Atlantean Dodgeball
Teacher Guide

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

Topic: Ratios and differences

Time Required: Two class periods

Learning Objectives: After watching the animation, completing the activities in the Learner Guide, and completing at least one bonus activity, students will

- Understand that ratios can represent part:part or part:whole relationships.
- Be able to demonstrate how part:whole ratios can be represented as fractions, converted to decimals, and converted to percentages.
- Be able to find equivalent ratios using various methods.

Vocabulary: Ratio, part-to-part, part-to-whole, equivalent ratio, fraction, equivalent fraction, decimal, difference, percentage

Vocabulary in Spanish: Razón, parte a parte, parte a todo, razón equivalente, fracción, fracción equivalente, decimal, diferencia, porcentaje

Materials and Technology required:

- Computer, LCD projector, access to Internet or animation
- Bonus activity: Access to dodgeballs, if allowed by your school
- Bonus activity: Access to a computer lab with sufficient computers for each student to play *Ratio Rumble*

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	**Analyze proportional relationships and use them to solve real-world and mathematical problems.**
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 Atlantean Dodgeball* video.
2. Make copies of Learner Guide for *Atlantean Dodgeball.*
3. Do all problems in the Learner Guide and compare with Teacher Guide answers.
4. Go to mathsnacks.com website and make sure the *Atlantean Dodgeball* 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 *Atlantean Dodgeball* and then ask the following questions:

1. What do you think this animation is about? (Record answers on board.)
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 remember about ratio from *Bad Date*? (Record answers on the board.)

Tell students, *Now we are going to watch Atlantean Dodgeball again, and I want you to pay attention to a few things. First, which coach is comparing the teams using a ratio? Second, which coach is comparing the teams using the difference? Which one of these methods do you think is more appropriate?*

After watching, ask the following questions:

1. Compare and contrast how the two coaches were comparing the different sizes of the teams throughout the game. (The goal for this question is to draw out a comparison between part:part ratios and the numerical difference between the sizes of the teams.)
2. Why is it more useful for the coaches to look at the ratio of players on the teams rather than the difference in the number of players on the teams?
3. How did the graphs in the animation help you understand how the teams were doing in the tournament?

Learner Guide Discussion

1. Pass out the Learner Guide and have students work individually or in pairs. The Learner Guide introduces the following concepts:
   - The importance of labeling a ratio (1B)
   - Understanding the relationship between part:part ratios and part:whole ratios (2A, 4)
   - Converting part:whole ratios into fractions, decimals and percentages (2B, 3A, 3B)
   - Comparing fractions relative to size (3C)
2. Discuss each question in the Learner Guide to bring out the main points listed above. Students should be able to do similar problems in the regular curriculum and in real-life situations when dealing with the concept of ratio. They should understand part:part and part:whole ratios; conversion of part:part ratios to part:whole ratios; conversion of part:whole ratios to fractions; conversion of fractions to decimals; and conversion of decimals to percentages.

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

1. What is a ratio?
2. What is a part:part ratio?
3. What is the relationship between a part:part ratio and a part:whole ratio?
4. Can a part:part ratio be expressed as a fraction? How?
5. Can a part:whole ratio be represented as a fraction? How?
6. How can a ratio be represented as a decimal and as a percentage?
7. How are these concepts related to *Atlantean Dodgeball*?

Bonus Activity

***Ratio Rumble* Game**

Ratio Rumble can be played on the iPad or on computers in a lab. Players are given ratio recipes and must identify equivalent ratios to win each round. The game should be played for a minimum of 20 minutes, and students can play individually or in pairs.

After students have played for 20 minutes, ask the following questions:

1. Why is this game called *Ratio Rumble*?
2. How is this related to the *Atlantean Dodgeball* and *Bad Date* animations?
3. If you have a ratio of 4:7, how many equivalent ratios can you find?
4. How do you find equivalent ratios? What operations are you using?

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

1. Divide students into small groups. Each group should try to convince the Belugas' coach to worry about the team-to-team ratio of players rather than the absolute difference in the number of players. They may create a skit, draw charts or pictures, or use props (e.g., books, chairs) to illustrate their points. A spokesperson for each group should present its case. (Estimated time: 20 min. to one class period.)
2. Organize a dodgeball game with students in the class, using appropriate balls (ask a PE teacher). Keep track of the ratios after each round or after each game. Have students create a chart with the various ratios and have them discuss the similarities and differences between the ratios – emphasize the relationship between the ratios in the game and a 1:1 ratio.
3. Ask the teams to calculate the player:player ratios and simplify them for the data presented in the table below. Calculators may be allowed. The instructor should call out the stats. For example, say, "Astros, 48, Stars, 8." The first team to give the reduced ratio 6:1 gets a point. Blank tables are provided on page 5 if needed as handouts.

