model with mathematics.** 5. Use appropriate tools strategically.	6-7, Ratios and Proportional Relationships http://commoncoretools.files.wordpress.com/2012/02/ccss_progression_rp_67_2011_11_12_corrected.pdf

6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	

[1] **Major Clusters – area of intensive focus where students need fluent understanding and application of the core concepts.**

[2] **Supporting/Additional Clusters – designed to support and strengthen areas of major emphasis/expose students to other subjects.**

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS	KEY VOCABULARY
• Procedures used for dividing fractions can be logically explained in several ways. • The system of rational numbers includes negative numbers as well as positive ones. • Rational number can be arranged in order. • Absolute value can be described in more than way, depending upon the real-world context. It can be distance, or it can be size (magnitude). • Points can be graphed in all four quadrants of a coordinate grid by using ordered pairs to determine location. • A rational number can be represented as a point on a number line and the number line can be used as a tool to order rational numbers.	1. How can you compute fractions by using visual fraction models and equations? 2. How do you find the GCF of two whole numbers using the distributive property? 3. How do you use positive and negative numbers to describe quantities having opposite values? 4. What is a rational number and how can you graph it? 5. What is absolute value? 6. How can we apply inverse operations in solving problems?	• Absolute value • Common factor • Coordinate • Distance • Distributive property • Divisor/Dividend • Equivalent fractions • Factors • Fraction • Greatest common factor • Inequality • Integers • Least common multiple • Magnitude • Multiples • Negative • Number line • Opposite • Ordered pair • Positive • Quadrants • Quotient • Rational number • Reflection • Zero

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
Materials: **Unit Planning Template** http://edtech4schools.pbworks.com/f/UbDPages.pdf **Supporting Teachers with Deep Understanding of Math Content** Ma, Liping. *Knowing and Teaching Elementary Mathematics: Teachers' Understanding of Fundamental Mathematics in China and the United States*, Chapter 3 "Generating Representations: Division by Fractions"	- Use of number line - Use of human graph -Using common denominators to divide fractions - Journal / Quick Write Prompts	SBAC – http://www.smarterbalanced.org/ PARCC - http://parcconline.org/samples/mathematics/grade-6-slider-ruler **Sample Assessment Items**

Other Resources 6.NS.1 Video explanation of division of fractions http://www.mathplayground.com/howto_divide_fractions.html Invert and Multiply? http://www.unclebobpuzzles.com/Permasite/UB&AC/dividefrac2.html 6.NS.4 Factor Trees http://www.mathplayground.com/factortrees.html 6.NS.6 Graphing http://mathforum.org/cgraph/cplane/ 6.NS.6c Maze Game http://www.shodor.org/interactivate/activities/MazeGame/ **LAUSD Adopted Textbooks** **Glencoe California Mathematics, Skills, Concepts and Problem Solving – Grade 6** Division of fractions: Chapter 5, Lesson 7 Computing with multi-digit numbers, including decimals: GCF/LCM: Chapter 4, Lessons 2 and 8 Distributive Property: Chapter 1, Lesson 8 Concepts of Integers: Chapter 2, Lessons 1, 2 and 3 Rational Numbers of the Number Line: Chapter 4, Lesson 9 Graphing Rational Numbers: Chapter 2, Lesson 3 **McDougal Littell California Mathematics, Course 1** Chapters 1, 2, and Chapter 3 Lesson 1 **Pearson EnVision Grade 6** Division of fractions: Topic 8, Lesson 1; Topic 10, Lessons 2, 3, and 6 Computing with multi-digit numbers, including decimals: Topic 3, Lessons 3, 4, 5 and 6 GCF/LCM: Topic 7, Lessons 1 and 2 Distributive Property: Topic 2, Lesson 4 Concepts of Integers: Topic 5, Lessons 1 and 2 Rational Numbers of the Number Line: Topic 1, Lesson 5 Graphing Rational Numbers: Topic 14, Lesson 4 **Illustrative Mathematics** • 6.NS Cup of Rice http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/463/original/illustrative_mathematics_463.pdf?1343856961	- Use of visual fraction models for division - Using common denominators to divide fractions to understand the remainder - Sorting cards - Fraction bars in teaching equivalent fractions - Vocabulary Development – 3x3 EL puzzle	http://illustrativemathematics.org/standards/k8

