Bad Date
Teacher Guide

The *Bad Date* animation is available on iTunes U (search "Math Snacks") and at mathsnacks.org

Time Required: Two class periods

Learning Objectives:
- Ratios can represent part-whole or part-part relationships.
- Proportional relationships can be related to a common rate in direct variations.

Vocabulary: Proportional relationships, ratios, part-whole, part-part, one-to-one

Vocabulary: Relaciones proporcionales, razones, parte a todo, parte a parte, uno a uno

Materials and Technology required:
- Computer, LCD Projector, Access to Internet or animation
- Bonus activity: Copies of blank survey tables

Common Core State Standards Covered

Standard	Standard Description
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.

Preliminary Preparation

1. Watch the "Teaching with *Bad Date*" video.
2. Make copies of learner guide for *Bad Date*.
3. Do all problems in the learner guide and compare with teacher guide answers.
4. Go to the MathSnacks.com website and make sure the *Bad Date* animation is working for you. If you are using iPads to view the animation, make sure to download the animation from iTunes prior to class.

Animation Viewing and Discussion Questions

Show *Bad Date,* and then ask the following question:

1. What do you think this animation is about?
2. What math words or concepts did you see in the animation? (Hopefully "ratio" will be mentioned…if not, don't worry. Mention the word ratio and see if that spurs any discussion.)
3. What do you think a ratio is? (Record answers on the board.)
4. What did you learn from it?
5. Can you think of situations in your life where ratios are used to compare numbers?
6. Why are ratios helpful in these situations?
7. What are some different ways of expressing ratios, e.g., 1:7, 1/7, or 1 to 7? Can you think of situations where one expression might be more appropriate to use than another?

Tell students, *We are going to watch* Bad Date *again, and this time I am going to stop the animation in places so we can discuss the math*.

Show *Bad Date* again, but be prepared to pause and discuss. Pause after first date when the ratio is 1:7.

Ask students:

1. What do you think the ratio 1:7 means?
2. Can you think of any situations in your life that are a 1:7 ratio? Provide the first example to spur discussion if necessary. For example, *the ratio of the number of times my husband cooks dinner to the number of times I cook dinner is about a 1:7 ratio*.

Restart the animation and pause after second date when the ratio is 6:1. Ask students:

3. What do you think the ratio 6:1 means?
4. Is it different than the 1:7 ratio? How? (The important thing to draw out with this question is the fact that a ratio can be written as 1:6 or as 6:1, so long as it is labeled properly. For example: "She spoke six words to every one word he spoke" is the same as "He spoke one word to every six words she spoke.")
5. Can you think of any situations in your life that are a 6:1 ratio? Have a discussion.

Start animation and let it run to the end. Ask the following questions:

6. What was she looking for in a date? (Desired answer: A 1:1 ratio)
7. At the end was it a 1:1 ratio? (Answer: Yes, 57:57 is the same as 1:1)
8. Why do you think he said "bread"? (Answer: To make it a 1:1 ratio)
9. Do you think 57:56 is close to a 1:1 ratio?
   (Answers will vary. Make sure student reasoning is logical. For example, if one of them says, "It is the same because 56 and 57 are only one number apart," offer them the ratio 1:2, and ask them if this is close to a 1:1 ratio. This discussion should lead students to understand that if the numbers in a ratio are very large, and the numbers are close together, then the ratio is close to a 1:1 ratio, but if the numbers in a ratio are small, like 1:2, this is not close to a 1:1 ratio, even though the numbers are close together.)

   If this is not clear to the students, use money as an example, and compare 56:57 and 1:2. For example:
   - *If the ratio of my earnings to my neighbor's is 56:57, then I earn $560 and my neighbor earns $570. Do we earn close to the same amount?* (Answer: Yes.)
   - *Ok, if I earn $100, but the ratio of my earnings to my neighbor's is 1:2, then how much does he earn? For every dollar I earn, he earns two, so how much does he earn?* (Answer: $200).
   Do we still earn close to the same amount?

   (DO NOT USE CROSS MULTIPLYING TO SHOW THIS STEP.) Show them how to use the ratio and to solve the problem using patterns and multiplication, or see what other ways they come up with to do this. Cross multiplication may confuse them rather than help them at this point.

