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| **ESTABLISHED GOALS:** |
| **Major (m) Idaho Core cluster for the Unit:** * 6.NS Compute fluently with multi-digit numbers and find common factors and multiples.

**6.RP Understand ratio concepts and use ratio reasoning to solve problems.*** **6.RP.1. Understand the concept of ratio and use ratio language to describe a ratio relationship between two quantities.**
* **6.RP.3a. 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.**
* 6.NS.4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.
* **6.EE.9.Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.**

**Not previously in Idaho State Standards for 6th grade.** | **Supporting and Additional (s/a) Idaho Core Standards for the Unit:** | **Bridging Idaho Core Standards from Previous Grade(s):*** 5.NF Use equivalent fractions as a strategy to add and subtract fractions.
* 5.NF Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
* 5.G Graph points on the coordinate plane to solve real world and mathematical problems.
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| **TRANSFER*****Students will be able to independently use their learning to persevere in solving a range of problems involving ratios and proportions.*** |
| **MEANING** |
| **Structure of Math / Overarching Understanding(s):**1. Use reasoning with ratios and rates to solve real-world and mathematical problems.

***Teacher Note:**** + *Relationships between fractions, decimals, and percents are developed in this unit. Students learn how these forms are related to one another and make decisions about when to use each form.*
	+ *Understanding and applying the relationships between fractions, decimals, and percents, students will solve real-world problems such as unit rate, measurement conversions, constant rate, and comparison of quantities.*
	+ *Fractions are viewed as rates, ratios, or parts of a proportion to provide underpinnings needed in seventh grade for work with proportional reasoning.*
 | **Understandings:****Students will understand that:*** Reasoning with ratios and rates help solve real-world and mathematical problems.
* Using tables of equivalent ratios, tape diagrams, double number line diagrams, or equations develop ratio and proportional reasoning.
 | **Essential Questions:****Students will keep considering:*** What is the relationship between a ratio and a rate?
* How does ratio and proportional reasoning help determine an unknown quantity?
* How does calculating a unit rate help you make decisions?
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| **ACQUISITION OF KNOWLEDGE AND SKILL****STUDENT-FRIENDLY LEARNING TARGET STATEMENTS** |
| **Learning Targets****6.RP.1** Understand the concept of ratio and use ratio language to describe a ratio relationship between two quantities. | MP.2 Reason abstractly and quantitatively.MP.4 Model with mathematics.MP.6 Attend to precision.MP.7 Look for and make use of structure. * Compare and contrast the properties of ratios and fractions.
	+ I understand that ratios compare part to part and fractions do not.
* Create a variety of models to show ratios in real-world settings.
	+ I can model real world ratios using appropriate symbols.
* Create examples of ratios and explain their meaning.
	+ I can create examples of ratios in context.
	+ I can explain the meaning and context of any ratio.
* Apply the use of ratios to real-world situations.
	+ I can translate a ratio into a real world problem.
* Use ratio language to describe a comparison of two quantities which can be written as *a* to *b*, *a/b*, or *a:b*.
	+ I can describe ratios and their symbols using correct vocabulary.
	+ I can select the correct symbols to express ratios three ways.
	+ I can compare two quantities using a ratio.
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| **6.RP.3.a** Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. | MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively.MP.3 Construct viable arguments and critique the reasoning of others.MP.4 Model with mathematics.MP.5 Use appropriate tools strategically.MP.6 Attend to precision.MP.7 Look for and make use of structure.* + Create table of equivalent ratios using real-world examples.
	+ I understand that all ratios in a ratio table are equivalent.
	+ I understand that every ratio has an infinite number of equivalent ratios.
	+ I can create a ratio table using real-world examples.
* Find missing values within a ratio table.
	+ I can apply previous ratio knowledge to find missing values in a table.
* Compare ratios using tables.
	+ I can expand ratio tables to compare ratios.
	+ I can describe the multiplicative value of ratios.
* Plot pairs of values from a ratio table on a coordinate plane.
	+ I can plot pairs on a coordinate plane from a ratio table.
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| **6.NS.4.** Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. | MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively.MP.3 Construct viable arguments and critique the reasoning of others.MP.5 Use appropriate tools strategically.MP.6 Attend to precision.MP.7 Look for and make use of structure.MP.8 Look for and express regularity in repeated reasoning.* Distinguish prime from composite numbers.
	+ I can classify prime and composite numbers.
* Apply divisibility rules.
	+ I can make and defend a conjecture involving divisibility rules.
	+ I can apply divisibility rules.
* Decompose (break down) numbers into factors.
	+ I can use divisibility rules to decompose numbers into factors.
	+ I can represent a number as the product of its factors.
	+ I can find the prime factorization of a number using various models.
* Demonstrate the use of prime factorization to find common factors and multiples.
	+ I can apply the concept of prime factorization to find common factors and multiples.
* Find the greatest common factor of two whole numbers less than or equal to 100.
	+ I can apply various strategies to find the greatest common factor of two whole numbers.
* Find the least common multiple of two whole numbers less than or equal to 12.
	+ I can apply various strategies to find the least common multiple of two whole numbers.
* Apply the distributive property to express any sum as a multiple of a GCF and the sum of two whole numbers.
	+ I understand and can use the distributive property.
	+ I can identify the greatest common factor using the distributive property.
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| 6.EE.9.Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time. | MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively.MP.3 Construct viable arguments and critique the reasoning of others.MP.4 Model with mathematics.MP.5 Use appropriate tools strategically.MP.6 Attend to precision.MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.* Use variables to represent two quantities in a real world problem that change in relationship to one another.
	+ I can identify to unknowns in a story problem.
	+ I can represent the unknowns using variables.
	+ I can use words to describe the relationships between the two variables.
* Use multiple representations to show relationships between two quantities that change in relation to one another.
	+ I can use a variety of visual representations to show the relationship between to quantities that change in relation to one another.
		- For example: T-charts, input/output tables, pictures, or function machine (input/output machine)
* Write an equation to express one quantity in terms of the other quantity (dependent/ independent variable).
	+ I can explain what makes an independent variable.
	+ I can explain what makes a dependent variable.
	+ I can identify two unknowns as independent and dependent variables.
	+ I can represent a pair of independent and dependent variables using an equation.
* Analyze the relationship between the dependent and independent variables using graphs and tables.
	+ I can identify a table given a corresponding equation.
	+ I can write an equation given a table.
	+ I can use a table to represent the relationship between dependent and independent variables.
	+ I can use a table to plot a line on a graph.
	+ I can identify a graph given a corresponding equation.
	+ I can write an equation given a graph.
	+ I can use a graph to represent the relationship between dependent and independent variables.
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| **ASSESSMENT EVIDENCE:****Assessment Tasks that Provide Evidence for Claims including DOK**  | * **Claim #1/DOK 1, 2, 3, 4 (circle one):**

