Alternative Accelerated CC Math 6/7 – UNIT 2
Developing Understanding and Application of Proportional Relationships and
The Number System: Operations to Add, Subtract, Multiply, and Divide Rational Numbers

Critical Area: Students will expand upon their understanding of ratios and develop an understanding of proportionality. Students will use concepts of ratios, rates, and proportionality to solve problems. 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.

Students develop a unified understanding of recognizing different representations of rational numbers. 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.

Rationale: 6th grade ratio and proportional relationship standards are the foundational support for the 7th grade standards. Additionally, students need to be familiar with fractions prior to working on 7th grade ratio and proportional relationship standards since students will be working with ratios specified by rational numbers, such as ¾ cups of flour for every ½ stick of butter. Students will identify unit rates in representations of proportional relationships and work with equations in two variables to represent and analyze proportional relationships. Students will use ratios in geometry and algebra when they study similar figures and slopes of lines, and even later when they study sine, cosine, and other trigonometric ratios in high school. 6th grade number system standards are the foundational support for the seventh grade standards. Students will extend their understanding of operations with rational numbers and begin to rely increasingly on the properties of operations to build the necessary bridges from their previous understandings.
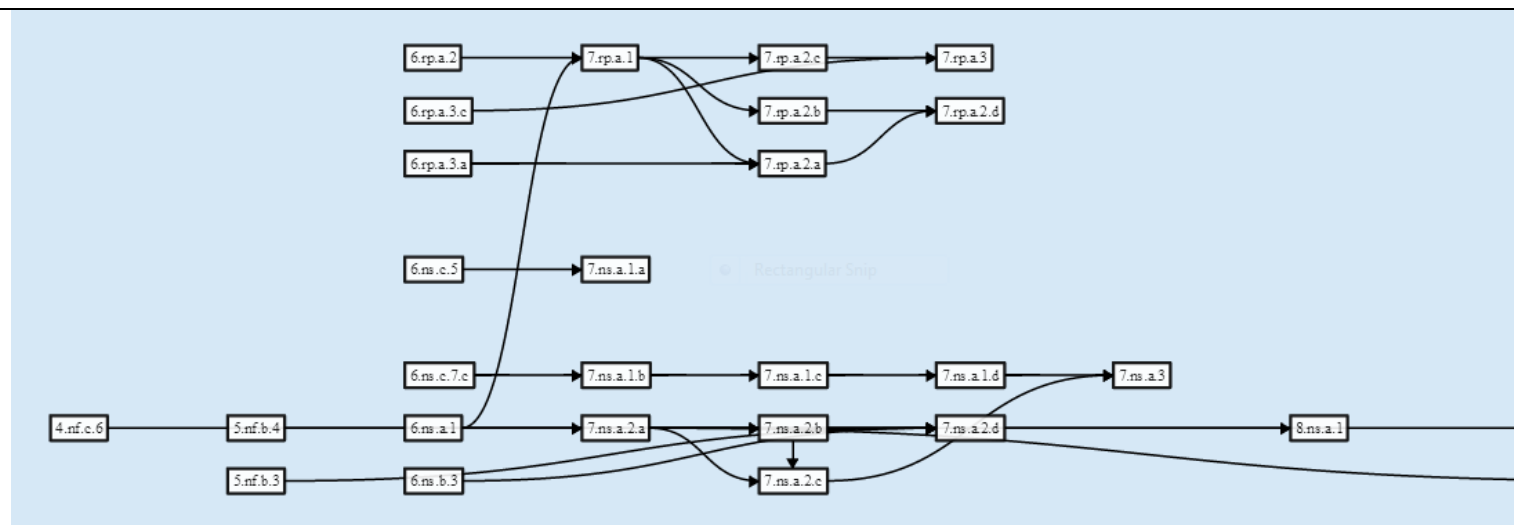
CLUSTERS	COMMON CORE STATE STANDARDS

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

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

Solve real-world and mathematical problems involving area, surface area, and volume. **6.G.1 is foundational to 7.G.1. 7.RP.1 and 7.RP.2 are foundational to 7.G.1** **Draw, construct, and describe**	**6.G.1** Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. **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.

geometrical figures and describe the relationships between them.	
STANDARDS ADDRESSED IN UNIT 2	PREREQUISITE COMMON CORE STATE STANDARDS
7.RP.1	6.RP.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."
7.RP.2 a – d	6.RP.2

6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. |
| 7.RP.3 | 6.RP.3

7.RP.2 |
| 7.NS.1 a | 6.NS.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.NS.6.a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite. |
| 7.NS.1.b | 6.NS.6a

