



Grade 6 - Unit B - Introducing Ratios, Unit Rate and Percentages

Unit Focus

In this unit, students learn that a ratio is an association between two quantities, e.g., “1 teaspoon of drink mix to 2 cups of water.” Students analyze contexts that are often expressed in terms of ratios, such as recipes, mixtures of different paint colors, constant speed (an association of time measurements with distance measurements), and uniform pricing (an association of item amounts with prices). Students develop an understanding of ratios, equivalent ratios, and unit rates. Students analyze situations involving both discrete and continuous quantities, and involving ratios of quantities with units that are the same and that are different. They learn all ratios that are equivalent to can be made by multiplying both and by the same non-zero number. Throughout the unit, students are introduced to discrete diagrams, double number line diagrams and ratio tables as tools that can assist in solving ratio problems. After developing an understanding of what a ratio is, students begin exploring “part-part-whole” ratios. They learn how to interpret ratios as rates per 1 or unit rate. Measurement conversions provide other opportunities to use rates. Students learn that “percent” means “per 100” and indicates a rate. Just as a unit rate can be interpreted in context as a rate per 1, a percentage can be interpreted in the context from which it arose as a rate per 100.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer		
Standards <ul style="list-style-type: none">Common Core<ul style="list-style-type: none"><i>Mathematics: 6</i><ul style="list-style-type: none">Understand ratio concepts and use ratio reasoning to solve problems.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. (<i>CCSS.MATH.CONTENT.6.RP.A.1</i>)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. (<i>CCSS.MATH.CONTENT.6.RP.A.2</i>)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. (<i>CCSS.MATH.CONTENT.6.RP.A.3</i>)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. (<i>CCSS.MATH.CONTENT.6.RP.A.3A</i>)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	<i>Students will be able to independently use their learning to...</i> T1 Represent situations using mathematical reasoning and symbols. T2 Apply an understanding of known patterns to new problems and make connections between concepts.		
	Meaning		
	Understanding(s)	Essential Question(s)	
	<i>Students will understand that...</i> U1 Mathematicians make sense of quantities to represent situations mathematically. U2 Mathematicians use their knowledge from patterns and structures to apply efficient strategies to solve a problem.	<i>Students will keep considering...</i> Q1 How can the relationship between quantities be represented? Q2 How can we apply knowledge of a pattern to similar problems?	
	Acquisition of Knowledge and Skill		
Knowledge	Skill(s)		
<i>Students will know...</i> K1 the concept of a ratio and how to use ratio language	<i>Students will be skilled at...</i> S1 writing/ representing ratios using words and numbers S2 recognizing and writing equivalent ratios		

Stage 1: Desired Results - Key Understandings

<p>many lawns could be mowed in 35 hours? At what rate were lawns being mowed? (<i>CCSS.MATH.CONTENT.6.RP.A.3B</i>)</p> <ul style="list-style-type: none"> ▪ 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. (<i>CCSS.MATH.CONTENT.6.RP.A.3C</i>) ▪ Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. (<i>CCSS.MATH.CONTENT.6.RP.A.3D</i>) ▪ Solve real-world and mathematical problems involving area, surface area, and volume. ▪ 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. (<i>CCSS.MATH.CONTENT.6.G.A.1</i>) ▪ Mathematical Practices ▪ Reason abstractly and quantitatively. (<i>CCSS.MATH.MP.2</i>) ▪ Look for and express regularity in repeated reasoning. (<i>CCSS.MATH.MP.8</i>) <p>Madison Public Schools Profile of a Graduate</p> <p>Analyzing: Examining information/data/evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (<i>POG.1.2</i>)</p>	<p>K2 the concept of a unit rate and how to use unit rate language K3 percent of a quantity is a rate per 100 K4 measurement unit conversions are ratios K5 Vocabulary: ratio, equivalent ratio, double number line, per, unit price, table, tape diagram, rate</p>	<p>S3 calculating unit rates S4 using ratio tables to solve problems S5 using tape diagrams to solve ratio problems S6 using double number lines to solve ratio problems S7 using benchmark percents S8 solving percentage problems S9 converting measurement units</p>
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