Bananas and OrangesBen’s Game WorldCafeteria FloorGas MileageJeremy’s BoardsMovie TicketsSandwiches |
| * **Claim #2/DOK 1, 2, 3, 4 (circle one):**

CerealGrandmas Sugar CookiesMarvin’s TilesPiano KeysPizza Party |
| * **Claim #3/DOK 1, 2, 3, 4 (circle one):**

Blue JeansBoxed orangesGirls vs boysJollyranchersMixed PaintPhoto CopyString Bean and SlimTown Populations |
| * **Claim #4/DOK 1, 2, 3, 4 (circle one):**

Big Bucks Skate ParkVideo for Skate ParkGrading Rubric for Big Bucks Skate ParkGoing MarblesWaverly Waves |
| **Materials/Resources** | [**http://commoncoretools.files.wordpress.com/2012/02/ccss\_progression\_rp\_67\_2011\_11\_12\_corrected.pdf**](http://commoncoretools.files.wordpress.com/2012/02/ccss_progression_rp_67_2011_11_12_corrected.pdf)[**http://schools.nyc.gov/NR/rdonlyres/A9F735CB-47E4-40F8-884F-EA54D0AB5705/0/NYCDOEG6MathRatios\_Final.pdf**](http://schools.nyc.gov/NR/rdonlyres/A9F735CB-47E4-40F8-884F-EA54D0AB5705/0/NYCDOEG6MathRatios_Final.pdf)[**http://illustrativemathematics.org/standards/k8**](http://illustrativemathematics.org/standards/k8)**Developing Essential Understanding of Ratios, Proportions & Proportional Reasoning Grades 6-8 NCTM** |
| **Sample Learning Plan****This is not intended to be a scope and sequence** |
| **Exploring and Making Connections****(Conceptual Understanding)** | **Practice****(Procedural Fluency)** | **Assessments****(Application)** |
| **6.RP.1** |
| **Focus Task (to begin unit)**: Tina is creating trail mix for her Girl Scouts’ hike next week. The recipe calls for the following ingredients:4 cups nuts2 cups M&Ms1 cup raisinsHow many ratios can you find?Teachers be sure to compare and discuss some or all of the following:1. M&Ms to nuts
2. Nuts to M&Ms
3. Nuts to raisins
4. Raisins to nuts
5. Raisins to M&Ms
6. M&Ms to raisins
7. Raisins to total mix
8. Total mix to raisins
9. Nuts to total mix
10. Total mix to nuts
11. M&Ms to total mix
12. Total mix to M&Ms
13. Nuts to non-nuts
14. Etc.
 | **Sample learning tasks:****Teacher note: These tasks may need refinement based on the needs of your students. Not all tasks have been vetted.**Part to Part RatiosBarnyard Animals (Tasks)Barnyard Animals (PowerPoint)Lemonade StandMaterial Resources:Prentice Hall Chapter 6 – 1Story Problem Workbook page 48 | **Formative assessment by teacher using I Can statement checklist** |
|  **6.RP.3a, 6.NS.4** |