Los Angeles Unified School District
Office of Curriculum Instruction and School Support
2015-2016 Common Core Math 7 Curriculum Map

Overview of the Common Core Mathematics curriculum map

Introduction to the Document:

Welcome to the Los Angeles Unified School District's Common Core Mathematics Curriculum Map. The mathematics curriculum map 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 mathematics curriculum map 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 Curriculum Map:

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 mathematics curriculum map 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 mathematics curriculum cap 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:
    - **Universal Design for Learning (UDL) / Universal Access (the approach formerly referred to as Front Loading):** strategies to make the content more accessible to all students, including EL, SEL, Students with Disabilities, and low-achieving students.
    - **Acceleration:** activities to extend the content for all learners, as all learners can have their thinking advanced, and to support the needs of students who are gifted/talented (GATE) as well as high-achieving/advanced learners. 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 strengths and needs. They guide teachers to resources appropriate for students needing additional instruction.

Using the Mathematics Curriculum Map:

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).

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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. 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 2015 edition of the *CCSS Mathematics Curriculum Map* 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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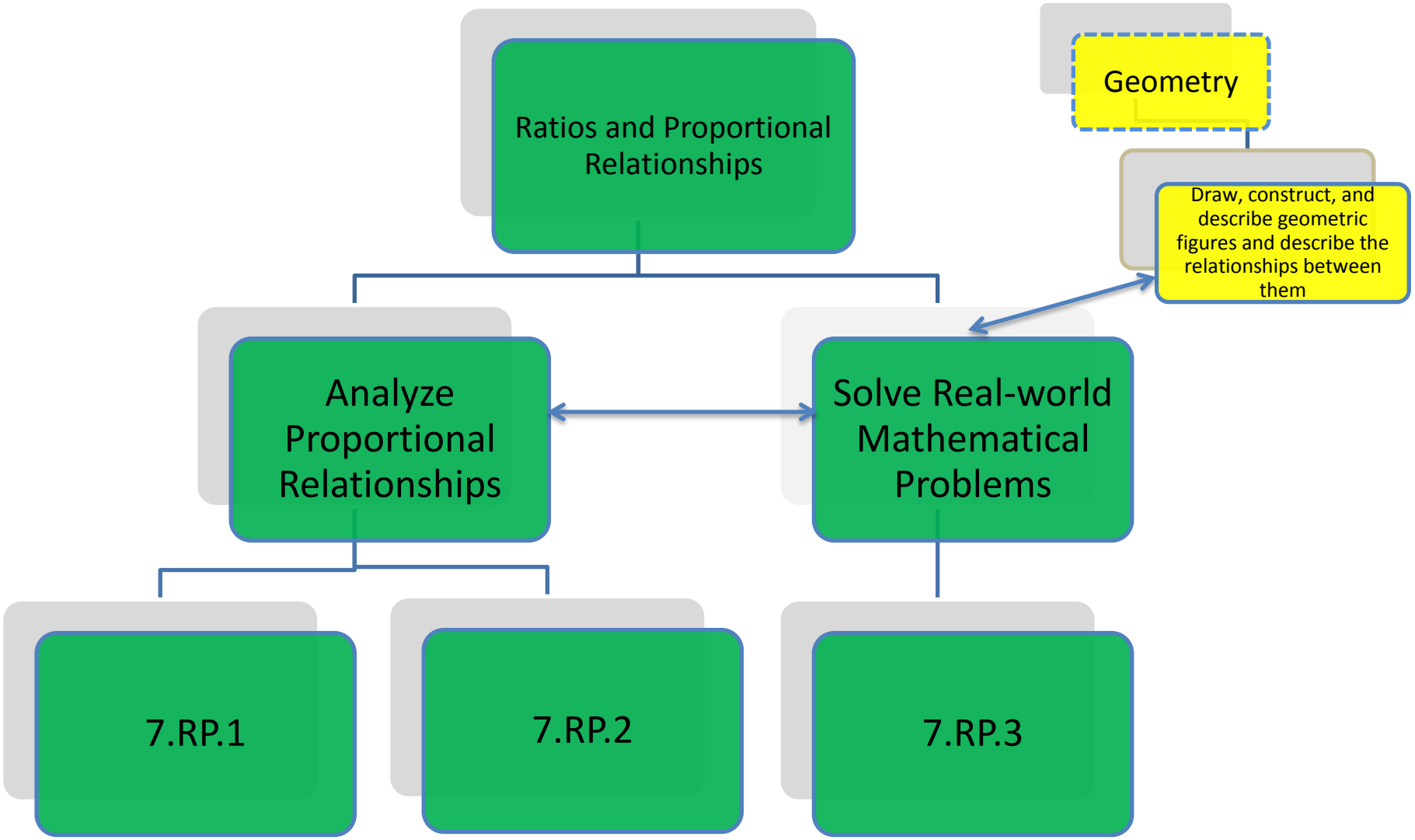
Common Core Math 7