• 6.NS Dan's Division Strategy http://www.illustrativemathematics.org/illustration_pdfs/330.pdf • 6.NS Interpreting a Division Computation http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/270/original/illustrative_mathematics_270.pdf?1343856975 **NCTM Illuminations Lessons** • 6.NS.6 Fractional Clothesline http://illuminations.nctm.org/LessonDetail.aspx?id=L784 • 6.NS.4 The Product Game http://illuminations.nctm.org/LessonDetail.aspx?id=U100 • The Venn Factor http://illuminations.nctm.org/LessonDetail.aspx?id=L859 • 6.NS.5 Zip, Zilch, Zero http://illuminations.nctm.org/LessonDetail.aspx?id=L819		

LANGUAGE GOALS

Students will be able to compare and contrast multiplication and division of rational numbers.
Example: To express 4x5 = 20 as division problem, I _____.

Students will be able to explain (writing/speaking) their understanding of absolute value and critique the reasoning of others.
Example: The absolute value of -5 is_____. This mean that if I travel to school for 5 miles, it will take_____ miles to travel home.

Students will be able to read a word problem and understand the situation in order to solve the problem.

Students will use the meaning of fractions to explain (writing/speaking) why the procedures for dividing fractions make sense.
Example: To divide fractions, I will _____ and _____.

When dividing fractions, students will be able to explain the meaning of the remainder.
Example: When I divide fraction, the remainder means _____.

PERFORMANCE TASKS

MARS Tasks

6.NS.4 Pedro's Tables http://www.insidemathematics.org/pdfs/seventh-grade/pedros-tables/task.pdf

Inside Mathematics

Winning Lines http://www.insidemathematics.org/pdfs/fourth-grade/winning-lines/task.pdf

LAUSD Concept Lessons

Fraction of a Fraction http://www.lausd.net/math/InstructionalGuides/Subjects/G6/PDF%20Documents/03.%20Fraction%20of%20a%20Fraction.pdf

Linking Fractions http://www.lausd.net/math/InstructionalGuides/Subjects/G6/PDF%20Documents/04.%20Linking%20Fractions.pdf

Off to the Races http://localdistrict5.org/index.php?option=com_phocadownload&view=category&id=61:elementary-math&Itemid=199

Game of Chips http://localdistrict5.org/index.php?option=com_phocadownload&view=category&id=61:elementary-math&Itemid=199

Need resources for NS.7-8

DIFFERENTIATION📖

FRONT LOADING	ACCELERATION	INTERVENTION
Students apply and extend their understanding of number sense, computation with multi-digit whole numbers and decimals (to hundredths), including application of order of operations, addition, subtraction, multiplication, and division of common fractions, and familiarity with factors and multiples. Front load vocabulary associated with applications of integers such as: Thermometer Elevator Credit/Debit Sea level	• Have students describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge. • Students design a story problems using temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge. • Explain absolute value by using the distant they travel to school each way (to and fro). That distance is always positive. • Provide a scenario where students will gather real – world data and graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	• Small teacher to student ratio discussion • Emphasize think-pair-share • Make connections to real life • give concrete examples • use of manipulatives – especially the number line • Use of multiple representations to represent fraction division problems. Set the problem in context and represent the problem with a concrete or pictorial model. • Provide multiple experiences to understand the relationships between numbers, absolute value, and statements about order. • Example: in real world, the absolute value can be used to describe size or magnitude. An ocean depth of 900 feet, write $\|-900\| = 900$ to describe the distance below sea level

GRADE 6 – UNIT 3
Understanding Expressions and Equations

Critical Area: Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as $3x = y$) to describe relationships between quantities.

