

Grade Six Chapter 4 - Ratio and Rates

Overview & Support

Standards:

Understand ratio concepts and use ratio reasoning to solve problems.

- 6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*
- 6.RP.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. *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."¹¹*
- 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.
- 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.
 - Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*

Suggested Routines:

- Number Talks
- spiral review of concepts covered in previous chapters
- modeling using manipulatives
- constructed responses and written explanations
- animated Go Math! models

Suggested Resource:

<https://tasks.illustrativemathematics.org/6.RP>

(visual activities)

<https://gfletchy.com/the-clapper/>

<https://gfletchy.com/rope-jumper/>

(3 Act Tasks)

Read *The Missing Cup* from the Grab and Go Differentiated Centers Kit (about finding equivalent fractions when baking).

Manipulatives:

fraction strips

multiplication charts

double number lines

tape diagrams/bar models (see framework p.9)

¹¹ Expectations for unit rates in this grade are limited to non-complex fractions.

<http://blogs.equsd.net/mathgen>

(Framework Link)

Vocabulary:

ratio

rate

unit rate

equivalent ratio

Strategies for Chapter:

- model ratios using manipulatives
- discuss real-world examples of ratio forms
<https://betterlesson.com/lesson/432417/real-world-ratios-day-1>
- use multiplication tables to show equivalent ratios
- use tables to compare ratios
- find equivalent ratios using tables, double number lines, tape diagrams/bar models
- use unit rates

Color Coding:

Green (G) - The lesson accurately reflects the Framework standard(s).

Yellow (Y) - This lesson includes notes to refer to while planning the lesson.

Red (R) - This lesson does not accurately reflect the Framework standard(s). Skip the lesson.

Essential Questions:

How can you use ratios to express relationships and solve problems?

What different strategies/tools can you use to model ratio relationships?

Lesson-by-Lesson Overview:

| Lesson #, Standard | Title | Materials | Vocab | Notes |
|-------------------------|--------------------|-----------|---|-------|
| Show What You Know G | Show What You Know | | -Numerator Denominator -Fraction -Product Vocab. Builder: -Fractions -Numerator Denominator -Simplify -Equivalent fractions -Ratios -Equivalent fractions -Equivalent ratios -Rate (see above) | |

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| | | | <ul style="list-style-type: none"> -Unit rate -Ordered pair | |
| <p>4.1 Y 6.RP.1</p> | Model Ratios | Two color counters Colored square tiles | <ul style="list-style-type: none"> -Ratios -Equivalent ratio tables | <p>Focus on how to model the ratio in different ways and how to describe the ratio relationship using double-sided counters</p> <p>Ask students to brainstorm ratio relationships in the real world. Many examples can be found in the Framework.</p> <p>Framework: <i>"Initially, students do not express ratios using fraction notation; this is to allow students to differentiate ratios from fractions and rates. In grade six, students also learn that ratios can be expressed in fraction notation but are different from fractions in several ways."</i></p> |
| <p>4.2 Y 6.RP.1</p> | Ratios and Rates | | <ul style="list-style-type: none"> -Rate -Ratio -Unit Rate -Whole -Whole to whole -Part to a whole -Whole to part -per/each -for every -in -perimeter | <p>Do not have students use fraction notation to write ratios.</p> <p>Focus on part to part, part to whole, and whole to whole ratio relationships.</p> <p>Focus on unit rate.</p> <p>The work with unit rate is limited in this lesson.</p> |

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| | | | | <p>Framework. Students understand ratios and their associated rates by building on their prior knowledge of division concepts.</p> |
| <p>4.3 Y 6.RP.3a</p> | <p>Equivalent Ratios and Multiplication Tables</p> | <p>Multiplication Table</p> | <p>-Equivalent ratios -Equivalent ratio table -Double number lines</p> | <p>Introduce double number lines to show equivalent ratios, label each number line with a title for what the ratio represents. (See Framework.)</p> <p>Framework: "A <i>tape diagram</i> (a drawing that looks like a segment of tape) can be used to illustrate a ratio. Tape diagrams are best used when the quantities in a ratio have the same units. A <i>double number line diagram</i> sets up two number lines with zeros connected. The same tick marks are used on each line, but the number lines have different units, which is central to how double number lines exhibit a ratio. Double number lines are best used when the quantities in a ratio have different units."</p> <p>Connect tables of equivalent ratios to double number lines</p> <p>Use multiple strategies to solve.</p> <p>Students explain their reasoning.</p> |
| <p>4.4 G 6.RP.3a</p> | <p>Problem Solving: Use Tables to Compare Ratios</p> | | <p>-Patterns -value -Equivalent ratio table -Double number lines</p> | |
| <p>4.5 Y 6.RP.3a</p> | <p>Use Equivalent Ratios</p> | | <p>-Equivalent ratios -Equivalent ratio table -Double number lines</p> | <p>Connect to double number lines introduced in lesson 4.3. (See framework p. 8-12.)</p> <p>Students should use reasoning about tables, tape diagrams, double number lines or equations to solve problems.</p> |

Mid-Chapter Checkpoint

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| 4.6 Y 6.RP.2 | Find Unit Rates | | -Unit rates -Equivalent ratios -Equivalent ratio table -Double number lines | If Students are ready, they will begin using fraction notation to represent ratios. Incorporate the double number line strategy from lessons 4.3 and 4.5. Students need to understand the concept of the unit rate. (See Framework) |
| 4.7 Y 6.RP.3b | Use Unit Rates | | -Unit rates -Tape diagrams/bar models -Equivalent ratio tables | Review tape diagrams/bar models and double number lines. (See framework) Use tape diagrams/bar models and double number lines to solve problems. |
| 4.8 Y 6.RP.3a | Equivalent Ratios and Graphs | | -Equivalent ratio tables -Equivalent ratios -Graphs -Coordinate plane -Graph of the ratio relationship | Connect the table to a double number line and then to the graph. Connect the two number lines to the axes of the coordinate plane. (See framework) |

End of Chapter Assessment

Reteach Options (1 day)

- Reteach standards from this unit to help meet students' need. Some ideas for reteach activities are listed below:
- Math centers or math games focused on unit standards
 - Small group instruction focused on a single standard
 - Whole group instruction focused on a single standard
 - My Favorite No – Rewrite student work with an error and work as a class to identify positives in the work and areas that need to be revised
 - Select 1 – 3 problems to resolve in their groups and discuss whole class. We want new learning to occur on this day that helps students over misconceptions.
 - Complete the "Performance Task" from Go Math! In the Assessment Book in small groups. Share strategies and discuss whole class.
 - Use the Reteach activities based on standards that need intervention.