Unit 1

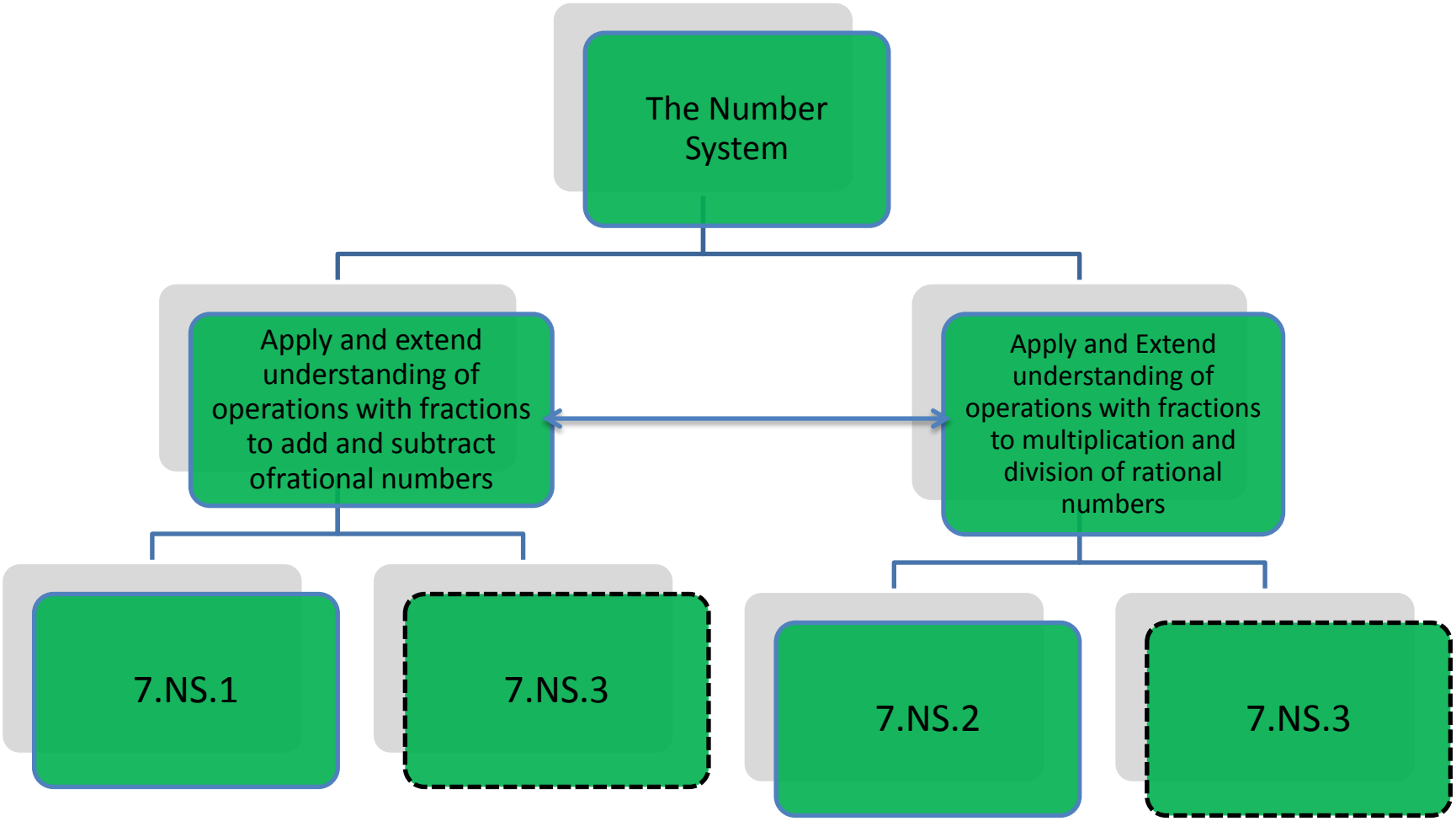
Developing Understanding and Application of Proportional Relationships



Common Core Math 7

Unit 2

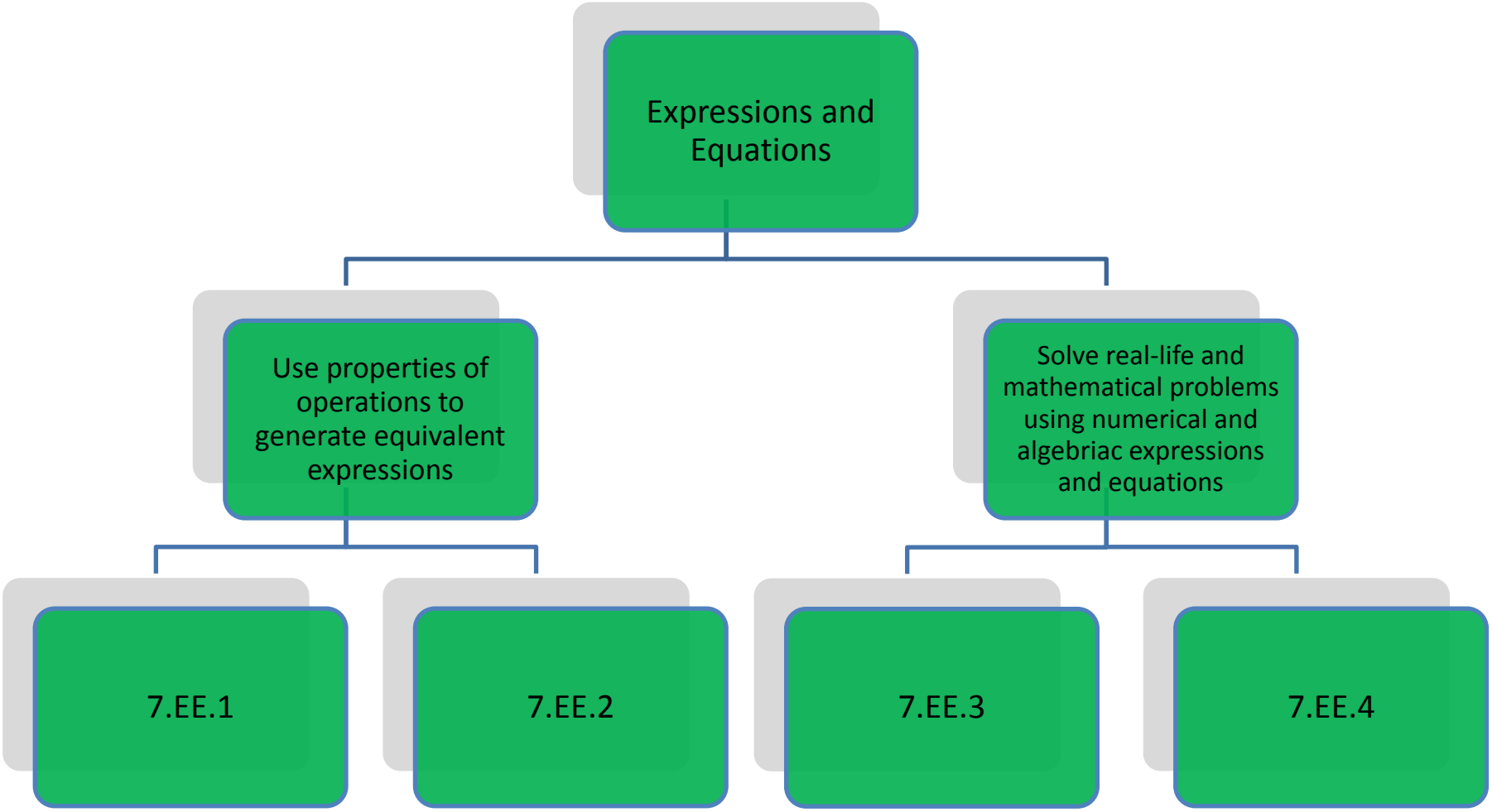
The Number System: Operations to Add, Subtract, Multiply and Divide Rational Numbers



