# Ratey the Math Cat

## Guide and Answer Key for Instructors

The *Ratey the Math Cat* animation is available on iTunes U (search "Math Snacks") and at mathsnacks.org

**Learning Objectives:** By watching the animation, completing the activities in the *Learner Guide*, and completing at least one bonus activity, students learn about:

- The importance of units
- Rates and Unit Rates
- Proportions as multiplicative situations
- Patterns
- Translating unit rates to a table and a graph
- (Optional) Identification of independent and dependent variables

## Animation Discussion:

With your students, watch the 3-minute animation, *Ratey the Cat,* at http://www.mathsnacks.org and spend about 10 minutes discussing the big ideas or key points in the animation. Ask:

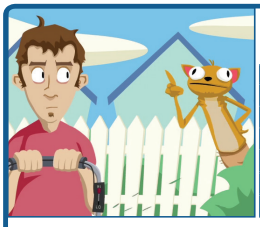
- What do you think the animation is about?
- What is so important about the word PER?
- Can you think of any other ways PER is used?
- What kinds of units can you remember from the animation? Why do you think these are important?

**Vocabulary** Rate, unit rate, per, dependent variable, independent variable

## Learner Guide Page 1

Ratey the Math Cat
Learner Guide

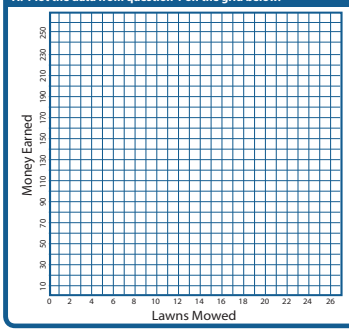
Watch the animation, *Ratey the Math Cat* and complete these activities. The animation and an instructor guide are available on iTunes U (search "Math Snacks") and at **mathsnacks.org**



**1. In the Ratey the Cat animation, there is a guy who earns $10 *PER* lawn. Complete the table below that represents money earned *PER* lawn.**

| Lawns Mowed | Money Earned |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 5 | |
| 10 | |
| | 250 |

**A. Plot the data from question 1 on the grid below.**





Math Snacks *Ratey the Math Cat* Student Learner Guide http://www.mathsnacks.org 1

## Learner Guide Page 2

**2. List five different rates, from your life, using the word *per*.**

1.
2.
3.
4.
5.

**A. Using one of the rates you listed in question 2, fill out a table and complete a graph that represents your rate. Make sure to label the table and the graph appropriately.**

| | |
|---|---|
| | |
| | |
| | |
| | |
| | |

**Nutrition Facts** Serving Size 4 oz. (113g). Serving Per Container 4

| Amount Per Serving | |
|---|---|
| **Calories** 280 | Calories from Fat 130 |
| | % Daily Value* |
| **Total Fat** 14g | 22% |
| Saturated Fat 3.5g | 18% |
| Trans Fat 2.5g | |
| **Cholesterol** 120 mg | 40% |
| **Sodium** 640mg | 27% |
| **Total Carbohydrate** 13g | 4% |
| Dietary Fiber 1g | 4% |
| Sugars 0g | |
| **Protein** 24g | |
| Calories per gram | |
| Fat 9 • Carbohydrate 4 • Protein 4 | |

**3. Nutritional information and labels *per* pound, *per* serving.**

| | |
|---|---|
| **A.** How many servings are there ***per*** package? | |
| **B.** The label says there are 280 calories ***per*** serving. How many calories is that ***per*** package? | |
| **C.** If the package was split up between 8 people, how much of the following would be comsumed. | |
| a. grams of fat ***per*** person? | |
| b. grams of protein ***per*** person? | |

**Bonus. How many protein calories are there *per* serving.**



2 http://www.mathsnacks.org Math Snacks *Ratey the Math Cat* Student Learner Guide

## Bonus Activities

Select one or more of these activities to do with your students after they have completed the *Learner Guide*.