6.NS.7.c Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars. |
| 7.NS.1.c | 7.NS.1.b

6.NS.7.c |
| 7.NS.1.d | 5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For |

	example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.) 7.NS.1.b 7.NS.1.C
7.NS.2.a	7.NS.1.d
7.NS.2.b	7.NS.1.d
7.NS.2.c	5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.) b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. 6.NS.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?
7.NS.2.d	5.NF.3 Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?
7.NS.3	6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. 4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies

	including rounding.
	7.NS.1.d
	7.NS.2.c
	7.NS.2.d
6.G.1	4.MD.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor. 5.NF.4
7.G.1	6.G.1 7.RP.2
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.	6-7, Ratios and Proportional Relationships http://commoncoretools.files.wordpress.com/2012/02/ccss_progression_rp_67_2011_11_12_corrected.pdf CDE Progress to Algebra continuum K-8 (P. Daro) - http://www.cde.ca.gov/be/cc/cd/documents/updateditem12catt3.doc 6-7, Number Systems http://commoncoretools.me/wp-content/uploads/2013/07/ccssm_progression_NS+Number_2013-07-09.pdf

6.rp.a.2 → 7.rp.a.1 → 7.rp.a.2.c → 7.rp.a.3
6.rp.a.3.c → 7.rp.a.2.b → 7.rp.a.2.d
6.rp.a.3.a → 7.rp.a.2.a
6.ns.c.5 → 7.ns.a.1.a
6.ns.c.7.c → 7.ns.a.1.b → 7.ns.a.1.c → 7.ns.a.1.d → 7.ns.a.3
4.nf.c.6 → 5.nf.b.4 → 6.ns.a.1 → 7.ns.a.2.a → 7.ns.a.2.b → 7.ns.a.2.d → 8.ns.a.1
5.nf.b.3 → 6.ns.b.3 → 7.ns.a.2.c

http://www.curtiscenter.math.ucla.edu/MapApp/prg_map.html

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) Computation with positive and negative numbers is often necessary to determine relationships between quantities. Models, diagrams, manipulatives, number lines, and patterns are useful in developing and remembering algorithms for computing with positive and negative numbers. Properties of real numbers hold for all rational numbers. Positive and negative numbers are often used to solve problems in everyday life.	• 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? • When should we use additive inverse or multiplicative inverse? • How do we use a number line to show addition and subtraction of rational numbers? • What is the result of (what happens when) adding a number and its inverse or	Ratio Proportion / proportional relationship Equivalency / equivalence Rate Unit rate Constant Equations Rational Numbers Opposite Additive Inverse Multiplicative Inverse Absolute Value Repeating Decimal Terminating Decimal Zero Pair Integers Commutative Property of Addition or Multiplication Associative Property of Addition or

	multiplying a number and its inverse?	Multiplication

- multiplying a number and its inverse?
- How is the identity related to its inverses?
- What is the relationship between addition and subtraction?
- What is the relationship between multiplication and division?
- How are the operations applied in real-world contexts?
- How do the properties of operation help us compute with rational numbers?
- Is it always true that multiplying a negative factor by a positive factor always produces a negative product?

Multiplication
Distributive Property
Divisor
Quotient
Factor
Product

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
National Library of Virtual Manipulatives - http://nlvm.usu.edu/en/nav/grade_g_3.html NCTM Activities – http://www.nctm.org/resources/content.aspx?id=32702 TI – http://education.ti.com/calculators/timathnspired/US/Activities/Subject?sa=1008 Geometer's Sketchpad - http://dynamicgeometry.com/ **NLVM** http://nlvm.usu.edu/ **NCTM Illuminations activities** 7.NS Comparing Freezing Points http://www.illustrativemathematics.org/illustrations/314 7.NS Distances on the Number Line 2 http://www.illustrativemathematics.org/illustrations/310 7.NS Operations on the number line http://www.illustrativemathematics.org/illustrations/46 **California Draft Mathematics Framework:** http://www.cde.ca.gov/be/cc/cd/draftmathfwchapters.asp.	• 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 • Number line model for operation with integers • Use of chips model (positive/negative numbers) for creating 0-pairs. • Use a foldable for integer rules. • Show that $\|a+b\| \neq \|a\| + \|b\|$	SBAC - http://www.smarterbalanced.org/ 7 RP 3 - Item #'s 42933, 42961 7G1 - Item # 43057 Marzano Proficiency Scales - http://www.itembank.marzanoresearch.com/search_details.aspx PARCC - http://parcconline.org/samples/mathematics/grade-7-speed http://parcconline.org/samples/mathematics/grade-6-slider-ruler SBAC - http://www.smarterbalanced.org/ Item #'s Items: 2959, 43022, 43023, 43026, 43047, 43053 Marzano Proficiency Scales - http://www.itembank.marzanoresearch.com/search_details.aspx