Common Core Math 7

Unit 3

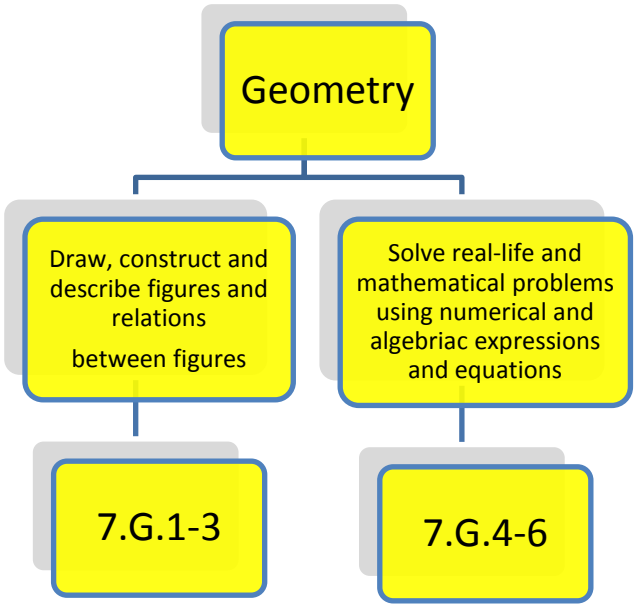
Understand Expressions and Equations

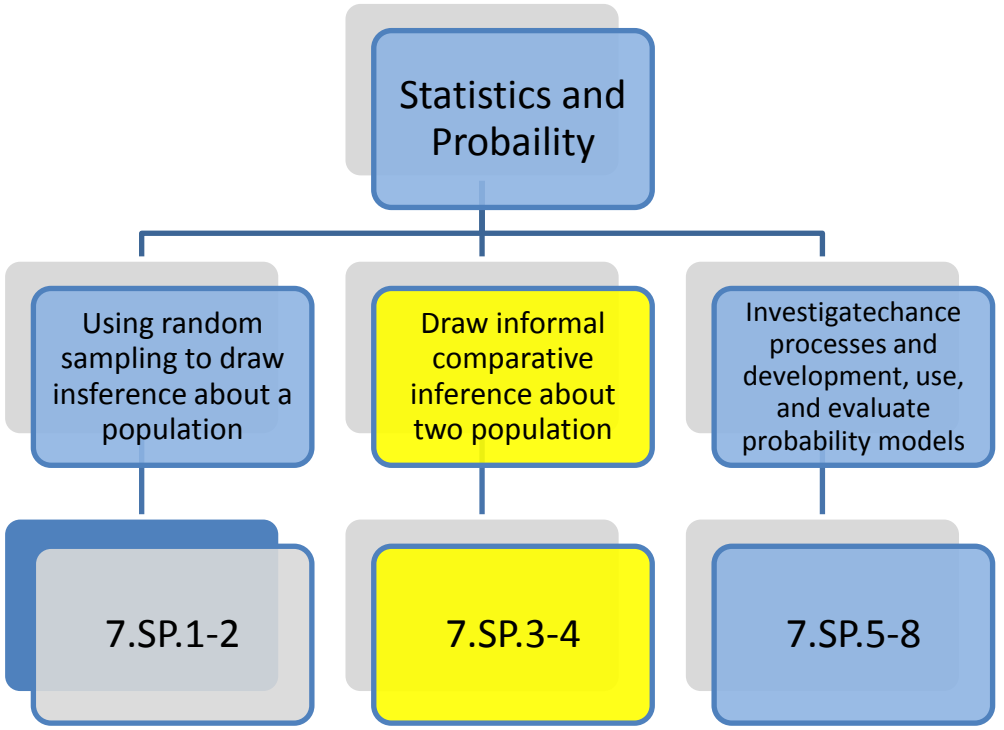


Common Core Math 7

Unit 4

Developing Understanding of Geometry, Statistics and Probability





COMMON CORE MATH 7 – UNIT 1

Developing Understanding and Application of Proportional Relationships

Critical Area: Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.

CLUSTERS	COMMON CORE STATE STANDARDS
m[1] Analyze proportional relationships and use them to solve real-world and mathematical problems.	**7.RP.1** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.* **7.RP.2** Recognize and represent proportional relationships between quantities. a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.* d. Explain what a point *(x, y)* on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r)* where *r* is the unit rate. **7.RP.3** Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*
m[1] Draw, construct, and describe geometrical figures and describe the relationships between them.	7.G.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
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.	As you begin the year, it is advised that you start with MP1, MP 3 and MP4 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.

