

MATH SNACKS

Atlantean Dodgeball Guide and Answer Key for Instructors



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

Learning Objectives: The *Atlantean Dodgeball* animation is about ratios and differences. By 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.
- 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.

Animation Discussion

With your students, watch the 6-minute animation *Atlantean Dodgeball* at <http://www.mathsnacks.org> and spend about 10 minutes discussing the big ideas or key points in the animation.

- Compare and contrast how the two coaches compared their team sizes throughout the game. (Draw out the difference between part:part ratios and the absolute numerical sizes of the teams.)
- Why was it more useful when the coaches considered the ratio of players on the teams rather than the difference in the number of players on the teams?
- Did the graphs in the animation help you understand how each team was doing in the tournament?

Vocabulary ratio, part:part, part:whole, fraction, equivalent ratio, equivalent fraction, decimal, percentage

Learner Guide Page 1



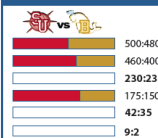
Atlantean Dodgeball Learner Guide

Watch the video, "Atlantean Dodgeball," and complete these activities. The video and an instructor guide are available on iTunes U (search for "Math Snacks") and at mathsnacks.org.

1. In the Atlantean Dodgeball tournament, both teams had lost about half of their members going into the final round. With team sizes of 500 and 400, the Sea Urchin coach was happy that the teams were still fairly evenly matched (close to a 1:1 ratio). The Belugas coach was upset that the Sea Urchins had 20 more players (a 20-player difference).

B. A newspaper reported that the final ratio of the tournament was 2:9. Are they correct? Why or why not?

A. Fill in the empty bar graphs to estimate ratios of Sea Urchins to Belugas players as the score changes during the tournament.



2. Here are three pie charts that show wins and losses as parts of the total games played. Fill in the empty circle with the ratio of wins to losses for Metro City.



B. Who do you think is the biggest loser? Why?

C. What is the ratio of games lost to total games for each team? Write your answer as a fraction.

Team Name	Ratio	Fraction	Simplified Fraction	Decimal	Percentage of games lost
Small Town	20:50	20/50	2/5	0.40	40%
Big City					
Metro City					

Math Snacks Atlantean Dodgeball Student Learner Guide

<http://www.mathsnacks.org>

Learner Guide Page 2

3. You and your friend, Joe, are arguing about which baseball team is the best. Big City's baseball team, Joe's favorite, had 48 wins and 16 losses for the season. You think your team, Metro City, has a better record because it lost fewer games. Joe thinks his team has a better record because they won more games.

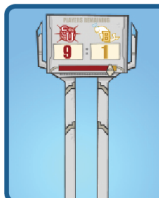
Try to settle the argument by filling out the table below.



Team	Games	Wins	Losses	Win to Loss Ratio	Wins to Total Ratio	Losses to Total Ratio
Small Town	50	30	20	30:20	30/50	
Big City	64	48	16			
Metro City	45	36	9			

A. How are the ratios of Win:Loss, Wins:Total, and Losses:Total related?

B. Use one or all of these ratios to decide which team has the best record for the season. Explain your answer and show your work.



4. 9:1 is the ratio of Sea Urchin players to Beluga players. Is this a part to part or part to whole ratio?

A. Describe how this ratio can be represented in fraction form.

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Math Snacks Atlantean Dodgeball Student Learner Guide <http://www.mathsnacks.org>

Bonus Activities

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 6 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	Kook 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 Activities

4. Last baseball season, the teams listed in the table below each played 144 games. Ask students to figure 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 6 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.

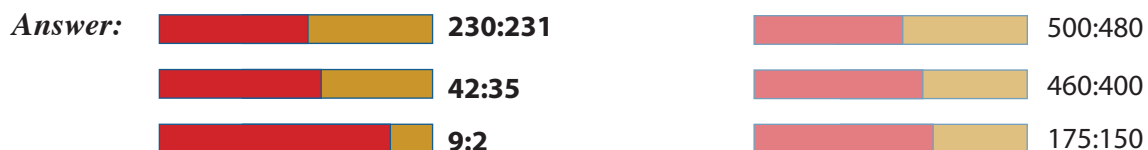
Answers: *Bears (143:1) Panthers (25:11) Pirates (11:5) Blues (73:71)*

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	Kook 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

Page 1 Answer Key

1. In the Atlantean dodgeball tournament, both teams had lost about half of their members going into the final round. The Sea Urchins' coach looked at the team sizes of 500 and 480 and was happy that the teams were still fairly evenly matched (close to a 1:1 ratio). The Belugas' coach was upset because the Sea Urchins had 20 more players (a 20-player difference).

