Sacramento City Unified School District

Curriculum Map

Common Core Mathematics Grade 7

Sacramento City Unified School District

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Unit #1: Proportional Reasoning and Relationships

(Approx. # Days)

Content Standards: 7.RP.1,2 and 7.G.1

Math Common Core Content Standards:

Domain: Ratios and Proportional Relationships 7.RP

Analyze proportional relationships and use them to solve real-world and mathematical problems.

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.*
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

Domain: Geometry 7.G

Draw, construct, and describe geometrical figures and describe the relationships between them.

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.

Standards for Mathematical Practice of Emphasis:

1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
4. Model with Mathematics

ELD Standards to Support Unit:

[Add text]

SEL Competencies:

[Add text]

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Outcomes	Strategies for Teaching and Learning	Differentiation e.g., EL/SpEd/GATE	Resources
• What is the role of unit rate in solving problems? • How do you know which of the two unit rates is important for a problem? • What makes a relationship proportional? • How is the constant of proportionality represented in a graph, table and equation?	Assessments/Tasks aligned to learning experiences 1) http://www.illustrativemathematics.org/illustrations/82 2) http://www.illustrativemathematics.org/illustrations/101 3) http://www.illustrativemathematics.org/illustrations/107 4) http://www.illustrativemathematics.org/illustrations/1527 5) http://map.mathshell.org/materials/download.php?fileid=1070 For Learning Experiences 1-5: http://www.engageny.org/sites/default/files/resource/attachments/g7-m1-student-materials.pdf (this link is to a module that has a variety of tasks that relate to the learning experiences)	Students will be able to…. 1) Identify and utilize unit rates to solve real-world problems with proportional relationships containing whole numbers, fractions and decimals by using visual representations. (Framework p.12) 2) Use their understanding of unit rates and proportionality to create equations, both in the form $\frac{a}{b} = \frac{d}{c}$ and y = kx, to solve real-world problems. (Framework p.12) 3) Identify, utilize and write equations with unit rates developed from scale drawings to solve problems and reproduce a scale drawing at a different scale. (Framework p.35, 36) 4) Use unit rate or constant of proportionality to determine if a relationship is proportional. Students should explore a variety of non-examples including: no relationship, linear but not proportional, inverse relationships, non-similar figures. (Framework p.8,9) 5) Given a real-world example, work simultaneously with a graph, table and equation. Determine if there is a constant of proportionality in each representation. If so, identify the constant of proportionality in each representation, giving careful attention to the point (1, r) on a graph.	**Tape Diagrams and Double Number Lines** http://science.kennesaw.edu/~twatanab/DeKalb%20Title%20I%20Summit%202012.pdf **Tape Diagrams** http://learnzillion.com/lessons/841-create-unit-rate-using-tape-diagram **Table of Equivalent Ratios** http://learnzillion.com/lessons/317-find-equivalent-ratios-using-ratio-tables http://www.virtualnerd.com/middle-math/ratios-proportions-percent/ratios-rates/equivalent-ratios-table-predict-example **Scale Drawings** http://www.virtualnerd.com/middle-math/ratios-proportions-percent/scale-drawings-models/scale-drawing-definition http://math.serpmedia.org/dragonfly/dragonfly.pdf		*CA Mathematics Framework Gr. 7* p. 6 – 14 *Progressions for the Common Core – Ratios and Proportional Relationships Gr. 6-7* North Carolina 7th Grade Math Unpacked Content: pgs. 6- 9, 25-26

Unit #2: Applying Proportional Reasoning to Problems with Percents

(Approx. # Days)

Content Standards: 7.RP.3

Math Common Core Content Standards:

Domain: Ratios and Proportional Relationships 7.RP

Analyze proportional relationships and use them to solve real-world and mathematical problems.