8. Look for and express regularity in repeated reasoning.	

LEARNING PROGRESSIONS
The Progressions for the Common Core State Standards in Mathematics (draft) for 6-7, Ratios and Proportional Relationships shows how the study of ratios and proportional relationships extends students' work from previous grade levels' standards. The Ratios and proportional relationships are foundational for further study in mathematics and science and useful in everyday life. The CDE Progress to Algebra continuum K-8 shows the clusters as the build to the study of Ratios and Proportional Relationships from earlier grades.

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

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS	KEY VOCABULARY
• Proportional reasoning is essential in problem solving • Understanding mathematical relationships allows us to make predictions, calculate and model unknown quantities. • Proportional relationships express how quantities change in relationship to each other. (Look at NYC Common Core Grade 7)	• How can proportions be used to solve problems? • When is a relationship proportional? • How can proportions increase our understanding of the real world? • How does the mathematical use of the word *similar* differ from the everyday use? • How can similarity help us solve measurement problems? • What are the connections between similarity, geometry and algebra?	Constant Equations Equivalency, Equivalence Proportion Proportional relationship Rate Ratio Scale Scale drawing Unit rate

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
LAUSD Adopted Textbook: • California Mathematics • College Preparatory Mathematics • Go Math Click on each list above for Textbook Alignment **Engage NY Common Core Curriculum** Rational and Proportional Relationships Percent and Proportional Relationships **National Library of Virtual Manipulatives** - http://nlvm.usu.edu/en/nav/grade_g_3.html **NCTM Tools Activities** – http://www.nctm.org/resources/content.aspx?id=32702	• Real-world connections (e.g. Use grocery store ads to find unit rates for various products) • Structured instructional conversations (Think-Pair-Share) • Peer Tutoring • Journal writing prompts (link) • Use visuals to illustrate multiple representations of rate of change	**Formative Assessment** SBAC - http://www.smarterbalanced.org/ 7 RP 3 - Item #'s 42933, 42961 7G1 - Item # 43057 PARCC – Sample Items http://parcconline.org/samples/mathematics/grade-6-slider-ruler http://www.parcconline.org/sites/parcc/files/PARCC_SampleItems_Mathematics_G7ProportionalRelationships_081913_Final.pdf http://www.parcconline.org/sites/parcc/files/PARCC_SampleItems_Mathematics_G7ReadingBooks_081913_Final.pdf

Illustrative Mathematics
7.RP.1 Molly's Run
7.RP.2 Music Companies, Variations 1

Other Resources
TI Math–
Geometer's Sketchpad

Illustrative Mathematics
- 7.RP.1 Cooking with Whole Cup
- 7.RP.1 Track Practice
- 7 RP.2 Art Class, Variations 1& Variations 2
  - Buying Coffee

7.RP.2d Robot Races
7.RP.2 Sore Throats – Variation 1

LAUSD Assessments

District assessments can be accessed through:
http://achieve.lausd.net/math
http://achieve.lausd.net/ccss

Use your Single Sign On to access the Interim Assessments

State Assessments

California will be administering the SMARTER Balance Assessment as the end of course for grades 3-8 and 11. The 11th grade assessment will include ítems from Algebra 1, Geometry, and Algebra 2 standards. For examples, visit the SMARTER Balance Assessment at:
SBAC - http://www.smarterbalanced.org/

LANGUAGE GOALS for **low achieving, high achieving, students with disabilities and English Language Learners**

Reading

Students will evaluate the argument and specific claims in a word problem, including the validity of the reasoning, making explicit reference to words in the problem and using reporting language (According to the problem, …; the problem states that…; the main points are…' *argues, In my opinion, the way to solve this problem is…; What is most important in this problem is* _____*;* because_____.
Students will read ratios, proportions, and percent's aloud fluently, without hesitating
Students will summarize the steps in setting up and solving a proportion as described in their textbooks using the words *first, second, third, etc*.
Students will identify words, or phrases, in word problems that help them solve them using a causative structure such as: *The following words* **"**unit " *and* "rate" *help me solve the problem*

Writing

Students will write definitions of key vocabulary using complete, well-formed sentences.
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.
Students will list possible reasons for their conclusions, using verbs such as *explain, demonstrate, justify* and *because*).
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."*

Listening and Speaking

Students will explain how to set up and solve a proportion to a partner using the words *first, second, third, etc.*
Students will describe the relationship between fraction, ratio, proportion, using the words comparison, part to whole , part to part.
Students will compare two geometric shapes (ratios, proportions, etc.) using comparative words such as equivalent, corresponding, proportional, etc.
Students will agree or disagree with mathematical answers to specific word problems using expressions of agreement or disagreement (I agree/disagree because).

PERFORMANCE TASKS	
Mathematics Assessment Project • 7.RP.1 and 7.RP.2 Proportion and Non-proportion Situations • 7.RP.1 and 7.G.1 Developing a Sense of Scale • 7.RP.3 Increasing and Decreasing Quantities by a Percent • 7.G.1 Drawing to Scale: Designing a Garden **LAUSD Concept Lessons** • Ratios and Percents • Shrinking and Enlarging • Gauging Gas Mileage	**Inside Mathematics** • 7.RP.1, 7.RP.3 – Mixing Paint Cereal Lawn Mowing- • 7.RP.2 - Cat Food **NCTM Illuminations** • 7.PR.2b Golden Ratio • 7.RP.1 What's Your Rate- • 7 G 1 Off the Scale **Utah Education Network** • 7.RP.1 and 7.RP.2 Ratios, Rates, and Proportions

DIFFERENTIATION📖		
UDL/ FRONT LOADING	ACCELERATION	INTERVENTION
• Skills of arithmetic for fractions, decimals and percents are required for introducing the concepts in this unit. • Understanding of coordinate plane and graphing of linear functions will be useful in engaging students in the study of of application of proportional relationships. • Generate and solve linear equations • Understand solving formulas for different variables (*t=pn; y=kx; i=prt*)	Acceleration for high achieving students: • How is rate of change related to the slope? • Multiple discounts • Limits of change • Rates of Change for Acceleration and Deceleration Use the following activities for acceleration: • First Rate (LEVEL D) - http://insidemathematics.org/problems-of-the-month/pom-firstrate.pdf • 7.RP.2 Bagel Algebra - http://illuminations.nctm.org/LessonDetail.aspx?id=L662	Intervention for low achieving students and students with disabilities: • 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 and graph, students can investigate and reason about proportions. • Using kinesthetic activities and manipulatives

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COMMON CORE MATH 7 – UNIT 2

The Number System: Operations to Add, Subtract, Multiply and Divide Rational Numbers

Critical Area: Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.

