

Ratios and Proportional Relationships

A **ratio** is a comparison of two quantities by division. In normal usage, the “ratio of a to b ” is written $\frac{a}{b}$, $a:b$, or a to b . For example, if you have 3 tickets to a movie and your friend has 4, the ratio of your tickets to your friend’s is $\frac{3}{4}$, $3:4$, or 3 to 4.

Ratio comparisons can be part-to-part (red apples to green apples) or part-to-whole (red apples to all the apples in the basket). Further, ratios behave like fractions. For example, the ratio $\frac{4}{6}$ can be reduced to $\frac{2}{3}$.

Rate is usually defined as a ratio that compares quantities having different units of measure. A *unit rate* is expressed as a part-to-one ratio: If you pay \$45 for 5 movie tickets, you pay a unit rate of \$9 per ticket (a ratio of 9:1).

Proportion is a statement showing that two ratios are equivalent. Proportional relationships can help us find missing information and solve problems. In the apple example, if the ratio of red apples to green apples is 4:5 and there are 12 red apples in the basket, a proportion can be set up and solved to find out how many green apples are in the basket.

The Grade 6 Common Core State Standards for Ratios and Proportional Relationships specify that students should—

- Understand ratio concepts and use ratio reasoning to solve problems.

Students will find that life is filled with opportunities to apply proportional reasoning. Proportional reasoning is required to calculate the cost of a food item when knowing the price per pound, to determine a weekly pay rate given an hourly wage, or to determine a distance represented on a map using the map scale.

The following hands-on activities enable teachers to help students learn the concepts of ratios and proportional reasoning in a rich and meaningful way. Because the concepts are closely related, they can be confusing for students. It is important that students develop a true understanding of ratios and proportions and not just a rote awareness of how to compute with them. Teachers will want to help students discover relationships among specific units and make sense of the quantities they are computing.