

**Richmond Public Schools**  
Curriculum Framework  
*Grade 6*

<b>Strand: Number and Number Sense</b>	
6.1 The student will represent relationships between quantities using ratios, and will use appropriate notations, such as $ab$ , $a$ to $b$ , and $a:b$ .	
<b>Suggested Pacing</b>	
Second Nine Weeks- 3 Instructional Days	
<b>Related Standards</b>	
<p><b>6.2</b> The student will a) represent and determine equivalencies among fractions, mixed numbers, decimals, and percents; and b) compare and order positive rational numbers.</p> <p><b>6.12</b> The student will a) represent a proportional relationship between two quantities, including those arising from practical situations; b) determine the unit rate of a proportional relationship and use it to find a missing value in a ratio table; c) determine whether a proportional relationship exists between two quantities; and d) make connections between and among representations of a proportional relationship between two quantities using verbal descriptions, ratio tables, and graphs.</p>	<p><b>7.2</b> The student will solve practical problems involving operations with rational numbers.</p> <p><b>7.3</b> The student will solve single-step and multistep practical problems, using proportional reasoning.</p> <p><b>7.10</b> The student will a) determine the slope, <math>m</math>, as rate of change in a proportional relationship between two quantities .</p> <p>8.4 The student will solve practical problems involving consumer applications.</p> <p>8.16 The student will a) recognize and describe the graph of a linear function with a slope that is positive, negative, or zero; b) identify the slope and <math>y</math>-intercept of a linear function, given a table of values, a graph, or an equation in <math>y = mx + b</math> form;</p>
<b>Essential Questions</b>	<b>Common Misconceptions</b>
<p>How can you use a ratio to compare two quantities?</p> <p>When comparing quantities, how can a ratio table help organize your thinking?</p>	<ul style="list-style-type: none"> <li>● When asked to write a ratio, students often write it in the order of the scenario instead of the order requested in the question.</li> </ul>

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	<ul style="list-style-type: none"> <li>● Students struggle with writing ratios in simplest form.</li> <li>● When asked to compare part to part of a set, students struggle with determining the other part of the data when the total of the set is given.</li> </ul>
<b>Understanding the Standard</b>	<b>Essential Knowledge and Skills</b>
<ul style="list-style-type: none"> <li>● A ratio is a comparison of any two quantities. A ratio is used to represent relationships within a quantity and between quantities. Ratios are used in practical situations when there is a need to compare quantities.</li> <li>● In the elementary grades, students are taught that fractions represent a part-to-whole relationship. However, fractions may also express a measurement, an operator (multiplication), a quotient, or a ratio. Examples of fraction interpretations include:             <ul style="list-style-type: none"> <li>○ Fractions as parts of wholes: <math>\frac{3}{4}</math> represents three parts of a whole, where the whole is separated into four equal parts.</li> <li>○ Fractions as measurement: the notation <math>\frac{3}{4}</math> can be interpreted as three one-fourths of a unit.</li> <li>○ Fractions as an operator: <math>\frac{3}{4}</math> represents a multiplier of three-fourths of the original magnitude.</li> <li>○ Fractions as a quotient: <math>\frac{3}{4}</math> represents the result obtained when three is divided by four.</li> <li>○ Fractions as a ratio: <math>\frac{3}{4}</math> is a comparison of 3 of a quantity to the whole quantity of 4.</li> </ul> </li> <li>● A ratio may be written using a colon (<math>a:b</math>), the word <i>to</i> (<math>a</math> to <math>b</math>), or fraction notation (<math>\frac{a}{b}</math>).</li> <li>● The order of the values in a ratio is directly related to the order in which the quantities are compared.             <ul style="list-style-type: none"> <li>○ Example: In a certain class, there is a ratio of 3 girls to 4 boys (3:4). Another comparison that could represent the relationship between these quantities is the ratio of 4 boys to 3 girls (4:3). Both ratios</li> </ul> </li> </ul>	<p><b>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</b></p> <ul style="list-style-type: none"> <li>● Represent a relationship between two quantities using ratios.</li> <li>● Represent a relationship in words that makes a comparison by using the notations <math>\frac{a}{b}</math>, <math>a:b</math>, and <math>a</math> to <math>b</math>.</li> <li>● Create a relationship in words for a given ratio expressed symbolically</li> </ul>

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give the same information about the number of girls and boys in the class, but they are distinct ratios. When you switch the order of comparison (girls to boys vs. boys to girls), there are different ratios being expressed.

- Fractions may be used when determining equivalent ratios.
  - Example: The ratio of girls to boys in a class is 3:4, this can be interpreted as:

number of girls =  
 $\frac{3}{4} \cdot \text{number of boys.}$

In a class with 16 boys, number of girls =  $\frac{3}{4} \cdot (16) = 12$  girls.

