# Ratios, Rates, and Percents

Content Area: **Math**
Course(s): **Math Grade 6**
Time Period: **MP3**
Length: **45**
Status: **Published**

## NJSLS

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| 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 □/□ associated with a ratio □:□ with □ ≠ 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. |
| 6.RP.A.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. |
| 6.RP.A.3.b | Solve unit rate problems including those involving unit pricing and constant speed. |
| 6.RP.A.3.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. |
| 6.RP.A.3.d | Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. |

## Unit Overview

| Unit Summary | Unit Rationale |
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| In Unit 3, students will understand ratio concepts. Students will use ratio reasoning to solve problems. Further, students will focus on percents of a number. Students will use percent reasoning to solve problems. | Unit 3 begins work with the concept of ratio. Learners will use ratio language to describe a ratio relationship and use rate language in the context of a ratio relationship. Learners use ratio and rate reasoning to solve real-world and mathematical problems. They reason about tables of equivalent ratios, solve unit rate problems, find a percent of a quantity as a rate per 100, solve problems involving finding the whole, given a part and the percent, and use ratio reasoning to convert measurement units. |

## Standards for Mathematical Practice

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| 1 | Make sense of problems and persevere in solving them |
| 2 | Reason abstractly and quantitatively |
| 3 | Construct viable arguments and critique the reasoning of others |

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| 4 | Model with mathematics |
| 5 | Use appropriate tools strategically |
| 6 | Attend to precision |
| 7 | Look for and make use of structure |
| 8 | Look for and express regularity in repeated reasoning |

## Unit Focus

| Enduring Understandings | Essential Questions |
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| • A ratio describes the relationship between two quantities where for every x units of one quantity, there are y units of another quantity.<br>• Equivalent ratios can be found by multiplying or dividing both terms by the same nonzero number.<br>• Ratio tables compare ratios to solve problems.<br>• Equivalent ratios can be represented in a table, and the pairs of values can be plotted on a coordinate plane.<br>• A rate is a special type of ratio that compares two quantities with different units of measure.<br>• A unit rate is a special rate that compares a quantity to one unit of another quantity.<br>• Rates are easily compared when they are expressed as unit rates. -Unit rates, including unit prices, are used to solve problems.<br>• Unit rates and conversion factors can be used to convert customary units of measure, to convert metric units of measure, and to convert between customary and metric units of measure.<br>• A percent is a rate in which the first term is compared to 100. The percent is the number of hundredths that represent the part of the whole.<br>• Fractions, decimals and percents are three ways to show parts of a whole.<br>• A percent greater than 100 is equivalent to more than the whole. A percent less than 1 is equivalent to less than 1/100 of the whole.<br>• Equivalent fractions and compatible numbers can be used to estimate the percent of a number.<br>• Finding the percent of a whole is similar to finding the fractional part of a whole.<br>• Models and equations can be used to find the whole amount when the percent and a part are | • What are ratios and rates?<br>• How can you use ratios and rates to describe quantities and solve problems?<br>• How can you find two ratios that describe the same relationship?<br>• How can you use rates to describe changes in real-life problems?<br>• How can you compare two ratios?<br>• How can you compare lengths between the customary and metric systems?<br>• What is the meaning of percent?<br>• How can percent be estimated and found?<br>• What is the connection between ratios, fractions, and percents?<br>• How can you use mental math to find the percent of a number? |

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| known.<br>• Mathematical models can represent many real-world problem situations, but the models may not represent a real-world situation exactly | |

## Instructional Focus

**Learning Targets**

● Use ratios to describe the relationship between two quantities. Use bar diagrams and double number line diagrams to model ratio relationships.

● Use multiplication and division to solve problems by finding equivalent ratios.

● Use ratio tables and graphs to compare ratios and to solve problems.

● Represent equivalent ratios in ratio tables and on graphs to solve problems.

● Use rates to describe ratios in which the terms have different units. Use rates and unit rates to solve problems.

● Use ratio reasoning to compare rates and solve problems.

● Use unit rates to solve problems, including problems involving constant speed and unit price. Solve unit rate problems using an equation.

● Use ratio reasoning and conversion factors to convert customary units of measure.

● Use ratio reasoning and conversion factors to convert metric units of measure.

● Use ratio reasoning and conversion factors to convert between customary and metric units of measure.

● Represent and find the percent of a whole.

● Write equivalent values as fractions, decimals and percents, including when the denominator of the fraction is not 100.

● Find percents that are greater than 100 and that are less than 1.

● Estimate the percent of a number.

● Use the decimal form of a percent to find the percent of a number. Write an equation to solve a percent problem.

● Find the whole amount when given a part and a percent.

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| **Prerequisite Skills** |
| • Analyze patterns and relationships.<br>• Use models to represent fractional relationships.<br>• Understand four quadrants of a coordinate plane.<br>• Graph equations using a table of values.<br>• Convert standard measurement units within the same measurement system.<br>• Explain patterns in the placement of the decimal point when multiplying or dividing a decimal by a power of 10.<br>• Use equivalent fractions to add and subtract fractions and mixed numbers.<br>• Use rounding and compatible numbers to estimate.<br>• Use models, number sense and properties to multiply decimals.<br>• Multiply whole numbers and decimals in the same way that students multiply whole numbers and then place the decimal point in the product.<br>• Understand algebraic expressions and generate equivalent algebraic expressions. Use patterns to write and solve equations. Write and solve multiplication and division equations. |
| **Common Misconceptions** |
| Students may think that the inverse of a ratio is also true or means the same thing. Students may think that a unit rate can only be written one way. Students may have difficulty identifying the “part” or the “whole” that the percent refers to. Students may have difficulty with multi-step conversions. |

## Spiraling For Mastery

| Current Unit Content/Skills | Spiral Focus | Activity |
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| • ratio reasoning<br>• rates<br>• concept of percent<br>• find the percent, the whole or a part | • fraction concepts and computations<br>• convert measurement units<br>• equivalent fractions<br>• multiplying decimals | • Math Diagnostic and Intervention System Activities (MDIS) |

## Assessment

| Formative Assessment | Summative Assessment |
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| • Homework<br>• Lesson Checks<br>• MathXL | • Topic Tests (Common Assessments)<br>• Unit 3 Benchmark (Link-It) |

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| • Quizzes<br>• Exit Tickets<br>• Lesson Reflections<br>• Performance Tasks | |

## Resources

| Key Resources | Supplemental Resources |
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| Savvas EnVision Math 6<br><br>Pacing Guide | • IXL<br><br>• Delta Math<br><br>• Desmos<br><br>• Khan Academy<br><br>• Manuevering the Middle |

## Career Readiness, Life Literacies, and Key Skills

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| 9.4.8.CI.4 | Explore the role of creativity and innovation in career pathways and industries. |
| 9.4.8.TL.3 | Select appropriate tools to organize and present information digitally. |
| 9.4.8.TL.6 | Collaborate to develop and publish work that provides perspectives on a real-world problem. |

## Interdisciplinary Connections

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| L.KL.6.2 | Use knowledge of language and its conventions when writing, speaking, reading, or listening. |
| SL.PE.6.1.A | Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. |
| SL.PE.6.1.C | Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion. |
| 6-8.MS-ETS1-3.4.1 | Analyze and interpret data to determine similarities and differences in findings. |
| 6-8.MS-ETS1-3.ETS1.B.1 | There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. |