

learning focus:

- ✓ determine if a relationship is proportional or non-proportional
- ✓ compute unit rates involving fractions
- ✓ represent proportional relationships using tables, graphs, and equations

PROPORTIONAL RELATIONSHIPS UNIT

7th
GRADE

9 DAY CCSS-ALIGNED UNIT



A MANEUVERING THE MIDDLE ® RESOURCE

PROPORTIONAL RELATIONSHIPS



a 9 day CCSS-aligned unit

CCSS: 7.RP.1, 7.RP.2, 7.RP.2a, 7.RP.2b, 7.RP.2c, 7.RP.2d

ready-to-go, scaffolded
student materials

PROPORTIONAL RELATIONSHIPS UNIT

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student friendly + real-world application

multiple representations

Unit: Proportional Relationships
Student Handout 4

Name _____
Date _____ Pd _____

REPRESENTING PROPORTIONAL RELATIONSHIPS


Practice representing proportional relationships in multiple ways with the following examples. Use the representation given to help you fill in the others.

[VERBAL DESCRIPTION] [EQUATION]

The student council is selling t-shirts to raise awareness for the local animal shelter. For every 10 t-shirts they sell, they will donate \$50 to the shelter.

[TABLE]

# OF SHIRTS SOLD	DOLLARS DONATED
0	
10	
20	
30	
40	
50	
60	



Use the representations in the example above to complete the following situations.

- Describe how you know that the above situation is proportional.
- Find a proportional relationship that represents the situation.

4. What does the ordered pair (10, 50) represent in the context of the situation?

Use the given information for each situation below to fill in the missing representations.

[VERBAL DESCRIPTION] [EQUATION]

$y = 3x$

[TABLE] [GRAPH]

JACK'S HALLOWEEN DECORATING



HOURS	# OF PUMPKINS
1	
2	
3	
4	
5	
6	
7	

[VERBAL DESCRIPTION] [EQUATION]

[TABLE] [GRAPH]

SHORESIDE BIKES

HOURS	COST (\$)
1	
2	\$24
3	
4	
5	
6	
7	\$84

Summarize today's lesson:

skill application

- What is the rate of change and what does it represent in this situation?
- What does the point (7, 84) represent in this situation?
- The bike rental company has determined that they will charge based on the nearest half hour. If Mikala rented a bike for 5.5 hours, how much would she be charged?
- If a customer has \$50.00 to spend, how many hours can they rent a bicycle?

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streamline your planning process with unit overviews

- ✓ key vocabulary
- ✓ vertical alignment

sample pacing calendar

PROPORTIONAL RELATIONSHIPS OVERVIEW

STANDARDS

7.RP.1 Compare unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units.

7.RP.2 Recognize and represent proportional relationships between quantities.

7.RP.2a Decide whether two quantities are in a proportional relationship, e.g. by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

7.RP.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

7.RP.2c Represent proportional relationships by equations.

7.RP.2d Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.

BIG IDEAS

- Proportional relationships exist
- Real world relationships can be proportional
- Not all linear relationships are proportional

ESSENTIAL QUESTION

- What characteristics can you use to identify a proportional relationship?
- How can you express a proportional relationship?
- How does a pattern support a proportional relationship?

PROPORTIONAL RELATIONSHIPS PACING GUIDE

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Constant of Proportionality	Proportional Relationships: Tables	Proportional Relationships: Graphs	Representing Proportional Relationships	Non-Proportional Relationships
Student Handout 1 Homework 1	Student Handout 2 Homework 2			
DAY 6	DAY 7			
Proportional Relationships Quiz	Fractional Unit Rates			
Quiz 1	Student Handout 6 Homework 6			

PROPORTIONAL RELATIONSHIPS OVERVIEW

TOPIC	TEACHING TIPS
Constant of Proportionality	<ul style="list-style-type: none"> The constant of proportionality can be an unnecessarily confusing topic. In math terms, the constant of proportionality is the slope of the line. However, since slope isn't yet introduced, it can get tricky. Students should be able to determine the constant of proportionality by dividing y by x, this is the rate at which the change is occurring. This is also the unit rate or the rate of change. Prompt students to see the constant of proportionality in real life. From the cost of a song in iTunes to the cost of a gallon of gas, proportionality can be easily spotted in the real-world.
Proportionality and Tables	<ul style="list-style-type: none"> List three different tables on the board, one that does not have a proportional relationship and two that do have a proportional relationship. Ask students to predict which ones are proportional based on yesterday's lesson. At the end of the lesson return to the various predictions and discuss.
Proportionality and Graphs	<ul style="list-style-type: none"> Students are going to want each graph to go through a perfect intersection on the graph. Help students to use their reasoning skills to find at least two points that are easy to read.
Proportional Equations	<ul style="list-style-type: none"> The unit should really start to come together here, as students will see how one relationship can be represented in multiple ways. Help students to connect the equation to the table and graph, making note of the rate of change or the constant of proportionality. Students should note that all of the equations are in the form $y=kx$ or $y=mx$.
Unit Rates	<ul style="list-style-type: none"> Snap a few pictures at the grocery store of various barcodes where the unit rate is included. Try to get a few where the rates are different (i.e. price per pound, price per unit). Then, continue to fractional unit rates by sharing the example, "A child can ride a bike at a rate of 2 miles every $\frac{1}{2}$ hour." Help students to then make the jump to a complex fraction. For example, "A canoe can travel at a rate of $\frac{1}{2}$ mile every $\frac{1}{4}$ of an hour."

teaching ideas

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unit study guide + assessments

✓ quizzes

✓ editable unit test

Unit: Proportional Relationships
Quiz 1

Name _____
Date _____ Pd _____

QUIZ: PROPORTIONAL RELATIONSHIPS

Use the table below to answer questions 1-4.

MINUTES	0	3	6	9	12
WORDS TYPED	0	120	?	360	480

1. Kenry is practicing for a typing test for 18 minutes. The number of words he can type is proportional to the time he types. If the test is 18 minutes long, how many words can he type?

2. What number is missing in the table above?

3. Which number represents k , the constant of proportionality?

a. 120
b. 60
c. 40
d. 12

Answer the following questions. Be sure to show your work.

5. Jermaine plots the points $(0, 0)$ and $(4, 12)$ on a graph to represent a proportional relationship. Which of the following equations represents the relationship between the x -values and y -values?

a. $y = \frac{4}{11}x$ b. $y = 2.75x$
c. $y = 0.36x$ d. $11y = 4x$

Unit: Proportional Relationships
Review

Name _____
Date _____ Pd _____

PROPORTIONAL RELATIONSHIPS UNIT STUDY GUIDE

Solve each of the problems below. These represent the types of questions on your test. Be sure to ask questions if you need more help with a topic.

I CAN DETERMINE IF A RELATIONSHIP IS PROPORTIONAL.

1. Determine if the representations are proportional.

a. _____

x	2	4	6
y	5	9	13

b. _____

x	3	5	7
y	1.5	2.5	3.5

c. _____ $y = 9x + \frac{1}{2}$

d. _____ $y = \frac{3}{4}x$

I CAN FIND THE CONSTANT OF PROPORTIONALITY.

2. Determine the constant of proportionality.

a. $y = 8x$

k = _____

b. _____

x	2	4	6	8
y	190	380	570	760

k = _____

c. A restaurant has an all-you-can-eat buffet. They charge \$13.95 per person.

k = _____

SEVENTH GRADE CURRICULUM

PROPORTIONAL RELATIONSHIPS

UNIT FOUR: ANSWER KEYS

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answer keys included