Bonus Activity

Have students play the game *Ratio Rumble,* at MathSnacks.com or on iPads, for at least 30 minutes. If you do not have access to a computer lab where all students can play the game simultaneously, it is possible to play the game with one computer at the front of the class, or students can play the game in pairs. Students can take turns completing different levels and helping each other. Throughout the game, encourage students to have discussions regarding equivalent ratios and how many different ways these equivalent ratios can be represented.

Initial Game Play Lesson

1. Allow students to play the game for 15–20 minutes.
2. Have students pause the game, and lead a discussion with the students about the gameplay.
   a. What do you like about this game?
   b. Did any of you have a hard time figuring out how to play?
   c. Can anyone give classmates any hints about how to play the game better?
   d. What math do you see in this game so far?
3. After the discussion, allow students to continue to play the game.
4. After 10–15 minutes, offer a challenge to the students. Create a ratio of numbers and have students identify five different equivalent ratios. Start with easy ratios and increase difficulty with student volunteers.
5. Encourage students to continue to play the game at home.

Extended Game Play Lesson

1. Allow students to play the game again.
2. Ask them to focus on the math concepts they see in the game.
3. Once everyone has done three or four rounds, have students pause the game.
4. Have students share their strategies for creating equivalent ratios using multipliers.

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

1. Ask students to imagine that Isabella had a date during which she spoke 64 words and her date spoke 512 words. Ask them to draw a picture, chart or graph that illustrates the ratio of her words to his words.
2. Isabella complains that she has had a lot of bad dates. Her idea of a bad date is someone who talks a lot more than she does or a lot less. Ask students to imagine themselves on a bad date and write a funny story or an animation script about it. They should use ratios to help explain what was so bad about it. For example, maybe a student's idea of a bad date is someone who eats a lot more or a lot less than he or she does. A student may not consider a 1:1 ratio ideal!
3. Ask students to make up five of their own ratio questions about text messaging. For example, if Derek sent 480 text messages last month and Angelina sent 464, what is the ratio of Derek's messages to Angelina's? Ask them to make an answer key on a separate sheet of paper. If there are several students in the class, they may exchange and answer each other's questions.
4. Complete the following table and have students calculate the ratios.

Question	*Yes*	*No*	Ratio *Yes : No*	Fraction *Yes*	Ratio *No : Yes*	Fraction *No*
a. **Are you an only child?**						
b. **Are you wearing red today?**						
c. **Do you understand what a ratio is?**						

Bonus Activity (continued)

5. Student-created surveys. Divide students into teams of two or three.
   - Have students create a three-question survey with yes/no questions.
   - Have students ask these questions to their classmates and other students in the school.
   - Have students create a table of their information similar to the table in question #4.
   - Have students calculate the ratios of the answers for each question and explain them verbally, in pictures, or in writing.
   - Have students calculate the appropriate ratios. Remember to remind them during the discussion how important it is to LABEL their ratios appropriately.

NOTE: For additional activities about ratios, please refer to the Teacher Guide for *Atlantean Dodgeball*.

Learner Guide Discussion

Pass out the learner guide and have students work alone or in groups of two, to solve the problems on the learner guide. Students may need assistance thinking of real-world ratios and may need to be asked guiding questions.

NOTE: Please offer some guidance for 2b. and 2c., because students must take into consideration the conversion from hours to minutes before doing the ratio. If this is too difficult, do these problems as a large group. Hopefully at least one student will get the correct answer and will be willing to share their strategy.

Make sure to review all answers and clear up any misconceptions from the learner guide, especially 2b and 2c, before moving on to the next activity.

The Bow
(Tie it all together to bring out the main ideas)

1. What is a ratio? (Desired answer: The comparison of two numbers.)
2. What does it mean for something to have a 1:1 ratio? (Desired answer: When the two numbers in a ratio are the same.)
3. What does it mean for two numbers to have CLOSE to a 1:1 ratio? What are some examples of this situation?
4. If I give you a ratio that is 125:200, what are some equivalent ratios? How did you figure out your answer?
5. Can the ratio 2:7 be the same as the ratio 7:2? Why?
6. What is the difference between a part:part relationship and a part:whole relationship when you are talking about ratios?

After using *Bad Date*, it would be most appropriate to use your curriculum to cover the concept of ratio. When the content in the curriculum starts to compare ratios and the difference between numbers, along with part:part versus part:whole relationships, then it would be appropriate to do *Math Snacks* ratio lesson 2, which is *Atlantean Dodgeball.*