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.*

Standards for Mathematical Practice:

1. Make Sense of Problems and Persevere in Solving Them
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model with Mathematics
5. Use Appropriate Tools Strategically

ELD Standards to Support Unit:

[Add text]

SEL Competencies:

[Add text]

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
• How can you check for reasonableness as you solve a problem and in your answer? • How do you round percentages strategically to estimate? • Which quantity represents the whole (or 100%)? • What are the connections between bar modeling, double number lines and the algorithmic procedure? • When bar modeling, how do you decide how to "chunk" the percents in the model? (Ex: How is 15% represented? Is it 10% + 5% or 10% + 1% +1% +1% +1% +1% or….)	Assessments/Tasks aligned to learning experiences: 1) & 2) http://www.illustrativemathematics.org/illustrations/105 http://www.illustrativemathematics.org/illustrations/106 http://map.mathshell.org/materials/download.php?fileid=1042 http://map.mathshell.org/materials/download.php?fileid=1524 3) http://map.mathshell.org/materials/download.php?fileid=794	Students will be able to…. 1) Estimate and calculate tips, simple interest, tax, fees and mark ups using bar modeling, double number lines and algorithmic procedures. (Framework p.14, 15) 2) Estimate and calculate discounts, markdowns and sales using bar modeling, double number lines and algorithmic procedures. 3) Estimate and calculate percent change including identifying the original value and comparing the difference in two values to the starting price. (Framework p.15, 16)	Bar Modeling http://learnzillion.com/lessons/3556-estimate-a-percent-value-using-a-bar-model Double Number Lines/Cost of Items with Tax http://learnzillion.com/lessons/3441-write-an-expression-to-find-the-cost-of-an-item-with-tax http://learnzillion.com/lessons/3507-apply-taxes-tips-and-discounts-using-a-proportion-and-scale-factor Algorithmic Procedures http://learnzillion.com/lessons/3507-apply-taxes-tips-and-discounts-using-a-proportion-and-scale-factor Decimal, Percentage, Fraction http://www.mathsisfun.com/decimal-fraction-percentage.html Percent Increase/Decrease http://learnzillion.com/lessons/3581-calculate-percent-increase-and-decrease-in-context		*CA Mathematics Framework Gr. 7* p. 14 – 16 http://www.cde.ca.gov/ci/ma/cf/documents/aug2013gradeseven.pdf *Progressions for the Common Core* – Ratios and Proportional Relationships Gr. 6-7 http://commoncoretools.files.wordpress.com/2012/02/ccss_progression_rp_67_2011_11_12_corrected.pdf North Carolina 7th Grade Math Unpacked Content: p. 10- 13 http://www.ncpublicschools.org/docs/acre/standards/common-core-tools/unpacking/math/7th.pdf *7th Grade Common Core State Standards*

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
					Flip Book http://katm.org/wp/wp-content/uploads/flipbooks/7th_FlipBookEdited21.pdf

Unit #3: Operations with Rational Numbers – Addition and Subtraction

(Approx. # Days)

Content Standards: 7.NS.1, 3

Math Common Core Content Standards:

Domain: The Number System 7.NS

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

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.
3. Solve real-world and mathematical problems involving the four operations with rational numbers.

Standards for Mathematical Practice:

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

ELD Standards to Support Unit:

[Add text]

SEL Competencies:

[Add text]