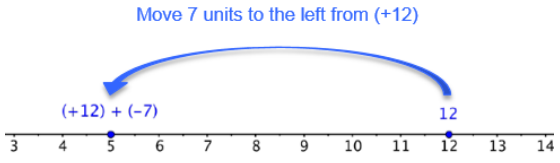
CLUSTER	COMMON CORE STATE STANDARDS
m[1] Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	**7.NS.1** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. a. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.* b. Understand p+q as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. c. Understand subtraction of rational numbers as adding the additive inverse, p-q=p+(-q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. d. Apply properties of operations as strategies to add and subtract rational numbers. **7.NS.2** Apply and extend previous understanding of multiplication and division and of fractions to multiply and divide rational numbers. a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1)=1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q)=(-p/q)=(p/-q). Interpret quotients of rational numbers by describing real-world contexts. c. Apply properties of operations as strategies to multiply and divide rational numbers. d. Convert a rational number to a decimal using long division; know that the decimal from of a rational number terminates in 0s or eventually repeats.

	7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.
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 reasoning of others. **4. Model with mathematics.** **5. Use appropriate tools strategically.** 6. Attend to precision. **7. Look for and make use of structure.** 8. Look for and express regularity in repeated reasoning.	http://commoncoretools.files.wordpress.com/2012/02/ccss_progression_nf_35_2011_08_12.pdf This cluster builds upon the understandings of rational numbers in Grade 6: • quantities can be shown using + or – as having opposite directions or values, • points on a number line show distance and direction, • opposite signs of numbers indicate locations on opposite sides of 0 on the number line, • the opposite of an opposite is the number itself, • the absolute value of a rational number is its distance from 0 on the number line, • the absolute value is the magnitude for a positive or negative quantity, and • locating and comparing locations on a coordinate grid by using negative and positive numbers. Learning now moves to exploring and ultimately formalizing rules for operations (addition, subtraction, multiplication and division) with integers. Using both contextual and numerical problems, students should explore what happens when negatives and positives are combined. Number lines present a visual image for students to explore and record addition and subtraction results. Students should be able to give contextual examples of integer operations, write and solve equations for real- world problems and explain how the properties of operations apply. Real-world situations could include: profit/loss, money, weight, sea level, debit/credit, football yardage, etc. CDE Progress to Algebra K-8 www.cde.ca.gov/be/cc/cd/documents/updateditem12catt3.doc

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS	KEY VOCABULARY
1. Computation with positive and negative numbers is often necessary to determine relationships between quantities. 2. Models, diagrams, manipulatives, number lines, and patterns are useful in developing and remembering algorithms for computing with positive and negative numbers.	1. When should we use additive inverse or multiplicative inverse? 2. How do we use a number line to show addition and subtraction of rational numbers? 3. What is the result of (what happens when) adding a number and its inverse or	• Absolute Value • Additive Inverse • Associative Property • Commutative Property • Distributive Property • Divisor

3. Properties of real numbers hold for all rational numbers. 4. Positive and negative numbers are often used to solve problems in everyday life. 5. Demonstrate that a number and its opposite have a sum of 0. 6. A positive quantity and negative quantity of the same absolute value add to make 0.	multiplying a number and its inverse? 4. How is the identity related to its inverses? 5. What is the relationship between addition and subtraction? 6. What is the relationship between multiplication and division? 7. How are the operations applied in real-world contexts? 8. How do the properties of operation help us compute with rational numbers? 9. Is it always true that multiplying a negative factor by a positive factor always produces a negative product?	• Factor • Integers • Multiplicative Inverse • Opposite • Product • Quotient • Rational Numbers • Repeating Decimal • Terminating Decimal • Zero Pair

m^1 Major Clusters – area of intensive focus where students need fluent understanding and application of the core concepts.

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
NLVM http://nlvm.usu.edu/ **NCTM Illuminations activities** 7.NS.3 Comparing Freezing Points 7.NS.1a Distances on the Number Line 2 7.NS.3 Operations on the number line **California Draft Mathematics Framework:** http://www.cde.ca.gov/be/cc/cd/draftmathfwchapters.asp. **LAUSD Adopted Textbooks:** • California Mathematics • College Preparatory Mathematics • Go Math Click on each list above for Textbook Alignment **Engage New York Common Core Curriculum** Module 2 – Rational Numbers	1. Help students to gain a general understanding regarding adding integers on a number line that the sum p+q is the number found when moving a total of |q| units from p to the right if q is positive, and to the left if q is negative. 2. Use Number line model for operation with integers 3. Use of chips model (positive/negative numbers) for creating 0-pairs. 4. Use a foldable for integer rules. 5. Show that $\|a+b\| \neq \|a\| + \|b\|$ 6. For example show that (+12) + (-7) on a number line. 	**Formative Assessment** SBAC - http://www.smarterbalanced.org/ Item #'s Items: 2959, 43022, 43023, 43026, 43047, 43053 **LAUSD Periodic Assessment** District assessments are under development. More information to come soon. **State Assessment** California will be administering the SMARTER Balance Assessment as the end of course for grades 3-8 and 11. The 11th grade assessment will include ítems from Algebra 1, Geometry, and Algebra 2 standards. For examples, visit the SMARTER Balance Assessment at: SBAC - http://www.smarterbalanced.org/

