

Unit 3 Title		Estimated Time Frame
Ratios and Proportional Relationships		20 days
Big Idea		
Understand ratio concepts and use ratio reasoning to solve problems.		
Essential Question(s)		
What are ratios and rates? How can you use ratios and rates to describe quantities and solve problems? What is the meaning of percent? How can percent be estimated and found? How are ratios used to compare two quantities or values? How do we use ratios and rates in the real world to solve problems? How can I model and represent ratios and rates? How are rate and percent related? How do we use ratio reasoning to convert measurement units?		
Standards for Mathematical Practice (MP.) - The practice standards in bold describe expertise to be intentionally developed in this unit.	Kentucky Interdisciplinary Literacy Practices (KILP.) - The practice standards in bold describe expertise to be intentionally developed in Mathematics.	
MP.1. Make sense of problems and persevere in solving them. <b>MP.2. Reason abstractly and quantitatively.</b> <b>MP.3. Construct viable arguments and critique the reasoning of others.</b> <b>MP.4. Model with mathematics.</b> <b>MP.5. Use appropriate tools strategically.</b> MP.6. Attend to precision. <b>MP.7. Look for and make use of structure.</b> <b>MP.8. Look for and express regularity in repeated reasoning.</b>	KILP.1 Recognize that text is anything that communicates a message. KILP.2 Employ, develop, and refine schema to understand and create text. KILP.3 View literacy experiences as transactional, interdisciplinary and transformational. KILP.4 Utilize receptive & expressive language arts to better understand self, others, and the world. KILP.5 Apply strategic practices, with scaffolding & then independently, to approach new literacy tasks. <b>KILP.6 Collaborate with others to create new meaning.</b> <b>KILP.7 Utilize digital resources to learn and share with others.</b> <b>KILP.8 Engage in specialized, discipline specific literacy practices.</b> <b>KILP.9 Apply high level cognitive processes to think deeply and critically about text.</b> KILP.10. Develop a literacy identity that promotes lifelong learning.	
Common Preconceptions/Misconceptions		
When asked to write the ratio, some students may confuse the order of the quantities. For example, when asked to write the ratio of boys to girls in the sentence, “ <i>There are 14 girls and 18 boys in our math class.</i> ” Instead of writing 18:14, some students may write 14:18. To address this common misconception, ask students to label the quantities they are comparing (i.e., 14 <b>girls</b> /18 <b>boys</b> ).		

Students often confuse the terms *ratio*, *rate*, and *unit rate*. Create an activity (vocabulary, foldable, etc.) to help students with these confusing terms. [Ratio Vocabulary Foldable](#) is one example that is posted on [MILC Ratio and Proportion resources](#).

Students may believe that a percent is *always* a natural number less than or equal to 100. Be sure to provide examples of percent amounts greater than 100% and less than 1%.

KAS Standards	Prerequisite Skill, Considerations, and Coherence	Samples of Learning Intentions and Success Criteria
<b>KY.6.RP.1</b> Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. <b>MP.2, MP.6</b>	<b>Considerations:</b> Students use the concept of ratios as a comparison between related quantities; students also express these relationships in equivalent ratios in the lowest terms, where appropriate.  Coherence KY.5.NF.5→KY.6.RP.1	We are learning to use ratios to describe the relationship between two quantities. <b>(Lesson 5-1)</b> <ul style="list-style-type: none"> <li>I can write ratios three ways: as a fraction, <math>\frac{\quad}{\quad}</math>, and <math>\quad</math> to <math>\quad</math>.</li> <li>I can use bar diagrams and double-number lines to model ratio relationships.</li> <li>I can write equivalent ratios in lowest terms.</li> </ul>
<b>KY.6.RP.2</b> 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. <b>MP.2, MP.6</b>	<b>Considerations:</b> Expectations for unit rates in grade 6 are limited to non-complex fractions; additionally, students reduce ratios of two whole numbers to a unit rate involving a fraction and a denominator of 1. Students describe real-life contexts using ratio language.  Coherence KY.5.NF.3→KY.6.RP.2→KY.7.RP.1	We are learning to understand rates and unit rates. <b>(Lesson 5-5)</b> <ul style="list-style-type: none"> <li>I can use rates to describe ratios in which the terms have different units.</li> </ul>
<b>KY.6.RP.3</b> Use ratio and rate reasoning to solve real-world and mathematical problems.  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.  b. Solve rate problems, including those involving unit pricing and constant speed.	<b>Considerations:</b> <ol style="list-style-type: none"> <li>Students find the missing values in a table, assuming the values in the table represent a proportional relationship; students plot the values from a table on a coordinate plane, with appropriate labels and scales; Students compare the ratios of tables, answering, which has a greater/less rate.</li> <li>Students find a unit rate from a given situation and reason to apply it to a future scenario.</li> </ol>	We are learning to generate equivalent ratios. <b>(Lesson 5-2)</b> <ul style="list-style-type: none"> <li>I can use multiplication and division to find equivalent ratios.</li> <li>I can solve problems by finding equivalent ratios.</li> </ul> We are learning to compare ratios to solve problems. <b>(Lesson 5-3)</b> <ul style="list-style-type: none"> <li>I can make a table of equivalent ratios.</li> <li>I can use ratio tables to compare ratios and to solve problems.</li> </ul>

c. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

**MP.1, MP.4, MP.7**

c. For example, convert miles per hour to feet per hour or meters per minute to meters per hour using appropriate conversion ratios.

Coherence KY.6.RP.3→KY.7.RP.2

We are learning to use ratio tables and graphs to solve problems. **(Lesson 5-4)**

- I can make a table of equivalent ratios and use the values to write ordered pairs.
- I can plot the ordered pairs on a coordinate plane.
- I can use repeated addition or subtraction in a ratio table to graph ratios.

We are learning to solve problems involving rates and unit rates. **(Lesson 5-5)**

- I can find equivalent rates by writing the rate as a fraction, then multiplying both terms (numerator and denominator) by the same number.

We are learning to compare unit rates. **(Lesson 5-6)**

We are learning to use unit rates to solve problems involving constant speed and unit price. **(Lesson 5-7)**

- I can use ratio reasoning to compare unit rates and solve problems.
- I can determine the unit price to find the better value.
- I can determine the unit rate, then complete a table of equivalent rates to solve problems.
- I can use the equation:  $distance = rate \times time$  to solve unit rate problems.
- I can determine the conversion factor needed to relate customary units.

We are learning to use ratios to convert customary units of measurement. **(Lesson 5-8)**

- I can identify the conversion factor and use it to find equivalent rates to convert customary units of length, capacity, and weight.

**Supporting Standards**

**KY.5.NF.3** Interpret a fraction by dividing the numerator by the denominator.

Solve word problems involving the division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual fraction models or equations to represent the problem.

**Essential Vocabulary**

**ratio** - A pair of numbers that compares different types of units.

**rate** - A ratio that compares different units.

**unit rate** - The cost for one unit of a given item; a rate simplified so that it has the denominator of 1.

**percent** - A fraction, or ratio, in which the denominator is assumed to be 100. The symbol % is used for percent.

**equivalent ratios** - The same in amount, value, or importance EX:  $\frac{2}{3}$  is equivalent to  $\frac{4}{6}$ ; 2+3 is equivalent to 5.

**whole numbers** - The set of numbers including zero and all natural numbers.

**rational numbers** - A number that can be expressed as the ratio of two integers.

**negative numbers** - A real number that is less than zero.

**Common Assessment**

Common Assessment Unit 3 Grade 6 Math

**Anchor Resources**

*enVision* Topic 5 - Ratio and Proportion MILC - [MILC Ratio and Proportion resources](#)

**FAL** (one per semester) - [FAL-Using Proportional Reasoning](#) \*\*\*\* Recommended for Semester Two FAL \*\*\*\*

**3-ACT Math Task: Get In Line**

\*Disclaimer: Success Criteria is the evidence students must produce to demonstrate learning. This example is not comprehensive.

\*\* Mathematical Practices (A.MP.1- 8) should be evidenced at some point throughout each unit.