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
• Why is subtracting a negative equivalent to adding a positive? • What is a zero pair? • How can you use zero pairs to solve problems? • How do you know which number to decompose when creating zero pairs? • How can you subtract something that isn't there? (Ex: -3 – 2, how can you subtract 2 positives from 3 negatives?) • How do you know how many zero pairs to add to a problem in order to subtract (take away)? • How do zero pairs and number lines compare and contrast? • What is the most efficient method to use for any given problem? • How can you transition from using a particular method to solve a problem to just knowing the answer?	Assessments/Tasks aligned to learning experiences: http://map.mathshell.org/materials/lessons.php?taskid=453#task453 http://www.illustrativemathematics.org/illustrations/310 http://www.illustrativemathematics.org/illustrations/46 http://www.illustrativemathematics.org/illustrations/998 http://www.illustrativemathematics.org/illustrations/317	Students will be able to… 1) Understand and develop fluency adding rational numbers (integers, fractions and decimals) by creating zero pairs using counting chips, the number line, decomposition and mental math. Apply understanding to solve real-world problems. (Framework p.20-21) 2) Understand and develop fluency subtracting rational numbers (integers, fractions and decimals) by creating zero pairs using counting chips and the number line, with an emphasis on "taking away" and by seeing subtraction as the inverse of addition (c – b = a means a + b = c). Apply understanding to solve real-world problems. (Framework p.22, 23) 3) Compare and contrast work with addition and subtraction of rational numbers to build the understanding that p – q = p + (-q) for the purpose of thinking of any subtraction problem as an addition problem with a negative quantity. Apply understanding to solve real-world problems. 4) Synthesize the work they have done with addition and adding the opposite to create an algorithm around comparing quantities of rational numbers and either adding or subtracting. (Framework p.21)	Strategies for adding and subtracting positive and negative numbers: • Counting chips http://learnzillion.com/lessons/2621-add-integers-using-chips • T-Charts http://www.mathfox.com/adding-integers-using-t-chart/ • Decomposition http://www.youtube.com/watch?v=fQX74Eeo4Tw • Number line http://learnzillion.com/lessons/3007-add-rational-numbers-using-algorithms-and-number-lines • "Taking Away" https://www.teachingchannel.org/videos/teaching-subtracting-integers • Reading the problem aloud • Making connections to real-world problems (i.e.		*CA Mathematics Framework Gr. 7* p. 18 – 28 http://www.cde.ca.gov/ci/ma/cf/documents/aug2013gradeseven.pdf *Progressions for the Common Core* – The Number System gr. 6-8 http://commoncoretools.me/wp-content/uploads/2013/07/ccssm_progression_NS+Number_2013-07-09.pdf North Carolina 7th Grade Math Unpacked Content: p. 14 – 1 7 http://www.ncpublicschools.org/docs/acre/standards/common-core-tools/unpacking/math/7th.pdf *7th Grade Common*

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
			problems involving money, debt, etc.) Warn away from rote memorization techniques or mnemonic devices (e.g., "keep-change-change", etc.)		*Core State Standards Flip Book* http://katm.org/wp/wp-content/uploads/flipbooks/7th_FlipBookEdited21.pdf

Unit #4: Operations with Rational Numbers – Multiplication and Division

(Approx. # Days)

Content Standards: 7.NS.2, 3

Math Common Core Content Standards:

Domain: The Number System 7.NS

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

2. Apply and extend previous understandings 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 form of a rational number terminates in 0s or eventually repeats.
3. Solve real-world and mathematical problems involving the four operations with rational numbers.

Standards for Mathematical Practice:

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

ELD Standards to Support Unit:

[Add text]

SEL Competencies:

[Add text]

