

**THEME: Ratios and Proportional Relationships****RATIOS AND PROPORTIONAL RELATIONSHIPS:**

Understand ratio concepts and use ratio reasoning to solve problems. (unit 4)

6.RP.A.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

6.RP.A.2. Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.

6.RP.A.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. b. Solve unit rate problems including those involving unit pricing and constant speed.

c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

THE NUMBER SYSTEM (NS)

Apply and extend previous understandings of numbers to the system of rational numbers. (unit 4)

6.NS.C.8. Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane.

EQUATIONS AND EXPRESSIONS (EE)

Represent and analyze quantitative relationships between dependent and independent variables. (unit 4)

6.EE.C.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.

GEOMETRY (G)

Solve real-world and mathematical problems involving area, surface area, and volume. (unit 5)

6.G.A.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

6.G.A.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l * w * h$ and $V = b * h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

6.G.A.3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

6.G.A.4. Represent 3-dimensional figures using nets made up of rectangles & triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world & mathematical problems.

Commentary**Ratios and Proportional Relationships**

Sixth graders are introduced to ratios, a relationship or comparison of two quantities or measure. Students represent ratios in various forms and compare types of ratios. At this level, they use reasoning about multiplication and division to solve ratio and rate problems about quantities. Students learn how and where ratios and rates are used in the real world.

Cluster A

The focus for this cluster is the study of ratio concepts and the use of proportional reasoning to solve problems. Students learn how ratios and rates are used to compare two quantities or values and how to model and represent them. Sixth graders find out how ratios are used in the real-world situations and discover solutions to percent problems using ratios tables, tape diagrams, and double number lines. Students also convert between standard units of measure.

Standards for Mathematical Practice**SFMP 1. Make sense of problems and persevere in solving them.**

Sixth graders interpret and solve ratio problems.

SFMP 2. Use quantitative reasoning.

Students solve problems by analyzing and comparing ratios and unit rates in tables, equations, and graphs.

SFMP 4. Model with Mathematics.

Students model real-life situations with mathematics and model ratio problem situations symbolically.

SFMP 6. Attend to precision.

Students communicate precisely with others and use clear mathematical language when describing a ratio relationship between two quantities.

SFMP 7. Look for and make use of structure. SFMP

Sixth graders begin to make connections between covariance, rates, and representations showing the relationships between quantities.

Ratios and Proportional Relationships (RP)**6.RP.A.1.**

In this standard, students learn to compare two quantities or measures such as 6:1 or 10:2. These comparisons are called ratios. Students discover that ratios can be written and described in different ways. For instance, 6:1 use colon to separate values. Standard 1 focuses on understanding the concept of ratio, however, students should use ratio language to describe real-world experiences and use their understanding of the concepts of a ratio, however, students use ratio language to describe real world experiences and see their understanding for decision making.

6.RP.A.2.

This standard focuses student learning on the concepts of a unit as a special kind of ratio. Students compare different units of measure such as the amount of money earned an hour worked by babysitting and calculate unit rare by setting up ratios and simplifying the. Students understand a situation in ratio form and wore the unit that describes the situation using appropriate rate language with words such as proper and symbols such as / to compare different units or measures.

6.RP.A.3.

In these standards, the students use reasoning about multiplication and division to solve a variety of ratio and rate problems about quantities. They make tables of equivalent ratios relating with whole-number, measurements, and find missing values in the table, and plot the pairs of values on the coordinate plane. They use the tables to compare ratios and solve unit rate and constant speed problems. Problems involving finding the whole given a part and the percent, such as 20% of a quantity means $\frac{20}{100}$, are also a focus. For these standards, students can use equivalent ratios tables, tape diagrams, double number lines, or equations. Students connect ratios and fractions.

The Number System (NS)**6.NS.C.8**

The focal point for this Standard 8 is solving problems by graphing points in all four quadrants of the coordinate plane. Students learn that the distance from point on a coordinate plane to an axis is an absolute value. The coordinate plane is used to represent real-world scenarios.

Expressions and Equations**6.EE.C.9**

Standard accents using variables to represent two quantities in real-world scenarios. Students recognize that a change in the independent variable creates a change in the dependent variable, such as the following: As x changes, y also changes. Emphasis is place on writing an equation to express the quantity in terms of the dependent and independent variables. Students also identify relationships between tables, graphs, and relate these back to the equation.

Geometry (G)**6.G.A.1.**

This cluster focuses on area, volume, and surface area. Students use knowledge and skills to solve real-world and mathematical problems and apply the concepts by manipulating nets, cubes, and other real-world and mathematical problems.

6.G.A.2

With this standard students build on their background knowledge if volume of the right rectangular prisms with whole number dimensions by using manipulatives to determine the volume of a right rectangular prism with fractional side lengths.

6.G.A.3.

Students plot points in all four quadrats of the coordinate plane. Coordinates are the vertices of polygons. Students connect the points and name the polygons. By giving students coordinates of vertices of the polygon that have the same first or same second coordinate (examples: (3,4) and (3,9) or (7,6) and (15, 6), students are challenged to find a technique to determine the length of a side of the polygon (subtract same coordinates). Students then apply this knowledge to solve real-world and mathematical problems.