As students are doing the activity, have them keep track of their rates using the word PER. After they have completed the activity and recorded their rates, have them create a table representing their rates. After the table is complete, have them draw a graph to represent their rates graphically. Make sure the students LABEL their tables and graphs appropriately. (Note: It is important to realize that this data may be discreet and not continuous and should be represented on the graph with single points and not necessarily with lines or line segments. However, lines could be used for prediction purposes.)

Always allow plenty of time for discussion and sharing after each activity to make sure the students clearly understand how rates are patterns that can be represented in a table and a graph.

NOTE: For each of these activities have students extend the rates into a table and a graph so they can compare patterns and slopes.

1. Texting Challenge: Depending on your school policies, this activity may or may not be possible, but it is very engaging for the students. Divide the class up into two or three different groups: the texters, the keyboarders and the writers. Find a small passage (at least 200 wds) and make copies for each student. Have a timer set for 1 min. Have each student either text, write or key the passage for one minute. Have them count the words they completed after one minute. This will give them the words per minute. Have them compare the results with the whole class to see which way of writing is most efficient. The students can then calculate the following: words per hour, words per second, characters per minute, characters per second, characters per hour, etc. This can be repeated with each student doing all three methods to figure out which way of writing is most efficient for them individually.
2. Show Me: Have students create an illustration of a situation similar to the ones in the animation that demonstrates the idea of a ratio that clearly shows the units involved. 20 flowers per plant, 30 miles per gallon, 25 students per class, etc.

   Note: For each of these activities have students extend the rates into a table and a graph so they can compare patterns and slopes.
3. Let's Move: Have students do a physical challenge and have them record the data in terms of various ratios. There are three examples provided, but there are many others that can be done to get the same results.
   a. Trashcan basketball: Set up a trash can and have students use paper balls to shoot baskets. Give them 30 seconds to shoot as many baskets as they can and count the shots taken and baskets made. They can record shots per minute (they will have to convert). They can record baskets made per minute (they will have to convert). They can also record shots and baskets made per second or per hour if that is something you want them to do.
   b. Let's Jump: Get a jump rope. Have students work in pairs. Each student should jump for one minute while the other records the number of jumps. They can then calculate jumps per minute, jumps per second, etc. for each student.
   c. Measure Me: Have students work in pairs. Each student can measure the number of footsteps it takes to walk down the hallway or across the classroom. They can calculate the number of steps PER distance and then compare with the class.