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
• Where do the rules of signed numbers come from? • Why is the product of two negative numbers a positive number? • How can you extend the rules for integers to all rational numbers? • How do the rules for multiplying signed numbers help you know the rules for dividing signed numbers? • What are examples of multiplying and dividing signed rational numbers in real life? • How do you know if a number is rational?	Assessments/Tasks aligned to learning experiences: For Learning Experience 5: http://www.illustrativemathematics.org/illustrations/604 http://www.illustrativemathematics.org/illustrations/593 For Learning Experience 6: http://www.illustrativemathematics.org/illustrations/298	Students will be able to… 1) Understand and develop fluency of multiplication of integers through definition of integers and multiplication as repeated addition. Additional methods that should be explored include using patterns in products of integers and the proof of why (-1)(-1) = 1. (Framework p. 25, 26) 2) Develop the rules for multiplying integers and extend that understanding to all rational numbers for the purpose of fluency. Apply rules of signed numbers to real-world contexts. 3) Extend the rules of multiplication to division of integers using the inverse relationship between multiplication and division. Apply division of integers to real-world contexts. 4) Apply rules of multiplication and division to all rational numbers. Solve real-world problems involving both operations. 5) Convert rational numbers to decimals using long division; know that the decimal form of a rational number terminates in 0's or repeats. 6) Solve real-world and mathematical problems involving the four operations with rational numbers. (Framework p.28)	Definition of multiplication for integers, for example: 3(-4) is three groups of negative four or -4 + -4 + -4 = -12 and -3(-4) is the opposite of three groups of negative four or –(-4 + -4 + -4) = -(-12) = 12. Understanding multiplication of integers using decomposition and number lines: https://www.youtube.com/watch?v=tNJhbgKq_Jg Proof of (-1)(-1) = 1 https://www.khanacademy.org/math/arithmetic/absolute-value/mult_div_negatives/v/why-a-negative-times-a-negative-is-a-positive Students look for patterns of products in integers. Multiplying fractions: $\frac{-3}{4}\cdot\frac{5}{7}=-3\left(\frac{1}{4}\right)\left(\frac{5}{7}\right)$		*CA Mathematics Framework Gr. 7* p. 18 – 28 http://www.cde.ca.gov/ci/ma/cf/documents/aug2013grade seven.pdf *Progressions for the Common Core* – The Number System gr. 6-8 http://commoncoretools.me/wp-content/uploads/2013/07/ccssm_progression_NS+Number_2013-07-09.pdf North Carolina 7th Grade Math Unpacked Content: p. 14 – 1 7 http://www.ncpublicschools.org/docs/acre/standards/common-core-tools/unpacking/math/7th.pdf

Unit #5: Equivalent Expressions

(Approx. # Days)

Content Standards: 7.EE.1,2

Math Common Core Content Standards:

Domain: Expressions and Equations 7.EE

Use properties of operations to generate equivalent expressions.

1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
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."*

Standards for Mathematical Practice:

3. Construct Viable Arguments and Critique the Reasoning of Others
7. Look For and Make Use of Structure
8. Look For and Express Regularity in Repeated Reasoning

ELD Standards to Support Unit:

[Add text]

SEL Competencies:

[Add text]

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
• Of the many possible equivalent expressions, how does each represent the meaning of a given situation? • Of the many possible equivalent expressions, which of them best represents the meaning of the situation? • How does changing one term of an expression change the meaning of the context?	Assessments/Tasks aligned to learning experiences: 1) http://www.illustrativemathematics.org/illustrations/541 1) http://www.illustrativemathematics.org/illustrations/543 http://www.illustrativemathematics.org/illustrations/1450 2) http://www.illustrativemathematics.org/illustrations/433	Students will be able to… 1) Generate equivalent expressions containing rational numbers by combining like terms in mathematical and real-world problems. Compare the meaning of each equivalent expression in the context of real-world problems. (Framework p.29) 2) Generate equivalent expressions containing rational numbers using the distributive property, both expanding and factoring, in mathematical and real-world problems. Compare the meaning of each equivalent expression in the context of real-world problems. (Framework p.29) 3) Generate equivalent expressions containing rational numbers using the distributive property, addition and subtraction, i.e. 8 – 2(0.5x + 1) in mathematical and real-world problems. Compare the meaning of each equivalent expression in the context of real-world problems.	Use pattern problems like the "Pool Border Problem" (Framework p. 31). Possible use of manipulatives: Integer tiles Other real-world problems could include: • Perimeter/Area Problems • Cell Phone Plans		*CA Mathematics Framework Gr. 7* p. 28 – 31 http://www.cde.ca.gov/ci/ma/cf/documents/aug2013gradeseven.pdf *Progressions for the Common Core* – Expressions and Equations Gr. 6 – 8 http://commoncoretools.files.wordpress.com/2011/04/ccss_progression_ee_2011_04_25.pdf North Carolina 7th Grade Math Unpacked Content: p. 18 – 2 0 http://www.ncpublicschools.org/docs/acre/standards/common-core-tools/unpacking/math/7th.pdf *7th Grade Common Core State Standards Flip Book* http://katm.org/wp/wp-content/uploads/