CLUSTERS	COMMON CORE STATE STANDARDS
m[1] Apply and extend previous understandings of arithmetic to algebraic expressions	6.EE.1. Write and evaluate numerical expressions involving whole-number exponents. 6.EE.2. Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.* b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.* c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.* 6.EE.3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* 6.EE.4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*

Reason about and solve one-variable equations and inequalities.	6.EE.5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. 6.EE.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. 6.EE.7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers. 6.EE.8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
Represent and analyze quantitative relationships between dependent and independent variables.	6.EE.9.Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.
(s/a)^2 Solve real-world and mathematical problems involving area, surface area, and volume.	6.G.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. 6.G.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. 6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

MATHEMATICAL PRACTICES	LEARNING PROGRESSIONS
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the arguments of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	Click on the link below to access Common Core Standards Writing Team's Grade 6-8 Progression for Expressions and Equations http://commoncoretools.files.wordpress.com/2011/04/ccss_progression_ee_2011_04_25.pdf

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS	KEY VOCABULARY
• Expression and Equations build a ramp from arithmetic in elementary school to more sophisticated work with algebraic expression in high school. • Write and evaluate numerical and variable expressions. Understand numbers in which one or more letters are used to stand for a number which is either unspecified or unknown. • As the complexity of expressions increase, students will see them as being built out of basic operations with products and factors. • Apply the properties of operations to generate equivalent expressions. • Solve real-world and mathematical problems by writing and solving equations • Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. • Use variables to represent two quantities in a real-world problem that change in relationship to one another. • Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.	How can you apply the properties of operations to generate equivalent expressions? Which values from a specified set, if any, make an equation or inequality true? In what ways can you reason and solve one-variable equations and inequalities? How do expressions and equations apply to real life situations? How might an inequality describe a real-life problem? How can you show that inequalities can have infinitely many solutions? In what ways can you show the relationship between dependent and independent variables?	• Associative property • Coefficient • Commutative property constants • Dependent variable • Distributive property • Equation • Equivalent • Expression • Formulas • Identity properties of addition and multiplication • Independent variable • Inequality • Rational numbers • Solution • Solution set • Terms • Variables

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
Glencoe - California Mathematics: Concept, Skills, and Problem Solving *Section 1.5* Problem Solving Investigation *Section 1.6* Algebra: Variables and Expressions *Section 1.7* Algebra: Equations *Section 3.1* Writing Expressions and Equations *Section 3.2* Solving Addition and Subtraction Equation *Section 3.5* Solving Two-Step Equations **Course 1 McDougal Littell MATH** Section 4.1 Evaluating Expressions Section 4.2 Writing Expressions Section 4.3 Simplifying Expressions Section 4.5 Equations and Mental Math Section 4.6 Solving Addition and Subtraction Equations Section 4.7 Solving Multiplication and Division Equations **EnVision** *Section 4.2* Solving Addition and Subtraction Equations *Section 4.3* Problem Solving: Draw a Picture and Write an Equation *Section 5.7* Algebra: Solving Equations with Integers **LAUSD Grade 6 Concept Lessons** Surround the Pool Banquet Table **Illustrative Mathematics** 6.EE Firefighter Allocation: http://www.illustrativemathematics.org/illustrations/425	Teachers are strongly encouraged to use algebra tiles or "Hands On Equations"© as students are developing a connection from concrete mathematical representations to abstract notions of variables. Spreadsheets are a powerful tool to help students understand the concept of variable because you can use formulas that are dependent on the values in a cell and then change the value in the cell. It is very easy for students to see how changing the value of the variable affects the value of the cell with the formula. Whole class response tools (such as index cards, white boards, and electronic response devices) allow teachers to check for understanding before moving forward with new material.	SBAC - http://www.smarterbalanced.org/ PARCC - http://parcconline.org/samples/mathematics/grade-6-slider-ruler

LANGUAGE GOALS

- Students will describe their understanding of properties of operations to generate equivalent fraction, using the words distributive, associative, commutative, and identity properties.
- Students will accurately read equivalent expressions aloud fluently, without hesitating.
- Students will ask and answer why values from a specified set, if any, make an equation or inequality true using equations and expressions.
- Students will write an opinion to show how inequalities can have infinitely many solutions. The key to determining that the inequalities have _____. This possible because ____. I believe this because ____.
- Students will distinguish between dependent and independent variables and describe the relationship between them using sentence starters such as:
  I think _____ is the dependent variable because _____.
  The relationship between_____ and _____ is _____.
- Students will explain how to use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity.