Team 1	Players	Team 2	Players	Ratio
Astro	48	Stars	8	6:1
Pelicans	24	Dolphins	12	2:1
Dawgs	65	Kool Kats	15	13:3
Tigers	14	Lions	63	2:9
Reds	1	Blues	73	1:73
Bears	143	Cubs	39	11:3
Panthers	100	Lions	10	10:1
Spiders	60	Scorpions	30	2:1
Knights	45	Lances	60	3:4
Mustangs	12	Colts	52	3:13
Pirates	99	Steelers	18	11:2
Jays	21	Cardinals	63	1:3
Cowboys	56	Wranglers	11	56:11
Hawks	102	Eagles	22	51:11

Bonus Activity

1. Last baseball season, the teams listed in the table below each played 144 games. Ask students to figure out each team's win:loss ratio. This activity may be done by teams or by individuals; or, assign a few teams to each person in the class. (For example, if you have 7 students, ask each student to figure the ratios for 4 teams.) Which teams had winning seasons? Blank tables are provided on page 5 if needed as handouts.

   If it is appropriate mathematically for some or all of the students in your class, have students calculate the win:total ratio and the loss:total ratio as well. However, be prepared to lead an appropriate discussion about the differences between these types of ratios.

Answers: Bears (143:1), Panthers (25:11), Pirates (11:5), Blues (73:71)

Teams	Wins	Losses	Wins:Losses	Teams	Wins	Losses	Wins:Losses
Astro	48	96	48:96 or 1:2	Stars	8	136	8: 136 or 1:17
Pelicans	24	120	24:120 or 1:5	Dolphins	12	132	12:132 or 1:11
Dawgs	65	79	65:79	Kool Kats	15	129	15:129 or 5:43
Tigers	14	130	14:130 or 7:65	Lions	63	81	63:81 or 7:9
Reds	1	143	1:143	Blues	73	71	73:71
Bears	143	1	143:1	Cubs	39	105	39:105 or 13:35
Panthers	100	44	100:44 or 25:11	Lions	10	134	10:134 or 5:67
Spiders	60	84	60:84 or 5:7	Scorpions	30	114	30:114 or 5:19
Knights	45	99	45:99 or 5:11	Lances	60	84	60:84 or 5:7
Mustangs	12	132	12:132 or 1:11	Colts	52	92	52:92 or 13:23
Pirates	99	45	99:45 or 11:5	Steelers	18	126	18:126 or 1:7
Jays	21	123	21:123 or 7:41	Cardinals	63	81	63:81 or 7:9
Cowboys	56	88	56:88 or 7:11	Wranglers	11	56	11:56
Hawks	102	42	102:42 or 51:21	Eagles	22	11	22:11 or 2:1

Player : Player Ratios

Team 1	Players	Team 2	Players	Answer
Astro	48	Stars	8	
Pelicans	24	Dolphins	12	
Dawgs	65	Kool Kats	15	
Tigers	14	Lions	63	
Reds	1	Blues	73	
Bears	143	Cubs	39	
Panthers	100	Lions	10	
Spiders	60	Scorpions	30	
Knights	45	Lances	60	
Mustangs	12	Colts	52	
Pirates	99	Steelers	18	
Jays	21	Cardinals	63	
Cowboys	56	Wranglers	11	
hawks	102	Eagles	22	

Win : Loss Ratios

Teams	Wins	Answer	Teams	Wins	Answer
Astro	48		Stars	8	
Pelicans	24		Dolphins	12	
Dawgs	65		Kool Kats	15	
Tigers	14		Lions	63	
Reds	1		Blues	73	
Bears	143		Cubs	39	
Panthers	100		Lions	10	
Spiders	60		Scorpions	30	
Knights	45		Lances	60	
Mustangs	12		Colts	52	
Pirates	99		Steelers	18	
Jays	21		Cardinals	63	
Cowboys	56		Wranglers	11	
Hawks	102		Eagles	22	