LANGUAGE GOALS for **low achieving, high achieving, students with disabilities and English Language Learners**
• Students will describe situations in which opposite quantities will combine to make 0 or 1. *Example*: To add -5 and 5, I_____. The resulting sum will be_____, because _____. • Students will explain how they will use the properties of operations to compute with rational numbers. *Example*: In performing operations with rational numbers, I will _____. • Students will create/write real-world problems representing operations with rational numbers. *Example*: If the temperature is 40^0F in the morning and increases by 10^0 F by noon, the new temperature will be_____ because _____.
PERFORMANCE TASKS
Mathematics Assessment Project 7. NS.1 and 7.NS.3 Using Positive and Negative Numbers in Context 7NS.2 and 7.NS.3 Increasing and Decreasing Quantities by a Percent

DIFFERENTIATION 🕮		
UDL/ FRONT LOADING	ACCELERATION	INTERVENTION
• Have students construct number lines and show how they would get zero by determining how many points they would move from point 3 to 6 and back. • Use the amount they owe their friend to show that when they pay the debt, that there will be zero amount left. • Explain absolute value by using the distant they travel to school each way (to and fro). That distance is always positive. • Introduce integer concept using chips, manipulatives, number line or modeling virtually.	Acceleration for high achieving students: • Show students on a number line that the absolute value of a and absolute value of b will equal the magnitude of |a| and |b| |a| + |b| = a + b • Have students prove the following: Are there any rectangles whose area and perimeter have the same numerical value? • Can you write 12 as the sum of two "unit fractions"? 1⁄2= 1/a + 1/b. • Have students write multiplication problem or fraction division problem that can be modeled using area or linear model.	Intervention for low achieving students and students with disabilities: • Use manipulative to reteach integer such as red and blue chips. • Provide number line strips to pairs of students and give them different integer problems. • Show students how to solve problems involving fractions with unlike denominators using a picture. Have them solve it using numbers and words. • Use Algebra tiles and fraction bars to reinforce learning.

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COMMON CORE MATH 7 - UNIT 3
Understand Expressions and Equations

Description of Critical Area 2B: Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers division including expanding linear expressions with rational coefficient, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.

CLUSTER	COMMON CORE STATE STANDARDS
m[1] Use properties of operations to generate equivalent expressions	7.EE.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients 7.EE.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that *"increase by 5%"* is the same as *"multiply by 1.05."*
m[1] Solve real-life and mathematical problems using numerical and algebraic expressions and equations	7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.* 7.EE.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write*

	an inequality for the number of sales you need to make, and describe the solutions.
m[1] Solve real-life and mathematical problems involving angle measure, area, surface area, and volume	7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure

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 reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	The Progressions for the Common Core State Standards in Mathematics (draft) for Expressions and Equations shows how the study of expressions and equations progress from grades 6 to 8. The progression of study and understanding that give rise to students solving real-life and mathematical problems using numerical and algebraic expressions and equations is presented in this document. The CDE Progress to Algebra continuum K-8 shows the clusters as the build to the study of Expressions and Equations from earlier grades.

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

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS	KEY VOCABULARY
• Generating equivalent, linear expressions with rational coefficients using the properties of operations will lead to solving linear equation. • Discovering that rewriting expressions in different forms in a problem context leads to understanding that the values are equivalent. • Ability to solve and explain real life and mathematical problems involving rational numbers using numerical and algebraic expressions is important for preparation for HS Algebra. • Constructing simple equations and inequalities to solve real life word problems is a necessary concept. • Write and solve real- life and mathematical	How can I apply the order of operations and the fundamentals of algebra to solve problems? How can I justify that multiple representations in the context of a problem are equivalent expressions? How do I assess the reasonableness of my answer? How will I use the properties of equality to explain the order of the steps in solving equations and inequalities? How do I interpret the solutions for equations and inequalities in the context of the problem? How can I use and relate facts about special pairs of	• Algebraic • Arithmetic • Coefficient • Context • Cube Root • Equation • Expand • Expression • Factor • Inequality • Linear • Operations • Per • Perfect Cube

problems involving simple equations for an unknown angle in a figure would help students as the engage in higher Geometry concepts.	angles to write and solve simple equations involving unknown angles?	• Perfect Square • Properties • Rational • Solution Set • Square Root

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
LAUSD Adopted Textbook: • California Mathematics • College Preparatory Mathematics • Go Math Click on each list above for Textbook Alignment **Others** National Library of Virtual Manipulatives NCTM Tools and Activities TI Math Tools Geometer's Sketchpad **California Draft Mathematics Framework Chapters** http://www.cde.ca.gov/be/cc/cd/draftmathfwchapters.asp. **Illustrative Mathematics** 7.EE.1– Equivalent Expressions 7.EE.1 and 7.EE.4a – Guess My Number **Engage NY Common Core Curriculum** Module 4 – Expressions and Equations **Illustrative Mathematics** • 7.EE.1 – The Mango Problem • 7.EE.1 – The Sailor and Cocoanut Problem • 7.EE.1 and 7.EE.2 Pan Balance - Expressions • 7.EE.1 – Miles to Kilometers • 7 EE.3 – Discounted Books • 7.EE.4 and 4b. – Fishing Adventures 2 • 7 EE.4b – Sport Equipment Set	• Help students to gain a fundamental understanding that the distributive property works "on the right" as well as "on the left," in addition to "forwards" as well as "backwards." • Real-world connections (Use equations to set up a home budget, e.g. Percent of take-home pay for rent, utilities, food, savings, etc.to provide students a conceptual understanding of expressions and equations). • Engage students in a discussion to learn that different ways of writing expressions can serve different purposes and provide different ways of seeing a problem. Have students use this *example* to work with expressions: A rectangle is twice as long as it is wide. Find as many different ways as you can to write an expression for the perimeter of such a rectangle. • Use the Surround the Pool Concept Lesson • Structured instructional conversations (Think-Pair-Share) • Peer Tutoring • Journal writing prompts - • Questioning Strategies	Formative Assessment SBAC - http://www.smarterbalanced.org/ Item #'s Items: 2959, 43022, 43023, 43026, 43047, 43053 LAUSD Assessments District assessments can be accessed through: http://achieve.lausd.net/math http://achieve.lausd.net/ccss Use your Single Sign On to access the Interim Assessments State Assessments California will be administering the SMARTER Balance Assessment as the end of course for grades 3-8 and 11. The 11th grade assessment will include ítems from Algebra 1, Geometry, and Algebra 2 standards. For examples, visit the SMARTER Balance Assessment at: SBAC - http://www.smarterbalanced.org/