Smarter Balanced Sample Item ID MAT.07.SR.1.000RP.A.290 MAT.07.SR.1.000RP.A.291 MAT.07.TE.1.000RP.A.294 MAT.07.SR.1.000RP.A.287 MAT.07.SR.1.000NS.B.163 MAT.07.SR.1.0000G.E.161 MAT.07.ER.000NS.A.293 MAT.07.PT.4.CCNTR.A.727		

OTRHER RESOURCES

http://www.arcademicskillbuilders.com/games/ratio-blaster/ratio-blaster.html

http://www.azed.gov/azcommoncore/files/2012/11/7th_flipbookedited21.pdf

http://schools.nyc.gov/NR/rdonlyres/41C0F04C-0BD6-491F-9BF0-16485EC080BE/0/NYCDOEG7MathProportionalReasoning_Final.pdf

LANGUAGE GOALS

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 <u>states</u> that…; the main points are…' *argues, In my opinion, the way to solve this problem is…; What is most important in this problem is…;*

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."*

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_____.

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)

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 _____.

PERFORMANCE TASKS

MATHEMATICS ASSESSMENT PROJECT
- Proportion and Non-proportion Situations http://map.mathshell.org/materials/lessons.php?taskid=483#task483
- Developing a Sense of Scale http://map.mathshell.org/materials/lessons.php?taskid=456#task456
- Drawing to Scale: Designing a Garden http://map.mathshell.org/materials/lessons.php?taskid=494#task494
- Increasing and Decreasing Quantities by a Percent http://map.mathshell.org/materials/lessons.php?taskid=210#task210

LAUSD CONCEPT LESSONS
- RATIOS AND PERCENT LESSON - http://www.lausd.net/lausd/offices/iss/Math/MS/RATIO_AND_PERCENTS.pdf
- SHRINKING AND ENLARGING - http://www.lausd.net/lausd/offices/iss/Math/MS/SHRINKING_AND_ENLARGING.pdf
- GAUGING GAS MILEAGE - http://www.lausd.net/lausd/offices/iss/Math/MS/GAUGING_GAS_MILEAGE.pdf

ILLUSTRATIVE MATHEMATICS
- 7 RP, 7 G1 – SAND UNDER THE SWING SET - http://illustrativemathematics.org/illustrations/266
- 7 RP 1 - MOLLY'S RUN - http://illustrativemathematics.org/illustrations/828
    - COOKING WITH THE WHOLE CUP - http://illustrativemathematics.org/illustrations/470
    - TRACK PRACTICE - http://illustrativemathematics.org/illustrations/82
- 7 RP 2 - ART CLASS, VARIATIONS 1&2 - http://illustrativemathematics.org/illustrations/100 ; http://illustrativemathematics.org/illustrations/101
    - BUYING COFFEE - http://illustrativemathematics.org/illustrations/104
    - MUSIC COMPANIES, VARIATIONS 1 - http://illustrativemathematics.org/illustrations/95
    - ROBOT RACES - http://illustrativemathematics.org/illustrations/181
    - SORE THROATS – VARIATION 1 - http://illustrativemathematics.org/illustrations/180
- 7 RP 3 - MEASURING AREA OF CIRCLE - http://illustrativemathematics.org/illustrations/765
- 7 G 1 - FLOOR PLAN - http://illustrativemathematics.org/illustrations/107

INSIDE MATHEMATICS
- 7 RP 1, 7RP 3 - MIXING PAINT - http://insidemathematics.org/common-core-math-tasks/7th-grade/7-2003%20Mixing%20Paints.pdf
    - CEREAL – http://insidemathematics.org/common-core-math-tasks/7th-grade/7-2004%20Cereal.pdf
    - LAWN MOWING - http://insidemathematics.org/common-core-math-tasks/7th-grade/7-2005%20Lawn%20Mowing.pdf
    - MIXING PAINTS - http://insidemathematics.org/common-core-math-tasks/7th-grade/7-2003%20Mixing%20Paints.pdf
    - PHOTOGRAPHS - http://insidemathematics.org/common-core-math-tasks/7th-grade/7-2006%20Photographs.pdf
- 7 RP 2 - CAT FOOD - http://insidemathematics.org/common-core-math-tasks/7th-grade/7-2009%20Cat%20Food.pdf