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
					flipbooks/7th_FlipBookEdited21.pdf

Unit #6: Problem Solving with Equations and Inequalities

(Approx. # Days)

Content Standards: 7.EE.3,4

Math Common Core Content Standards:

Domain: Expressions and Equations 7.EE

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

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.*
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?*

Standards for Mathematical Practice:

1. Make Sense of Problems and Persevere in Solving Them
2. Reason Abstractly and Quantitatively
4. Model with Mathematics
5. Use Appropriate Tools Strategically
7. Look For and Make Use of Structure

ELD Standards to Support Unit:

[Add text]

SEL Competencies:

[Add text]

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
• What are some arithmetic tools you can use to solve real-life problems? • When is it appropriate to use arithmetic tools and when is it appropriate to solve equations algebraically? • What is the purpose of using inverse operations? • When solving equations and inequalities, using inverse operations, how do you know whether to create a zero or a one? • For equations such as $5(x+10)=25$ and $\frac{2}{3}(9x+6)=10$, what are different methods for solving algebraically? • What does your solution mean in the context of the problem? • When solving a problem using both methods (arithmetic tools and algebraically), where do you see relationships in your work? • Why and when would you reverse an inequality symbol? • How do you interpret the graph of an inequality in terms of the context of the problem?	Assessments/Tasks aligned to learning experiences: 1) http://www.illustrativemathematics.org/illustrations/997 2) http://www.illustrativemathematics.org/illustrations/108 3) http://www.illustrativemathematics.org/illustrations/478 4) http://www.illustrativemathematics.org/illustrations/712 5) http://www.illustrativemathematics.org/illustrations/643	Students will be able to… 1) Solve multi-step, real-life and mathematical problems by using arithmetic methods such as bar modeling, Guess and Check, drawing a picture or other tools instead of creating an equation. Use estimation to assess the reasonableness of answers. 2) Generate equations equivalent to px + q = r with rational coefficients and solve mathematical and real-life situations using inverse operations. 3) Generate equations equivalent to p(x + q) = r with rational coefficients and solve mathematical and real-life situations using inverse operations. 4) Compare and contrast the use of arithmetic (see 1) versus algebraic methods (see 2 and 3) of solving equations equivalent to px + q = r and p(x + q) = r in mathematical and real-life situations. * 5) Generate and solve inequalities with rational numbers, in the form of px + q < r and px + q > r (including ≤ and ≥) that arise from real world problems. Graph the solution region and interpret the meaning of solutions in the context of the problem.	Problem solving strategies for real-world context problems: • Bar Modeling: http://www.showme.com/sh/?h=uAslN8C • Drawing a picture • Make a table • Guess and Check • Estimation (3/7 of $105 is about ½ of $100) • Integer Tiles • Side-by-side instruction • Multiple Representations: http://www.wccusd.net/cms/lib03/CA01001466/Centricity/domain/60/lessons/Grade%206%20Lessons/SolvingEquationsMultipleMethodsV4.pdf http://www.acoe.org/acoe/files/EdServices/Math/OneStepEquationsMultipleApproachesV3.pdf Use inverse operations to solve algebraic equations (i.e. creating zeroes and ones). Warn against the language of "cancel out."		*CA Mathematics Framework Gr. 7* p. 31 – 33 http://www.cde.ca.gov/ci/ma/cf/documents/aug2013gradeseven.pdf *Progressions for the Common Core* – Expressions and Equations Gr. 6 – 8 http://commoncoretools.files.wordpress.com/2011/04/ccss_progression_ee_2011_04_25.pdf North Carolina 7th Grade Math Unpacked Content: p. 21 – 24 http://www.ncpublicschools.org/docs/acre/standards/common-core-tools/unpacking/math/7th.pdf *7th Grade Common Core State Standards Flip Book* http://katm.org/wp/wp-content/uploads/flipbooks/7th_FlipBo