LANGUAGE GOALS for **low achieving, high achieving, students with disabilities and English Language Learners**

By the end of 7th grade, students are expected to:

Reading

Students will evaluate the argument and specific claims in a word problem, including the validity of the reasoning, making explicit reference to words in the problem and using reporting language (According to the problem, …; the problem states that…; the main points are…' *argues, In my opinion, the way to solve this problem is…; What is most important in this problem is _____; because_____.*

Students will read equations, expressions, and inequalities aloud fluently, without hesitating

Students will summarize the steps in setting up and evaluating/solving expressions, equations and inequalities as described in their textbooks using the words *first, second, third, etc*.

Students will identify words, or phrases, in word problems that help them solve them using a causative structure such as: *The following words* **"**evaluate" *and* "solution," and "solution set" *help me solve the problem*

Students will use the definitions in their textbook to describe key geometrical shapes using the relative pronoun "whose" (angles whose measures add up to 180° are supplementary)

Writing

Students will write definitions of key vocabulary using complete, well-formed sentences.

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

Students will list possible reasons for their conclusions, using verbs such as *explain, demonstrate, justify* and *because*)

Students will explain how they use a specific mathematical concept in their lives, using the following specific set of words: *variable, distribute,*

Listening and Speaking

Students will explain how to set up and solve/evaluate equations, expressions, and inequalities to a partner using the words *first, second, third, etc.*

Students will describe the difference between an equation, an expression, and an inequality using the words solution, simplify, solution set

Students will compare two angles (complementary, supplementary, and straight) using comparative words such as less than, greater than, equal to, etc.

Students will agree or disagree with mathematical answers to specific word problems using expressions of agreement or disagreement (I agree/disagree because)

PERFORMANCE TASKS

Mathematics Assessment Project

- 7.EE.1 and 7.EE.4 Steps to Solving Equations

LAUSD Concept Lessons

Planning a Bowling Party

7.EE.4a – Calling Plans

Inside Mathematics

- 7 EE.2 & 4 – The Wheel Shop
- 7 EE.3 – The Toy Train

DIFFERENTIATION 🕮		
UDL/ FRONT LOADING	ACCELERATION	INTERVENTION
• Reason about and solve 1-variable equations and inequalities • Apply and extend previous understandings of arithmetic to algebraic expressions • Apply and extend understandings of numbers to the number system of rational numbers	Use the Building bridges activity to enrich high achieving students: http://illuminations.nctm.org/LessonDetail.aspx?id=L247	Intervention for low achieving students and students with disabilities: • Small teacher to student ratio discussion • Emphasize think-pair-share • Make connections to real life • ALEKS –www.aleks.com • Small group re-teach • Using kinesthetic activities and manipulatives

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COMMON CORE MATH 7 – UNIT 4

Developing Understanding of Geometry, Statistics and Probability

Students continue their work with area from Grade 6, solving problems Involving the area and circumference of a circle and surface area of three-dimensional objects. Students reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with relationships between angles formed by Intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections. They solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. Students build on their work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.

CLUSTERS	COMMON CORE STATE STANDARDS
Geometry **(s/a)^2 Draw, construct, and describe geometrical figures and describe the relationships between them.**	**7.G.1**. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. **7.G.2**. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. **7.G.3**. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. **7.G.3.1** ***Describe how two or more objects are related in space (e.g., skew lines, the possible ways three planes might intersect).CA***
(s/a)^2 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	**7.G.4**. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. **7.G.5**. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. **7.G.6**. Solve real-world and mathematical problems involving area, volume and surface area of two- and three dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Statistics and Probability **(s/a)^2 Use random sampling to draw inferences about a population.**	**7.SP.1**. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. **7.SP.2**. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the

CLUSTERS	COMMON CORE STATE STANDARDS
	same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*
(s/a)[2] Draw informal comparative inferences about two populations.	**7.SP.3**. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.* **7.SP.4**. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*
(s/a)[2] Investigate chance processes and develop, use, and evaluate probability models.	**7.SP.5**. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. **7.SP.6**. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.* **7.SP.7**. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.* b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?* **7.SP.8**. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

CLUSTERS	COMMON CORE STATE STANDARDS
	a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. c. Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*
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.**	The Progressions for the Common Core State Standards in Mathematics (draft) for Statistics and Probability shows how the study of Statistics and Probability progress from grades 6 to 8. In Grade 6, students build on the knowledge and experiences in data analysis developed in earlier grades (see K-3 Categorical Data Progression and Grades 2-5 Measurement Progression). In Grade 7, students move from concentrating on analysis of data to production of data, understanding that good answers to statistical questions depend upon a good plan for collecting data relevant to the questions of interest. Because statistically sound data production is based on random sampling, a probabilistic concept, students must develop some knowledge of probability before launching into sampling. The CDE Progress to Algebra continuum K-8 shows the clusters as the build to the study of Statistics and Probability from earlier grades.