- MOVIN' N GROOVIN - http://insidemathematics.org/problems-of-the-month/pom-movinngroovin.pdf
- 7 RP 3 - CIRCULAR REASONING (LEVEL D) - http://insidemathematics.org/problems-of-the-month/pom-circularreasoning.pdf
- FIRST RATE (LEVEL D) - http://insidemathematics.org/problems-of-the-month/pom-firstrate.pdf
- PROBLEMS OF THE MONTH

NCTM ILLUMINATIONS
- 7 PR 2b GOLDEN RATIO - http://illuminations.nctm.org/LessonDetail.aspx?ID=L510
- 7 RP 1 WHAT'S YOUR RATE - http://illuminations.nctm.org/LessonDetail.aspx?ID=L511
- 7 RP 2 BAGEL ALGEBRA - http://illuminations.nctm.org/LessonDetail.aspx?id=L662
- 7 RP 1, 7 RP 2 DISCOVERING GALLON MAN - http://illuminations.nctm.org/LessonDetail.aspx?ID=L513
- 7 G 1 OFF THE SCALE - http://illuminations.nctm.org/LessonDetail.aspx?ID=L516
- 7 RP 2d CONSTANT DIMENSIONS - http://illuminations.nctm.org/LessonDetail.aspx?id=L572

UTAH
- RATIOS, RATES, AND PROPORTIONS – http://www.uen.org/Lessonplan/preview.cgi?LPid=23491

MATHEMATICS ASSESSMENTS PROJECT

7. NS Using Positive and Negative Numbers in Context http://map.mathshell.org/materials/lessons.php?taskid=453#task453

7NS Increasing and Decreasing Quantities by a Percent http://map.mathshell.org/materials/lessons.php?taskid=210#task210

ILLUSTRATIVE MATHEMATICS

7.NS Comparing Freezing Points

http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/314/original/illustrative_mathematics_314.pdf?1349547239

7.NS Distances on the Number Line 2

http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/310/original/illustrative_mathematics_310.pdf?1343857038

7.NS Operations on the number line

http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/046/original/illustrative_mathematics_46.pdf?1343857040

DIFFERENTIATION📖		
FRONT LOADING	ACCELERATION	INTERVENTION
• Skills of arithmetic for fractions, decimals and percents • Understanding of coordinate plane and graphing of linear functions • Generate and solve linear equations	• How is rate of change related to the slope? • Multiple discounts • Limits of change • Rates of Change for Acceleration and Deceleration • Show students on a number line that the absolute	• ALEKS –www.aleks.com • Small group re-teach • Using kinesthetic activities and manipulatives • Use manipulative to reteach integer

- Understand solving formulas for different variables ($t=pn;\ y=kx;\ i=prt$) - 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.	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.	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.

References:

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2. McCallum, W., Zimba, J., Daro, P. (2011, December 26 Draft). *Progressions for the Common Core State Standards in Mathematics*. Cathy Kessel (Ed.). Retrieved from http://ime.math.arizona.edu/progressions/#committee.
3. Engage NY. (2012). New York Common Core Mathematics Curriculum. Retrieved from http://engageny.org/sites/default/files/resource/attachments/a-story-of-ratios-a-curriculum-overview-for-grades-6-8.pdf.
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6. Partnership for Assessment of Readiness for College and Career. (2012). PARCC Assessments. Retrieved from http://www.parcconline.org/parcc-assessment.
7. Institute for Mathematics & Education (2013). Illustrative Mathematics. Retrieved from http://www.illustrativemathematics.org/
8. California Department of Education. (2013). Draft Mathematics Framework Chapters. Retrieved from http://www.cde.ca.gov/be/cc/cd/draftmathfwchapters.asp.
9. National Council of Teachers of Mathematics (NCTM) Illuminations. (2013). Retrieved from http://illuminations.nctm.org/Weblinks.aspx.
10. The University of Arizona. (2011-12). Progressions Documents for the Common Core Math Standards. Retrieved from http://ime.math.arizona.edu/progressions.

11. National Governors Association Center for Best Practices, Council of Chief State School Officers. (2010). *Common Core State Standards (Mathematics)*. Washington D.C.: National Governors Association Center for Best Practices, Council of Chief State School Officers.
12. McCallum, W., Zimba, J., Daro, P. (2011, December 26 Draft). *Progressions for the Common Core State Standards in Mathematics*. Cathy Kessel (Ed.). Retrieved from http://ime.math.arizona.edu/progressions/#committee.
13. Engage NY. (2012). New York Common Core Mathematics Curriculum. Retrieved from http://engageny.org/sites/default/files/resource/attachments/a-story-of-ratios-a-curriculum-overview-for-grades-6-8.pdf.
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