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
			* Learning Experience 4 can be embedded in Experiences 2 and 3 Use investigation to help students understand the reason for reversing inequality symbols when multiplying or dividing by negative numbers. https://www.youtube.com/watch?v=y5vx0oXVyY0 http://www.algebra.com/algebra/homework/Inequalities/Inequalities.faq.question.203735.html		okEdited21.pdf

Unit #7: Data Analysis

(Approx. # Days)

Content Standards: 7.SP.1,2,3,4

Math Common Core Content Standards:

Domain: Statistics and Probability 7.SP

Use random sampling to draw inferences about a population.

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.
2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*

Draw informal comparative inferences about two populations.

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.*
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.*

Standards for Mathematical Practice:

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

ELD Standards to Support Unit:

[Add text]

SEL Competencies:

[Add text]

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
• How do you conduct a random sample to most accurately reflect a population? • How do you know if a random sample is representative of a population? • How do you know if your inferences and predictions about a population are valid? • Why might you conduct more than one random sample of the same population? • What kinds of inferences or predictions can you make from looking at visual representations of given data sets (for example, dot plots)? • How can you use the mean absolute deviation (MAD) of a given data set? • When is it appropriate to use the different measures of center (mean and median) and when is it appropriate to use the different measures of variability (MAD and inter-quartile range)?	For Learning Experiences 1 – 4: http://www.engageny.org/sites/default/files/resource/attachments/math-g7-m5-student-materials.pdf (pg: 82 – 157) (This module contains a variety of tasks that relate to multiple learning experiences.) Possible Unit Project: http://www.ciese.org/curriculum/tempproj/	Students will be able to… 1) Determine if a given random sample is representative of a population, and make generalizations about the population based on characteristics of the sample. 2) Make predictions about a population given data from a random sample, and then generate and analyze data from additional random samples representing the same population to determine the validity of the predictions. (Framework, p. 39, 40) 3) Make inferences, predictions, and comparisons from visual representations (for example, dot plots and box plots) of given data sets. 4) Determine if the averages (mean or median) of two or more given data sets serve as a valuable reference for comparison based on the variance (mean absolute deviation or inter-quartile range) of the data set. (Framework, p. 41, 42).	Random Sampling of a Population: http://www.glencoe.com/sec/math/prealg/prealg04/add_lesson/using_sampling_pa1.pdf (from Glencoe textbook) http://learnzillion.com/lessons/2716-take-a-simple-random-sample Dot Plots: http://learnzillion.com/lessons/2842-create-a-dot-plot Box plots (including interquartile range comparison): http://www.khanacademy.org/math/probability/descriptive-statistics/Box-and-whisker%20plots/v/box-and-whisker-plots http://learnzillion.com/lessons/3596-compare-iqr-using-box-plots Simulated Samples: http://learnzillion.com/lessons/3206-generate-survey-data-through-simulations Mean Absolute Deviation: http://learnzillion.com/lesson		*CA Mathematics Framework Gr. 7* p. 38 – 42 http://www.cde.ca.gov/ci/ma/cf/documents/aug2013gradeseven.pdf *Progressions for the Common Core* – Statistics and Probability Gr. 6-8 http://commoncoretools.files.wordpress.com/2011/12/ccss_progression_sp_68_2011_12_26_bis.pdf North Carolina 7th Grade Math Unpacked Content: p. 34 – 38 http://www.ncpublicschools.org/docs/acre/standards/common-core-tools/unpacking/math/7th.pdf *7th Grade Common Core State Standards Flip Book* http://katm.org/wp/

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
			s/3578-compare-two-populations-using-mean-absolute-deviation		wp-content/uploads/flipbooks/7th_FlipBookEdited21.pdf

Unit #8: Probability

(Approx. # Days)

Content Standards: 7.SP.5,6,7,8

Math Common Core Content Standards:

Domain: Statistics and Probability 7.SP

Investigate chance processes and develop, use, and evaluate probability models.