PERFORMANCE TASKS

Mathematics Assessment Project
Laws of Arithmetic: http://map.mathshell.org/materials/download.php?fileid=1358

Optimizing: Security Cameras: http://map.mathshell.org/materials/download.php?fileid=1354

Illustrative Mathematics
6. EE Distance to School: http://www.illustrativemathematics.org/illustrations/540
6.EE Rectangle Perimeter 1: http://www.illustrativemathematics.org/illustrations/421
6.EE Equivalent Expressions: http://www.illustrativemathematics.org/illustrations/542
6.EE Rectangle Perimeter 2: http://www.illustrativemathematics.org/illustrations/461
6.EE Log Ride: http://www.illustrativemathematics.org/illustrations/673
6.EE Morning Walk: http://www.illustrativemathematics.org/illustrations/1107
6.EE Fishing Adventures 1: http://www.illustrativemathematics.org/illustrations/642
6.EE.9 Chocolate Bar Sales: http://www.illustrativemathematics.org/illustrations/806

DIFFERENTIATION 🕮

FRONT LOADING	ACCELERATION	INTERVENTION
Students apply and extend understandings using	Encourage students to individualize their learning by	Transitioning from concrete to abstract is

numerical expressions. They use whole number exponents to express powers of 10; using letters to represent an unknown quantity. They also move from viewing expressions as actions describing a calculation to viewing then as objects in their own right (concrete to abstract). In grades k-5 students have been using properties of operations to write expression in different ways. These experiences with properties help students prepare for work with algebraic expressions. For example students in grades k-5 have been writing numerical expressions and simple equations involving one operation with a variable.	providing them with the tools to further investigate concepts that will be developed further in other grade levels. For example, Although the process of reasoning will eventually lead to standard methods for solving equations, students should study examples where looking for structure pays off, such as in $4x + 3x = 3x + 20$, where they can see that $4x$ must be 20 to make the two sides equal. This understanding can be reinforced by comparing arithmetic and algebraic solutions to simple word problems. For example, how many 44-cent stamps can you buy with $11? Students are accustomed to solving such problems by division; now they see the parallel with representing the problem algebraically as $0.44n = 11$, from which they use the same reasoning as in the numerical solution to conclude that $n = 11/0.44$. Interdisciplinary connections can be made to Social Studies units were math enables history to be explained in more concrete ways. For example population growth rates.	important and needs to be a part of intervention. A clear connection between symbolic representation and expression is key. • Small teacher to student ratio discussion. For example, describing the relationship between distance and time for a person starting 5 miles from home and walking away at 5 miles per hour. With these types of discussions students begin to develop an understanding of variables. • Emphasize think-pair-share. • Students can use tabular and graphical representations to develop an appreciation of varying quantities. • Make connections to real life

[1] **Major Clusters – area of intensive focus where students need fluent understanding and application of the core concepts.**

[2] **Supporting/Additional Clusters – designed to support and strengthen areas of major emphasis/expose students to other subjects.**

GRADE 6 – UNIT 4
Geometry and Statistics and Probability

Critical Area: Description of the critical area: Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. The median measures center in the sense that it is roughly the middle value. The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point. Students recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability.

Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected. Students in Grade 6 also build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area, and volume. They find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Using these methods, students discuss, develop, and justify formulas for areas of triangles and parallelograms. Students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. They reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths. They prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane.

CLUSTERS	COMMON CORE STATE STANDARDS
Develop understanding of statistical variability.	6.SP.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.* 6.SP.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. 6.SP.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
Summarize and describe distributions.	6.SP.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. 6.SP.5. Summarize numerical data sets in relation to their context, such as by: • Reporting the number of observations. • Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. • Giving quantitative measures of center (median and/or mean) and variability (interquartile

	range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. • Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.
Solve real-world and mathematical problems involving area, surface area, and volume.	6.G.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. 6.G.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. 6.G.3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems. 6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
MATHEMATICAL PRACTICES	LEARNING PROGRESSIONS
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the arguments of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	**Click on the links below to access common core team's grade 6 learning progressions for this unit on:** **Statistics and Probability** http://commoncoretools.files.wordpress.com/2011/12/ccss_progression_sp_68_2011_12_26_bis.pdf **Geometry** http://commoncoretools.files.wordpress.com/2012/06/ccss_progression_g_k6_2012_06_27.pdf

