Name _____ Date _____ Class Period _____

Writing and Comparing Rates

MATERIALS	• calculator • stopwatch
QUESTION	How can you use unit rates to compare different quantities?
Objective	Students will be able to write and compare rates.

STEP 1 Form a group

Work with at least two other students.

STEP 2 Organize experiment

Choose one student to be Student 1, one student to be Student 2, and one student to be Student 3. Record each person's name in the table below. Each round, the student's name written is the one who will be performing the activity. One other student will be the timer and one other the counter.

Student	Time	Number of hops	Number of hops ÷ Time	Unit Rate
Student A *Joni*	*10 seconds*	*12 hops*	$\frac{12}{10}$	*1.20 hops per second*
Student 1	15 seconds			
Student 2	20 seconds			
Student 3	25 seconds			

STEP 3 Conduct an experiment

When the timer says "go:"

- Student 1 will start hopping on one foot.
- The counter will count the number of hops until the timer says "stop."
- Each student records the number of hops in the table.

STEP 4 Rotate duties and repeat experiment

Repeat Step 3 for the next student on the list. Make sure to rotate duties and perform the activity for the specific number of seconds on the table.

STEP 5 Find unit rates

Use division on a calculator to find the *unit rate* (a rate that has a denominator of 1) for each student and complete the fourth and fifth columns of the table. Round to the nearest hundredth.

DRAW CONCLUSIONS

1. Which student hopped the most times? Is it fair to compare the number of hops that each student completed?

2. Which student has the highest unit rate?

3. Which student can hop on one foot the fastest? *Explain*.

4. How could you find how many hops each student could do in one minute?

5. Find how many hops each student could do in one minute.

6. Which student could do the most hops in one minute? How does this compare to your answer to Exercise 3? *Explain*.

Answer Key A

EXPLORE

STEP 1

Answers in chart will vary.

DRAW CONCLUSIONS

1. It would be hard to compare rates because each student hopped for a different amount of time. It would make sense that the student who was timed for 25 seconds did more hops than the person who was timed for 15 seconds, but the second student may have done them at a faster rate.
2. Answers will vary.
3. Answer should be the same as answer for Exercise 2. Students should realize that the higher the unit rate, the faster the student can hop.
4. Multiply the unit rates by the number of seconds in one minute, 60.
5. Answers will vary.
6. Answer should be the same as Exercise 3. Students should realize that the unit rates do not change when amount of time changes. This means the same student will always be able to do the most hops.

Teacher Notes

ACTIVITY PREPARATION

- Each student should be given a copy of this activity sheet.
- Each student should be supplied with a calculator.

ACTIVITY MANAGEMENT

- It is a good idea to work through one row of the table together as a class so you can clear up any confusion.
- Express to the students that after every calculation they make they should check the answer to see if it makes sense.
- As an alternative to hopping, students can also write “Math is fun” or another phrase as many times as they can in the allotted time.

Activity and Closure Questions

Ask these questions as a class.

1. Can you think of any other common rates used in every day life?

   Answer: Answers will vary. An example is miles per hour.

2. How could you use rates to help plan a car trip?

   Answer: By knowing the rate at which you can travel, you can estimate arrival time.

3. Does the number of hops completed in one minute seem realistic? *Why* or *why not*?

   Answer: Chances are that a student will be able to hop at a faster rate in the beginning of the minute. As more time passes, the student will get tired and the rate will decrease.