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.
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. 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?*
8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
    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?*

Standards for Mathematical Practice:

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

ELD Standards to Support Unit:	**SEL Competencies:**
[Add text]	[Add text]

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
• Why does it make sense that the probability of a chance event is represented as a number between 0 and 1? • How do you know if your predictions based on observed frequencies are valid? • What is a reasonable number of data points to collect in order to make a prediction about the probability of a chance event? • What are some similarities and differences when using an organized list, a table, and a tree diagram to find probabilities of compound events? • What are some similarities and differences between simple events and compound events? • How do you design a simulation that represents a compound event?	http://www.engageny.org/sites/default/files/resource/attachments/math-g7-m5-student-materials.pdf (pp. 1 - 82) (This module contains a variety of tasks that relate to multiple learning experiences.) http://www.illustrativemathematics.org/illustrations/1581 http://www.illustrativemathematics.org/illustrations/1216 http://www.illustrativemathematics.org/illustrations/885 http://map.mathshell.org/materials/tasks.php?taskid=367#task367 http://map.mathshell.org/materials/lessons.php?taskid=225&subpage=concept	Students will be able to… 1) Determine the probability of a chance event and represent it as a number between 0 and 1 (for example, the probability of flipping heads on a quarter is ½), and understand that a probability near zero is an unlikely event, while a probability near 1 is a likely event. 2) Collect data from a chance event (for example, rolling a die), calculate the probability based on the observed frequencies, and use proportional reasoning to make predictions. 3) Compare the theoretical probability of a chance event to the probability based on observed frequencies, and explain any possible sources of discrepancies. 4) Find probabilities of compound events using organized lists, tables, and tree diagrams. 5) Make connections between finding the probability of a simple event and finding the probability of a compound event. 6) Design and use a simulation from a compound event (for example, rolling two dice) to generate frequencies.	Conduct class discussions about observed data (e.g. flipping a coin), paying attention to similarities and differences between students' observations, and focusing on any predictions that can be made. Possible chance events: • Rolling dice • Flipping coins • Choosing cards from a deck • Choosing colored objects • Spinner http://learnzillion.com/lessons/1206-calculate-the-probability-of-an-event-by-creating-a-ratio Use organized lists (http://www.youtube.com/watch?v=tc6F54fbLRU) , tables (http://learnzillion.com/lessons/1862-find-the-probabilit	Technology for random sampling: http://www.randomizer.org/ http://stattrek.com/statistics/random-number-generator.aspx	*CA Mathematics Framework Gr. 7* p. 42 – 45 http://www.cde.ca.gov/ci/ma/cf/documents/aug2013gradeseven.pdf *Progressions for the Common Core* – Statistics and Probability Gr. 6-8 http://commoncoretools.files.wordpress.com/2011/12/ccss_progression_sp_68_2011_12_26_bis.pdf North Carolina 7th Grade Math Unpacked Content: p. 39 – 43 http://www.ncpublicschools.org/docs/acre/standards/common-core-tools/unpacking/math/7th.pdf

			y-of-a-compound-event-by-creating-a-table) , tree diagrams (http://learnzillion.com/lessons/1861-find-the-probability-of-a-compound-event-by-creating-a-tree-diagram) , and simulations to model events.		

Unit #9: 2-Dimensional and 3-Dimensional Geometric Figures

(Approx. # Days)

Content Standards: 7.G.1,2,3,4,5,6

Math Common Core Content Standards:

Domain: Geometry 7.G

Draw, construct, and describe geometrical figures and describe the relationships between them.