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS	KEY VOCABULARY
Statistics and Probability: • Students build on the knowledge and experiences in data analysis. • Students develop a deeper understanding of variability and more precise descriptions of data distributions, using numerical measures of center and spread, and terms such as cluster, peak, gap, symmetry, skew, and outlier. • Students use histograms and box plots to represent and analyze data distributions. • Students formulate questions, design and use a plan to collect relevant data, analyze the data with appropriate methods, and interpret results and draw valid conclusions from the data.	**Statistics and Probability:** How are mean, median, and mode related? How are range different from mean, median, and mode? What are the best ways to predict the outcomes of an experiment? How can data be manipulated to show what you want? What kind of conclusions can be made from a set of data, based on numerical measures of center and spread?	**Statistics and Probability:** Box Plots Cluster Data and Plots Distribution Gap Histogram Interquartile Range Mean, Median Mode Outlier Peak Range Sample space Set of Data Skew Symmetry Tree diagrams Variability and Variation Deviation
• **Geometry:** • Students develop an understanding and solve problems involving areas and volumes. • Students extend previous work and provide a context for developing and using equations involving area and volume. • Students learn to find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. • Students develop visualization skills connected to their mathematical concepts as they recognize the existence of, and visualize components of three-dimensional shapes that are not visible from a given viewpoint. • Students understand and measure the attributes of	**Geometry:** What are perimeter and area, and circumference and how are they related? How are perimeter and circumference related? How is geometry used in our world? How is the attributes of space measured? How could you construct a complex three-dimensional composition through the creation of corresponding two-dimensional nets?	**Geometry:** Area Coordinate plane Counterclockwise Edge Length Ordered pair Origin Polygons Prism Quadrilaterals Quadrants Square units Surface Area Triangles Vertex Volume

shapes, and apply area formulas to solve surface area problems. • Students learn to plan the construction of complex three-dimensional compositions through the creation of corresponding two-dimensional nets. • Students extend their understanding of properties of two-dimensional shapes to use of coordinate systems.	What strategies could you use to recognize the existence of, and visualize components of three-dimensional shapes that are not visible from a given viewpoint?	volume, cubic units x-axis, x-coordinate y-axis, y-coordinate

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
Teaching and Learning Framework http://illuminations.nctm.org/	• Real world connections • Structured instructional conversations • Use visuals and physical model of shapes • Use of Language frames for classroom communication • Encourage Student to student questioning	SBAC - http://www.smarterbalanced.org/ PARCC - http://parcconline.org/samples/mathematics/grade-6-slider-ruler

LANGUAGE GOALS

Students will recognize and write statistical questions. How old am I?" is not a statistical question, but "How old are the students in my school?"
Students will explain the meaning of statistical distribution.
Students will compare and contrast the differences between measure of center for a numerical data and variation.
Example: Measure of central tendency is_____ and variability describes how_____.
Students will discuss and write how to determine the area of right triangles, other triangles, special quadrilaterals, and polygons.
Example: When I find the area of my rectangular classroom floor, I _____ the length by the _____.
Students will apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths.

PERFORMANCE TASKS

Statistics and Probability:
Inside Mathematics

Statistics and Probability (SP)

6.SP.1, SP.4, SP.5- Through the Grapevine: Problem of the Month http://insidemathematics.org/problems-of-the-month/pom-throughthegrapevine.pdf

6.SP.2 - Pick a Pocket: Problem of the Month http://insidemathematics.org/problems-of-the-month/pom-pickapocket.pdf

6.SP.3, SP.5 - Baseball Players: Task http://insidemathematics.org/common-core-math-tasks/6th-grade/6-2003%20Baseball%20Players.pdf

Mathematics Assessment Project
Mean, Median, Mode, and Range: http://map.mathshell.org/materials/download.php?fileid=1360