INSTRUCTIONAL ALIGNMENT								
<u>DIGITAL / PRINT TEXT</u>	<u>PERFORMANCE TASKS</u>	<u>DIFFERENTIATION</u>						
<p>Essential Questions:</p> <p>Text: SpringBoard Mathematics Course I</p> <p>Unit 4: Ratios (Sections: Getting Ready 17.1 – 21.3)</p> <ul style="list-style-type: none"> Why is it important to understand calculations with ratios, rates, and percents? Why are proportional relationships important in mathematics? <p>Unit 5 Geometric Concepts (Sections: Getting Ready 22.1 – 24.2)</p> <ul style="list-style-type: none"> In what ways are geometric figures used in real life? Why is it important to understand the characteristics of two- and three-dimensional figures? 	<p>Unit 4</p> <p>EA1: Ratios and Rates, A Summer Job (p. 245)</p> <ul style="list-style-type: none"> Solve problems involving ratios and proportional relationships Write equivalent ratios <p>EA2: Understanding and Applying Percents, An Ice Cream Treat (p. 273)</p> <ul style="list-style-type: none"> Find the percents of a quantity as a rate per 100 Represent ratios and percents with fractions and decimals Use equivalent percents, fractions, and decimals to show parts of the same whole Represent percents with concrete models, fractions, and decimals <p>Unit 5</p> <p>EA1: Geometric Concepts, Astronomy Logo (p. 315)</p> <ul style="list-style-type: none"> Classify triangles and quadrilaterals Find a missing angle measure in a triangle or a quadrilateral Find the area of a composite figure Solve real-world problems involving the area of rectangles, parallelograms, trapezoids, and triangles 	<p>Source: SpringBoard Mathematics Course I</p> <p>Units 4-5: Differentiated Instruction Activities - Pages: 224; 227; 234; 236; 248; 251; 253; 262; 269; 278; 285; 299; 306; 307; 309</p> <p>Digital Resources: www.clevelandmetropolitanoh.springboard.org Online Book, Additional Practice Pages, Common Core Correlation, Standards for Mathematical Practices, Mini-Lessons, Additional Getting Ready Practice</p>						
<p>PREREQUISITE SKILLS</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 33%;">Unit 4</td> <td style="text-align: center; width: 33%;">Unit 5*</td> <td style="text-align: center; width: 33%;"></td> </tr> <tr> <td style="text-align: center;"> *Fractions and Decimals *Number Systems </td> <td style="text-align: center;"> *Equations *Unit Measures *Coordinate Plane *Number lines. </td> <td style="text-align: center;"> Two-dimensional figures. *Perimeter </td> </tr> </table>			Unit 4	Unit 5*		*Fractions and Decimals *Number Systems	*Equations *Unit Measures *Coordinate Plane *Number lines.	Two-dimensional figures. *Perimeter
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<p>VOCABULARY benchmark, ratio, equivalent ratios, rate, dimensional analysis, conversion factor, unit rate, unit price, proportion, average composite, theorem, equiangular, polygon, quadrilateral, consecutive angles, perimeter, area, altitude</p>								
ASSESSMENTS	Springboard Digital Online Assessment for Unit 4 and Unit 5							
ADDITIONAL RESOURCES	Materials: Three number cubes per group; one set of segment models per group; protractors, rulers; scissors; graph paper; unit cubes; tape							
ESL								
NOTES:								

Addressing Student Misconceptions and Common Errors**6.RP.A.1.**

Some sixth graders may confuse the order of the quantities as when to write the ratio of boys to girls in the sentence, “*There are 14 girls and 18 boys in our math class.*” Instead of writing 18:14, Other students may not recognize the difference between a part-to-part and a part-to-whole ratio as, “*There are 14 compared to 18 boys in class (14:18 part-to-part); however 14 of the 32 students in our class are girls (14:32 part-to-whole)*” To address these common misconceptions, ask students to label the quantities they are comparing such as 14 girls/18 boys.

6.RP.A.2.

Students often confuse the terms ratio, rate, and unit rate. Try using paper foldable with vocabulary definitions to help students with these confusing terms. To make the foldable, divide an $8\frac{1}{2}$ x11 inch sheet of blank paper in half horizontally. Then fold it into thirds as if a letter is being folded to fit an envelope. Unfold and write the term on each of the sections. On the inside of the foldable, write the definitions that match each term. Students may want to cut on the vertical folded lines to flip up each section to practice the definitions.

6.RP.A.3.

Some sixth graders misunderstand and believe that a percent is always a natural number less than or equal to 100. To help this misconception, provide examples of percent amounts that are greater than 100% and percent amounts that are less than 1%. Try using a percent when for developing this understanding.

6.NS.C.8.

Students may have procedural graphing misconceptions and may not plot points in spaces rather than intersections. Some sixth graders count intervals on lines rather than x or y axis. Provide hands-on experiences for these learners. Have students plot real objects on a coordinate grid while you observe. Then, have them find the distance between the objects and explain how they found it.

6.EE.C.9.

Some students may confuse what a graph represents. To help, have students explain in their own words what the graph means.

6.G.A.1.

Students who have difficulty performing more than two steps in solving problems may have difficulty finding the area of the composite figures even after decomposing them. These students benefit from writing the area of the joined shapes directly in the composite figures to help keep track of the parts. Students can also code the decomposition.

6.G.A.2

Students may understand the relationship between volume as the filling of a space with cubes and the volume formulas but, due to weak fractional computations skills, may still produce incorrect responses. Provide additional opportunities for these students to improve their computational fluency. Technology offers many solutions for improving computational fluency.

6.G.A.3.

Students who confuse knowing which coordinates to subtract may have memorized an algorithm for finding the distance (length of side) without understanding how to use the coordinates on the plane. To address this, provide additional experiences drawing polygons and explaining (orally and in writing) how to find the length if a side with the same first (and then same second) coordinates. Communication helps students clarify their understanding.

To prevent the misconception that coordinates only appear in the first quadrant, it is important to use coordinate points in all four quadrants. This means that students will need to have previous experience with negative integers so they can find points such as (-3, -2).

GRADE 6
Quarter 3

MATH INSTRUCTIONAL ALIGNMENT

