

Proportional Relationships

Family Letter

Dear Family,

In this module, *Proportional Relationships*, students will use their prior knowledge of ratios and rates to develop understanding of proportional relationships. Proportional reasoning is a foundational topic for middle school mathematics, with applications in algebra, geometry, probability, statistics, and everyday life!

What Did Students Learn Previously?

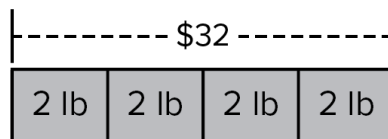
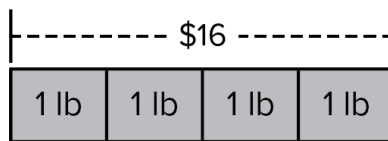
In a previous grade, students used rate and ratio reasoning to solve real-world and mathematical problems.

For example, a basketball player made 3 out of every 5 free throws during a game. By using ratio reasoning, such as bar diagrams, double number lines, or tables, students determined that the basketball player made 21 out of 35 free throws, because *3 out of 5* and *21 out of 35* are equivalent ratios.

What Will Students Learn in This Module?

Proportional Relationships

- Students will apply and extend their understanding of ratios and rates to develop foundational understanding of **proportional relationships**.
- In the bar diagram, four pounds cost a total of \$16. This means that each pound costs \$4. The unit rate is \$4 per pound.
- In order for a relationship to be in a **proportional relationship**, the second unit rate must also be \$4 per pound.
- In this second bar diagram, eight pounds cost a total of \$32. This means that each two-pound section costs \$8. By using rate reasoning, this means that each pound costs \$4. Because the ratios were maintained, this is a proportional relationship.
- Proportional relationships can be shown in tables, graphs, and equations. In each representation, the constant ratio (or **constant of proportionality**) must be maintained.



Proportions

- A proportion is an equation stating that two ratios are equivalent, for example $\frac{16}{4} = \frac{32}{8}$. Because each ratio is equivalent to $\frac{4}{1}$, or 4 to 1, this is a proportion.
- Students will solve problems involving proportional relationships using words, ratio tables, graphs, or equations.

What Vocabulary Terms Will Students Use?

Term	Definition
constant of proportionality	The constant ratio in a proportional relationship. It has the same value as the unit rate.
nonproportional	Two quantities are nonproportional if the ratios comparing them are not equivalent.
proportion	An equation stating that two ratios are equivalent.
proportional	Two quantities are proportional if the ratios comparing them are equivalent.
proportional relationship	Two quantities that vary and have a constant ratio between them.
unit rate	A comparison of a first quantity per every 1 unit of a second quantity.

How You Can Provide Support

1. Support your child's understanding of proportional relationships by asking them to explain how they can use proportions to solve problems in everyday life.
 - *Shopping:* Find the total cost of a certain number of items, such as oranges, based on the cost of two of the items.
 - *Driving:* Find the distance traveled in 3 hours if the speed you traveled was constant.
 - *Home Improvement:* Find the number of gallons of paint needed to cover the four walls of a room given the number of square feet one gallon of paint covers.
2. Encourage your child to have a positive, growth-oriented attitude towards mathematics and their learning.
 - Encourage them to ask questions – both at home and in class. Sometimes, an answer to a question will generate more questions. That's how you know they are learning!
 - Encourage your child to embrace challenges and remind them that every challenge is an opportunity to learn something new.
 - Celebrate successes – both small and large.
3. Contact me to arrange a time to discuss the specifics of your child's performance and how we can work together to help them succeed in this module.

Sincerely,

(Teacher's Name)

(Email/Phone)