[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
Geometry • Solve problems involving the area and circumference of a circle and surface area of three-dimensional objects. • Reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, which will lead to gaining familiarity with the relationships between angles formed by intersecting lines. Work with three-dimensional	**Geometry** What 2-D figure results from slicing 3-D figures? (cones, spheres, or cylinders) How do you find the surface area and volume of a 3D figure? What is the total number of degrees in supplementary and complementary angles? What is the relationship between vertical and adjacent	**Geometry** Adjacent Complementary Cones Construct Cylinders Plane Rectangular figures Rectangular Supplementary Surface area Two-dimensional (2-D) Three-dimensional (3-D) Vertical

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS	KEY VOCABULARY
figures, relating them to two- dimensional figures by examining cross-sections. • Solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms.	angles? How would the volume and surface area be affected when dimensions of a figure are doubled and/or triple?	pyramids Scale Skew Spheres
Probability and Statistics • Compare two data distributions and address questions about differences between populations. • Begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.	**Probability and Statistics** How do you determine which measures of variability should be used to draw informal comparative inferences? How are lists, tables, tree diagrams or simulation used to find the probability of an event? How is probability used to predict frequency of an event?	**Probability and Statistics** Comparative Compound events Deviation Discrepancy Distribution Draw inference Frequency Gauge Inferences Prediction Probability Random Relative Simple events Simulation Statistics Variability Variation

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
NLVM http://nlvm.usu.edu/ **NCTM Illuminations activities** 7.G.1 - Floor Plan - **California Draft Mathematics Framework:** http://www.cde.ca.gov/be/cc/cd/draftmathfwchapters.asp. **LAUSD Adopted Textbooks:** • California Mathematics • College Preparatory Mathematics • Go Math Click on each list above for Textbook Alignment Engage NY Common Core Curriculum Module 5 – Statistics and Probability Module 6 - Geometry	• Journal writing prompts (link) • Technology to show visual representations of geometric figures: Geometry sketchpad • Use visuals to illustrate multiple representations of rate of change • Real-world connections • Structured instructional conversations (Think-Pair-Share)	**Formative Assessments** **Illustrative Mathematics** 7.SP Estimating the Mean State Area **Mathematics Assessment Project** 7.G.4 and 7.G.6 Drawing to Scale: Designing a Garden **LAUSD Assessments** District assessments can be accessed through: http://achieve.lausd.net/math http://achieve.lausd.net/ccss Use your Single Sign On to access the Interim Assessments.

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
		State Assessments California will be administering the SMARTER Balance Assessment as the end of course for grades 3-8 and 11. The 11th grade assessment will include ítems from Algebra 1, Geometry, and Algebra 2 standards. For examples, visit the SMARTER Balance Assessment at: SBAC - http://www.smarterbalanced.org/

LANGUAGE GOALS for **low achieving, high achieving, students with disabilities and English Language Learners**

- Students will understand that some verbs have different meanings in different mathematical situations. (draw)
- Students will be able to interpret the characteristics of 2D and 3D figures in order to manipulate them.
  Example: The difference between 2D figure and 3D figure is _____.

- Students will understand the context and relationship between data in order to make prediction and draw inferences.
  Example: Given two different sets of data, I can predict that _____ . Based on this prediction, I could draw inference that _____.

- Students will be able to select the appropriate formulas needed to solve real-world and mathematical problems.
  Example: I can compare the formulas for computing area, surface area, and volume of figures and objects, by _____.

- Students will be able to justify steps taken to arrive at a logical conclusion.
  Example: If the situation is_____, then I can conclude that _____.

PERFORMANCE TASKS

Mathematics Assessment Project

- 7.G.6 Maximizing Area: Gold Rush
- 7.G.4 and 7.G.6 Using Dimensions: Designing a Sports Bag
- 7.G.4 and 7.G.6 Drawing to Scale: Designing a Garden
- 7.SP.1 Estimating: Counting Trees
- 7.G.6 Estimations and Approximations: The Money Munchers
- 7.SP.5-8 Evaluating Statements About Probability

Illustrative Mathematics

- 7.SP.1, 7.SP.2 and 7.SP.7 Estimating the Mean State Area
- 7.SP.2 and &.SP.7 Election Poll, Variation 1
- 7.SP.2 and SP.2 Election Poll, Variation 2

<table>
<tr><th colspan="3">DIFFERENTIATION 🕮</th></tr>
<tr><th>UDL/ FRONT LOADING</th><th>ACCELERATION</th><th>INTERVENTION</th></tr>
<tr><td>Statistics and Probability:

• Students Formulate questions that can be answered with data
• Students design and use a plan to collect relevant data
• Students analyze the data with appropriate methods
• Students are able to interpret results and draw valid conclusions from the data that relate to the questions posed.
• Such investigations involve making sense of practical problems by turning them into statistical investigations; moving from context to abstraction and back to context; repeating the process of statistical reasoning in a variety of contexts.

Geometry:
• Students work on problems involving areas and volumes.
• Students understand multiple algorithms for the volume of prisms
• Students apply visualization skills connected to solve the area of 3D shapes.
• Students can construct 3d models from 2d models.</td><td>Acceleration for high achieving students:

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 at their own rate. This also includes the opportunity for students to make personal meeting of the lesson.

Statistics and Probability:
Simulating probability experiments via technology where students collect meaningful data (type of music, who eats cafeteria food). Use the following activity for acceleration: Election Poll, Variation 3
http://www.illustrativemathematics.org/illustrations/558

Geometry:
Extension of standard 7G.3 - Students describe or define the features or characteristics of 2-D geometric figures that result when 3d figures are sliced horizontally, vertically or diagonally.</td><td>Intervention for low achieving students and students with disabilities:

• Small teacher to student ratio discussion – have students draw informal comparative inferences about two populations (boys vs. girls)
• Data discussed comes from sampling life data (soccer team height vs. football team height)
• Use Physical objects to demonstrate the math. In geometry : Such as cones, squares, sphere, etc.
In probability and statistics: Census data, experimental results</td></tr>
</table>

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