Geometry:
Mathematics Assessment Project
6.G.4 and MP1,3,4 – Designing Candy Cartons http://map.mathshell.org/materials/lessons.php
6.G.2 and 6.G.4 Fruit Boxes http://map.mathshell.org/materials/download.php?fileid=802
6.G.4 Smoothie Box http://map.mathshell.org/materials/tasks.php?taskid=392#task392
6.SP. 4 – 5 Candy Bars http://map.mathshell.org/materials/tasks.php?taskid=396#task396
6.SP.5 Suzi's Company http://map.mathshell.org/materials/tasks.php?taskid=383#task383

Research Development and Accountability
6G.1 – Triangle Try Outs http://www.rda.aps.edu/mathtaskbank/pdfs/tasks/6-8/t68TriTryOut.pdf. Use this activity as enrichment activity

Inside Mathematics

6.G.1 Polly Gone: Problem of the Month http://insidemathematics.org/problems-of-the-month/pom-pollygone.pdf

6.G.2 - Building Blocks: Task http://insidemathematics.org/common-core-math-tasks/6th-grade/6-2007%20Building%20Blocks.pdf

DIFFERENTIATION

FRONT LOADING	ACCELERATION	INTERVENTION
Statistics and Probability: • Students apply their understanding of data and how to construct line plots. • Students apply and extend their knowledge of symmetric shapes • Students use their knowledge in division, fractions, and decimals in computing a new measure of center- arithmetic mean, often simply called the mean. **Geometry:** • Students should be provided opportunities prior to the lesson to develop apply and extend competencies in shape composition and decomposition, especially with spatial structuring of rectangular arrays. • Apply and understand previous understandings of the coordinate plane to graphs • Apply, understand and extend previous understandings of areas polygons to more complex geometric, including prisms.	Relate the area of study to other subjects within, between, and across disciplines. Such as in, Geography and Environmental Literacy Students apply knowledge and understanding of data collection to answer questions regarding – the emergence and expansion and decline of civilizations, societies and regions LEARN NC Interdisciplinary Math and Social Studies, Gridding an archaeological dig site http://www.learnnc.org/lp/pages/1005	• Small teacher to student ratio discussion • Emphasize think-pair-share • Build the 2-D AND 3-D geometric figures to give students the opportunity to make connections between the real and the abstract • Make connections to real life • • Use Physical Objects to demonstrate the math. In geometry : Such as cones, squares, etc • In probability and statistics: Census data, experimental results

References:

1. National Governors Association Center for Best Practices, Council of Chief State School Officers. (2010). *Common Core State Standards (Mathematics)*. Washington D.C.: National Governors Association Center for Best Practices, Council of Chief State School Officers.
2. McCallum, W., Zimba, J., Daro, P. (2011, December 26 Draft). *Progressions for the Common Core State Standards in Mathematics*. Cathy Kessel (Ed.). Retrieved from http://ime.math.arizona.edu/progressions/#committee.
3. Engage NY. (2012). New York Common Core Mathematics Curriculum. Retrieved from http://engageny.org/sites/default/files/resource/attachments/a-story-of-ratios-a-curriculum-overview-for-grades-6-8.pdf.
4. Mathematics Assessment Resource Service, University of Nottingham. (2007 - 2012). Mathematics Assessment Project. Retrieved from http://map.mathshell.org/materials/index.php.
5. Smarter Balanced Assessment Consortium. (2012). Smarter Balanced Assessments. Retrieved from http://www.smarterbalanced.org/.
6. Partnership for Assessment of Readiness for College and Career. (2012). PARCC Assessments. Retrieved from http://www.parcconline.org/parcc-assessment.
7. California Department of Education. (2013). Draft Mathematics Framework Chapters. Retrieved from http://www.cde.ca.gov/be/cc/cd/draftmathfwchapters.asp.
8. National Council of Teachers of Mathematics (NCTM) Illuminations. (2013). Retrieved from http://illuminations.nctm.org/Weblinks.aspx.
9. The University of Arizona. (2011-12). Progressions Documents for the Common Core Math Standards. Retrieved from http://ime.math.arizona.edu/progressions.