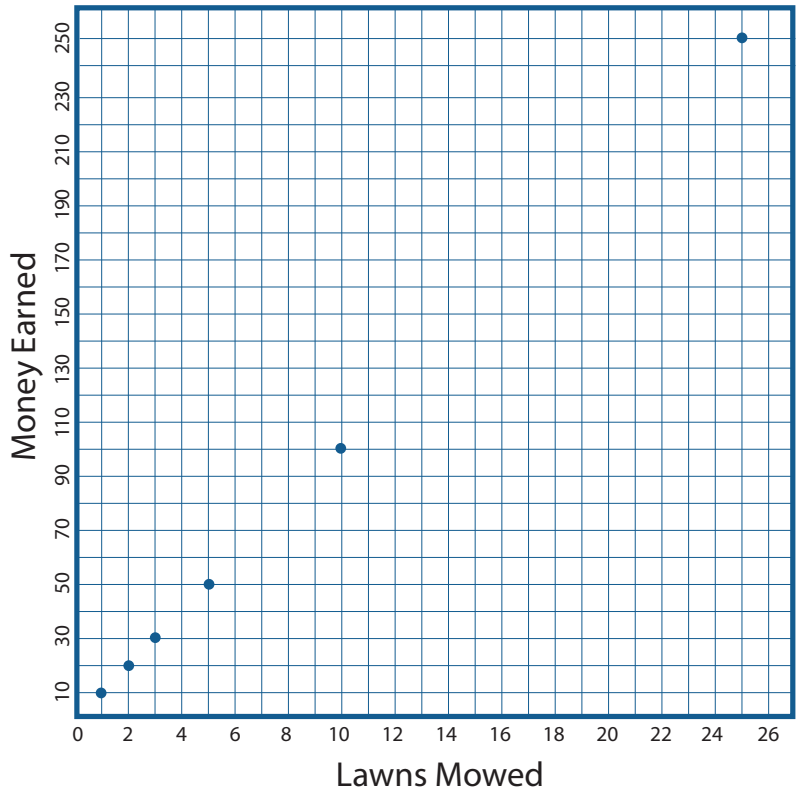
## Page 1 Answer Key

**1. In the Ratey the Cat animation, there is a guy who earns $10 *PER* lawn. Complete the table below that represents money earned *PER* lawn.**

***NOTE: If you want to make this more challenging, have students plot these points on a graph to see the linear relationship of this situation.***

| Lawns Mowed | Money Earned |
|---|---|
| 1 | *10* |
| 2 | *20* |
| 3 | *30* |
| 5 | *50* |
| 10 | *100* |
| 25 | *250* |

**A. Plot the data from question 1 on the grid below.**




## Page 2 Answer Key

**2. List five different rates, from your life, using the word *PER*, like 2 hours of video games *PER* day.**

***ANSWER: will vary. Make sure students label the table and graph appropriately.***

**3. Questions about nutritional information.**

*Note: Please stress the importance of labeling the units for all problems.*

**Nutrition Facts** Serving Size 4 oz. (113g). Serving Per Container 4

| **Amount Per Serving** | |
|---|---|
| **Calories** 280 | Calories from Fat 130 |
| | % Daily Value* |
| **Total Fat** 14g | 22% |
| Saturated Fat 3.5g | 18% |
| Trans Fat 2.5g | |
| **Cholesterol** 120 mg | 40% |
| **Sodium** 640mg | 27% |
| **Total Carbohydrate** 13g | 4% |
| Dietary Fiber 1g | 4% |
| Sugars 0g | |
| **Protein** 24g | |
| Calories per gram | |
| Fat 9 • Carbohydrate 4 • Protein 4 | |

**3A. How many servings are there *PER* container?**

*ANSWER: 4 servings*

**3B. The label says there are 280 calories PER serving. How many calories are there *PER* container?**

*ANSWER: 1120 calories*

**3C. If this container of food was divided equally amoung 8 people, how much of the following would be consumed.**

**1. How many grams of fat *PER* person are there?**

*ANSWER: (14g)(4 servings)=56 grams per package. 56/8=7 grams per person.*

**2. How many grams of protein *PER* person are there?**

*ANSWER: (24)(4)=96 grams per package. 96/8=12 grams per person*

**Bonus: How many protein calories are there *PER* serving.?**

*ANSWER: 96 calories. 24 protein grams x 4 calories per gram. 24 x 4=96 calories*

| Common Core State Standards of Mathematics | |
|---|---|
| **6.RP** | Understand ratio concepts and use ratio reasoning to solve problems. |
| **6.RP.1** | Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. |
| ***6.RP.2*** | Understand the concept of a unit rate a/b associated with the ratio a:b with b not equal to 0, and use rate language in the context of a ratio relationship. |
| ***6.RP.3*** | Use ratio and rate reasoning to solve real-world and mathematical problems, e.g. by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. |
| ***7.RP*** | Ratios and Proportional Relationships |
| ***7.RP.1*** | Compute unit rates associated with ratios and 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.3*** | Use proportional relationships to solve multistep ratio and percent problems. |
| ***8.EE.5*** | Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. |
| ***8.F.2*** | Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. |
| ***8.F.4*** | Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. |

Math Snacks animations, games and support materials address all of the Common Core State Standards for Mathematical Practices when used as recommended in the teacher guide.