Unit Rates

Procedural Lesson
Grade 7 · Unit 3 · Lesson 3
MC: 7.RP.1▲

MPs ✓ Applied MP * Embedded MP

1	2	3	4	5	6	7	8
*	✓	*	*		*	✓	*

Problem of the Day

Objective: _____

Vocabulary

Rate: a special ratio that compares two quantities that have different units of measure

Example:

Miguel types 160 words in 4 minutes.

$\frac{W}{T}$ words : time words to time

$\frac{160}{4} = 40$ words per minute.

Unit Rate: a ratio showing a comparison to one; a rate with a denominator of 1

70 miles per hour = $\frac{70}{1}$

Cross Multiplication Method:

$\frac{1}{2} = \frac{5}{10}$

$2 \cdot 5 = 10 \cdot 1$

$10 = 10$

$\frac{x}{9} = \frac{2}{3}$

$9 \cdot 2 = 3 \cdot x$

$18 = 3x$

$6 = x$

Notes

Steps:

1. Identify the desired unit rate.
2. Write the ratio in fractional form.
3. Divide the numerator by the denominator to get a denominator of 1.
4. Solve for the variable.
5. Use the unit rate to solve for the given measurement.

Structured Guided Practice

(A/B Partners Practice)

Directions: Read and solve.

1. Daryl scores 455 points every $\frac{1}{3}$ of a minute playing his videogame. What is the unit rate of points per minute? How many points would Daryl score in 10 minutes of game time?

2. Kareem can wash $12\frac{1}{2}$ cars every $1\frac{1}{4}$ hours. What is the unit rate of hours per car? How many hours will it take him to wash 60 cars?

Final Check for Understanding
(Teacher Checks Work)

Directions: Read and solve.

1. Makayla changes 3 diapers every 7 hours. What is the unit rate of diapers per hour? How many diapers will Makayla change in 30 hours?

2. The cafeteria worker scoops 14 scoops of mashed potatoes every $\frac{2}{3}$ minute. What is the unit rate of scoops per minute? How many scoops will they make during the 30-minute lunch period?

Student Practice

Unit 3 · Lesson 3: Unit Rates

Name: _____

Date: _____

Directions: Read and solve.

1. Lisa walks $\frac{1}{3}$ mile every $\frac{1}{2}$ hour. What is the unit rate of miles per hour?

2. Chantel finishes $\frac{1}{5}$ of a page of homework every $\frac{1}{4}$ hour. What is the unit rate of hours per page?

3. Harriet eats $\frac{2}{5}$ a hotdog every $\frac{1}{10}$ of an hour. What is the unit rate of hours per hotdog?

4. Glen watches $3\frac{1}{4}$ episodes every $1\frac{1}{2}$ weeks. What is the unit rate of episodes per week? How many episodes does Glen watch in 9 weeks?

5. Chris completes $\frac{2}{3}$ of a math problem every $1\frac{3}{4}$ minutes. What is the unit rate of minutes per math problem?

6. The carpenter cuts $1\frac{4}{5}$ inches off a piece of wood every $2\frac{1}{2}$ minutes. What is the unit rate of inches per minutes? How many inches will be cut off in 25 minutes?

Challenge Problems

Directions: Read and solve.

1. Marco is racing his car. It can drive $11\frac{1}{2}$ miles on $\frac{3}{4}$ of a gallon of gas. If the race is 100 miles, how many gallons of gas will he need to complete the race?

2. Monica walks $\frac{3}{4}$ of a mile in $\frac{1}{5}$ of an hour. Kari walks $\frac{2}{3}$ of a mile in $\frac{1}{4}$ of an hour. Who will walk 3 miles faster, and by how much?

Extension Activity

* **MP1:** Make sense of the problem and persevere in solving it.
* **MP4:** Apply mathematics in everyday life.

Using the following ratio, create a real-world situation where these numbers would make sense. Then, find a proportional relationship in which a certain total is required for one of the quantities. Apply a unit rate, then solve.

$$\frac{\frac{1}{8}}{\frac{2}{3}} \text{ or } \frac{1}{8}:\frac{2}{3} \text{ or } \frac{1}{8} \text{ to } \frac{2}{3}$$

Closure

Reaching Consensus

**MP3:* *Do you agree or disagree with your classmate? Why or why not?*

Student Presentations

**MP1:* *What steps in the process are you most confident about?*
**MP6:* *Explain how you might show that your solution answers the problem.*

Closure

Recap today's lesson with one or more of the following questions:

✓*MP2:* *How can a fraction inside a fraction be written differently to make more sense?*
✓*MP7:* *How are ratios, conversions, and equivalent fractions similar?*