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.
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.
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.

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

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.
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.
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.

Standards for Mathematical Practice:

3. Construct Viable Arguments and Critique the Reasoning of Others
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

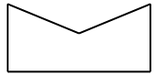
ELD Standards to Support Unit:

[Add text]

SEL Competencies:

[Add text]

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
• What are the criteria for 3 side lengths to form a triangle? • What is an example of a situation where you could be given three pieces of information about a triangle and have more than one possible drawing that fit the given criteria? • What is π (pi)? Why is it an important number and how is it used? • How do you subdivide a composite figure to find its area? • What is the relationship between the ratios of side lengths and areas of geometric figures in scale drawings? • What is the relationship between area, surface area, and volume?	Assessments/Tasks aligned to learning experiences: 1) http://map.mathshell.org/materials/lessons.php?taskid=581&subpage=concept 4) http://www.illustrativemathematics.org/illustrations/1553 http://www.illustrativemathematics.org/illustrations/34 6) http://www.illustrativemathematics.org/illustrations/107 http://map.mathshell.org/materials/lessons.php?taskid=494&subpage=problem 8) http://www.illustrativemathemati	Students will be able to… 1) Draw triangles (freehand, with ruler and protractor and with technology) given three out of six possible criteria, for example two side lengths and an angle. Determine if the triangle exists, is unique, or determines more than one triangle. 2) Write and solve equations for unknown angles in figures involving supplementary, complementary, vertical and adjacent angles.* 3) Explore the relationship between the circumference and diameter of circles to discover π. 4) Build on understanding of circumference, diameter and π to generate formulas for circumference and area of circles and use them to solve mathematical and real-world problems. 5) Find the area of triangles, quadrilaterals, and other polygons, including composite figures composed of triangles, quadrilaterals, and polygons, in the context of real-world and mathematical problems. 6) Investigate relationships between side lengths and areas in scale drawings of geometric figures, and reproduce a scale drawing at a different scale. 7) Identify the two-dimensional figure that results from slicing a plane section of a three-dimensional figure. 8) Solve real-world and mathematical problems involving the surface area and volume of cubes and right prisms, and explore the relationship between surface area and volume.	• Informal introduction to triangle inequality theorem. http://www.mathopenref.com/triangleinequality.html • Informal introduction to triangle congruence theorems: SSS, SSA, AAS, SAS, AAA. http://www.regentsprep.org/Regents/math/geometry/GP4/BegTriPrf.htm *Use circles to explore supplementary, complementary, vertical and adjacent angles. http://www.mathsisfun.com/geometry/circle-theorems.html Exploration of π https://www.teachervision.com/math/lesson-plan/3430.html Use students' previous knowledge to explore and generate formulas for circumference of a circle and area of a circle. http://learnzillion.com/lessons/818-find-the-circumference-	GeoGebra	*CA Mathematics Framework Gr. 7* p. 33 – 38 http://www.cde.ca.gov/ci/ma/cf/documents/aug2013gradeseven.pdf North Carolina 7th Grade Math Unpacked Content: p. 25 – 33 http://www.ncpublicschools.org/docs/acre/standards/common-core-tools/unpacking/math/7th.pdf *7th Grade Common Core State Standards Flip Book* http://katm.org/wp/wp-content/uploads/flipbooks/7th_FlipBookEdited21.pdf

Essential Questions	Suggested Assessments for Learning	Sequence of Learning Experiences	Strategies for Teaching and Learning	Differentiation (EL/SpEd/GATE)	Resources
	cs.org/illustrations/266		of-a-circle http://learnzillion.com/lessons/819-find-the-area-of-a-circle Compare the use of addition and subtraction when finding the area of composite figures, for example:  http://cc.betterlesson.com/lesson/441863/area-of-composite-shapes-using-a-grid		