- a. Fill in the empty bar graphs to estimate the ratios of Sea Urchins to Belugas as the score changes during the tournament.

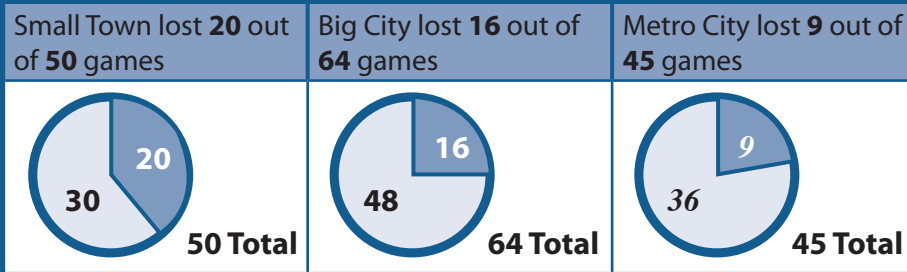


- b. A newspaper reports that the final ratio of the tournament was 2:9. Are they correct? Why or why not?

Answer: *If the paper reported the ratio of Belugas to Sea Urchins as 2:9, it would be correct, but if it did not specify Belugas to Sea Urchins it could be interpreted wrongly.*

Page 1 continued Answer Key

2. Here are three pie charts that show wins and losses as parts of the total games played. Fill in the empty circle with the ratio of wins to losses for Metro City.



a. Who do you think is the biggest loser? Why?

Answer: Small town. Justifications may vary. One answer would be that Small Town lost 40%, Big City lost 25%, Metro City lost 20%.

b. What is the ratio of games lost to total games for each team? Write your answer as a fraction.

Team Name	Ratio	Fraction	Simplified Fraction	Decimal	Percentage of games lost
Small Town	20:50	$\frac{20}{50}$	$\frac{2}{5}$	0.40	40%
Big City	16:64	$\frac{16}{64}$	$\frac{1}{4}$	0.25	25%
Metro City	9:45	$\frac{9}{45}$	$\frac{1}{5}$	0.20	20%

Page 2 Answer Key

3. You and your friend, Joe, are arguing about which baseball team is the best. Big City's baseball team, Joe's favorite, had 48 wins and 16 losses for the season. You think your team, Metro City, has a better record because it lost fewer games. Joe thinks his team has a better record because they won more games. Try to settle the argument by filling out the table below.

Team	Games	Wins	Losses	Win to Loss Ratio	Wins to Total Ratio	Losses to Total Ratio
Small Town	50	30	20	30:20	30:50	20:50
Big City	64	48	16	48:16	48:64	16:64
Metro City	45	36	9	36:9	36:45	9:45

a. How are the ratios of Win:Loss, Wins:Total, and Losses:Total related?

Answer: Total = Wins + Losses

b. Use one or all of these ratios to decide which team has the best record for the season. Explain your answer and show your work.

Answers will vary, but reasoning should be similar to that in 2c or 3a of Bonus Activities.

4. 9:1 is the ratio of Sea Urchin players to Beluga players. Is this a part-to-part or part-to-whole ratio?

Answer: Part-to-part

a. Describe how this ratio can be represented in fraction form.

Answer: Fractions represent part-to-whole relationships, so the fraction representation of the 9:1 ratio can be written as follows: 1/10 of the players left are Belugas and 9/10 of the players left are Sea Urchins. Emphasize the importance of labeling.

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.

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.

Player-player ratios				
Team 1	Players	Team 2	Players	Answer
Astro	48	Stars	8	
Pelicans	24	Dolphins	12	
Dawgs	65	Kook 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 ratio					
Teams	Wins	Answer	Teams	Wins	Answer
Astro	48		Stars	8	
Pelicans	24		Dolphins	12	
Dawgs	65		Kook 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	