- Example: A similar comparison could compare the ratio of boys to girls in the class as being 4:3, which can be interpreted as:

number of boys =  $\frac{4}{3} \cdot \text{number of girls.}$

In a class with 12 girls, number of boys =  $\frac{4}{3} \cdot (12) = 16$  boys.

- A ratio can compare two real-world quantities (e.g., miles per gallon, unit rate, and circumference to diameter of a circle).
- Ratios may or may not be written in simplest form.
- A ratio can represent different comparisons within the same quantity or between different quantities.

Ratio	Comparison
part-to-whole (within the same quantity)	compare part of a whole to the entire whole
part-to-part (within the same quantity)	compare part of a whole to another part of the same whole
whole-to-whole	compare all of one whole to all of

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(different quantities)	another whole
part-to-part (different quantities)	compare part of one whole to part of another whole

- Examples: Given Quantity A and Quantity B, the following comparisons could be expressed.

<b>Ratio</b>	<b>Example</b>	<b>Ratio Notation(s)</b>
part-to-whole (within the same quantity)	compare the number of unfilled stars to the total number of stars in Quantity A	3:8; 3 to 8; or
part-to-part <sup>1</sup> (within the same quantity)	compare the number of unfilled stars to the number of filled stars in Quantity A	3:5 or 3 to 5
whole-to-whole <sup>1</sup> (different quantities)	compare the number of stars in Quantity A to the number of stars in Quantity B	8:5 or 8 to 5
part-to-part <sup>1</sup> (different quantities)	compare the number of unfilled stars in Quantity A to the number of unfilled stars in Quantity B	3:2 or 3 to 2

- <sup>1</sup>Part-to-part comparisons and whole-to-whole comparisons are ratios that

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<p>are not typically represented in fraction notation except in certain contexts, such as determining whether two different ratios are equivalent</p>									
<b>Vocabulary</b>	<b>Instructional Activities Organized by Learning Objective</b>								
<p>ratio relationship quantity fraction equivalent compare comparison symbolic simplest form related whole unit rate numerator denominator rate</p>	<p><b>Textbook</b> Eureka - <a href="#">The Story Ratios</a></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 2px;">Eureka Grade</th> <th style="padding: 2px;">Module</th> <th style="padding: 2px;">Topic</th> <th style="padding: 2px;">Lesson(s)</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">6</td> <td style="padding: 2px;"></td> <td style="padding: 2px;">1 A</td> <td style="padding: 2px;">1-7</td> </tr> </tbody> </table> <p>Virginia Math Connects, Course 1, ©2012, Glencoe/McGraw-Hill page(s) 150 – 155 and 173 - 177 Extra Practice page –EP 7 – 8 Lessons 3-1 and 3-3</p> <p><b>Notes</b> 6.1 Ratios Interactive Note Pages</p> <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>● Print             <ul style="list-style-type: none"> <li>○ Virginia, Coach, New SOL Edition, Mathematics, Grade 6, Ratios, page(s) 16 - 22</li> <li>○ Illustrative Math -                     <ul style="list-style-type: none"> <li>▪ <a href="#">Equivalent Ratios</a></li> </ul> </li> </ul> </li> <li>● Technology-based  <a href="#">Studyjams.com, Ratio</a>  <a href="#">Gizmos: Part-to-part and Part-to-whole Ratios</a> </li> </ul> <p>Station Activities  <a href="#">Ratio Game (online)</a></p>	Eureka Grade	Module	Topic	Lesson(s)	6		1 A	1-7
Eureka Grade	Module	Topic	Lesson(s)						
6		1 A	1-7						
<b>Assessment</b>									

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	<a href="#">Ratio Activities</a>
<b>Cross-Curricular Connections</b>	<b>Tiered Differentiations</b>
Ratio scenarios can be embedded in reading selections that students encounter in reading, science, and history instruction. For example, students can compare the number of verbs in one paragraph to the number of verbs or some other part of speech of another paragraph.	<b>Suggested manipulatives: number lines, pattern blocks, square tiles, grid paper.</b> <ul style="list-style-type: none"><li>● Use objects, pictures and symbols to build the foundation.</li><li>● Include rates and unit rates.</li><li>● Use ratio tables to show equivalency between ratios and to solve real world problems.</li><li>● Use double number lines to showing equivalency between ratios and to solve real world problems.</li><li>● Have students in the classroom collect and compare data. For example, boys to girls, students to teacher, colors of shoes, hair color, eye color, etc.</li><li>● Survey classmates on favorite color and write ratios from results.</li><li>● When representing ratios, students often struggle with the order of the quantities.</li></ul>