Plan for Grade 6 Unit 2: Introducing Ratios

Relevant Unit(s) to review: Grade 5 Units 3 and 6

Essential prior concepts to engage with this unit	• additive reasoning • use of a number line • dividing one whole number by another • multiplication as scaling
Brief narrative of approach	This unit will be taught with fidelity with some minor adjustments. The unit's broad goal, to introduce students to the concept of ratio, starts with an accessible entry point where students are introduced to the concept of ratios using direct modeling and counting strategies. From there, students learn multiple approaches to make sense of ratio thinking such as double number lines, tables, and tape diagrams.

Lessons to Add	**Lessons to Remove or Modify**
An introductory understanding of the use of a number line and tape diagram is helpful when engaging with this unit. These lessons might make a nice reference to activate prior knowledge: 1. IM Grade 5, Unit 3, Lessons 10 and 11 for division using algorithms. 2. IM Grade 5, Unit 6, Lesson 17 for the use of a number line and multiplication by scaling.	1. 6.2.1 and 6.2.2 combine to make sense of ratios. 2. 6.2.3 and 6.2.4 have similar goals. 6.2.3 also requires physical manipulatives and could be combined with a lesson from the Accelerated course Acc6.2.2. 3. 6.2.14 is optional and centers around using an additional strategy. 4. 6.2.17 is optional. It is a culminating task that could be done outside of class.
Lessons added: 3	Lessons removed: 4

Modified Plan for Grade 6 Unit 2

Day	IM lesson	Notes
	Check Your Readiness	
1	6.2.1 6.2.2	Combine these lessons with an emphasis on making sense of ratios.
2	5.3.10	Understand how the value of a quotient changes when the numerator or denominator changes.
3	5.3.11	Recall division of whole numbers including the use of tape diagrams.
4	Acc6.2.2	Use the Accelerated lesson to work with ratios.
5	6.2.5	
6	6.2.6	
7	5.6.17	Compare the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
8	6.2.7	Introduction to the double number line.
9	6.2.8	Emphasize “per” and “at this rate”.
10	6.2.9	
11	6.2.10	
12	6.2.11	
13	6.2.12	Introduction to ratio tables.
14	6.2.13	

15	6.2.15	Introduction to tape diagrams
16	6.2.16	
17	End Assessment	

Priority and Category List for Lessons

High priority (+), Medium priority (0), Low priority (-)

E: Explore, Play, and Discuss, D: Deep Dive, A: Synthesize and Apply

IM lesson	Priority (+, 0, -)	Category (E, D, A)	Notes
6.2.1	+	E	In this lesson, students use collections of objects to make sense of the idea of a ratio and compare two quantities at the same time. Activity 2 is a high priority towards this outcome. The cool down asks students both to draw a diagram to express a ratio and to complete statements to describe a ratio correctly.
6.2.2	0	D	In this lesson, students use diagrams to represent situations involving ratios to continue to develop ratio language. The cool down asks students both to draw a diagram to express a ratio and to complete statements to describe a ratio correctly.
6.2.3	0	E	First of two lessons to develop the idea of equivalent ratios through physical experiences. Students see that scaling a ratio up or down requires multiplying the amount of each ingredient. The cool-down asks students to scale down a ratio.
6.2.4	0	D	This is the second of two lessons to develop the idea of equivalent ratios. The cool-down asks students to write equivalent ratios given a doubling or tripling of scale.
6.2.5	+	A	In this lesson, students work through different types of ratio problems that involve scaling. The cool-down asks students given a ratio to create an equivalent

			one.
6.2.6	+	E	In this lesson, students get introduced to the double number line. The cool down asks students to create a double number line and use it to answer further questions.
6.2.7	+	E	In this lesson, students create double number line diagrams from scratch. The cool-down gives students a ratio (using cats ears, paws, and tails) to represent using a double number line.
6.2.8	+	E	In this lesson, students are introduced to the idea of a unit price. In this context, they are introduced to the idea of "per" and "at this rate". The cool down gives students a double number line, and a ratio as a tool to find both a unit rate and an unknown quantity that requires scaling.
6.2.9	0	A	In this lesson, students are looking at the idea of ratios through the context of constant speed. The cool-down has students compare two different sets of double number lines that represent the speed of a train to figure out which one is moving faster.
6.2.10	+	A	In this lesson, students compare ratios to see if two situations in familiar contexts involve the same rate. The cool-down rationalizes whether two given rates with different quantities (2 people running) are the same rate.
6.2.11	+	E	In this lesson, students are introduced to the idea of using tables to solve ratio problems. The cool-down asks students to interpret a table for equivalent ratios and, given the table, to find unknown quantities.
6.2.12	+	D	In this lesson, students build on what they learned about tables and ratios in the previous lesson. Here, they use multipliers to solve ratio problems. The cool down asks students, given a rate with different quantities, to find different values of each quantity.
6.2.13	+	D	In this lesson, students explicitly connect and contrast double number lines and tables. The cool-down asks students given a rate, to find a value (in this case how far a cyclist travels in 3 seconds).
6.2.14	-	A	This lesson is optional. The purpose of this lesson is to give students further practice in solving equivalent ratio problems and introduce them to the info gap

			activity structure. Cool down asks given missing information, what a student would need to solve a ratio problem.
6.2.15	+	A	In this lesson, students are introduced to tape diagrams as a way to represent ratios. The cool-down asks students to find the total of each part. given a total amount (189 square feet) and a 3 part ratio (example 4:3:2).
6.2.16	+	A	In this lesson, students use all representations they have learned in this unit—double number lines, tables, and tape diagrams—to solve ratio problems that involve the sum of the quantities in the ratio. The cool-down gives a scenario where students are given a ratio (6 ounces dough, 4 ounces sauce) and total (130 ounces total) and are to find the values that equal the sum of the quantities.
6.2.17	-	A	The lesson is optional.

Lesson 10: Concepts of Division

- Let’s think about the size of quotients.

Warm-up: Number Talk: Same Dividend, Different Divisor

Find the value of each expression mentally.

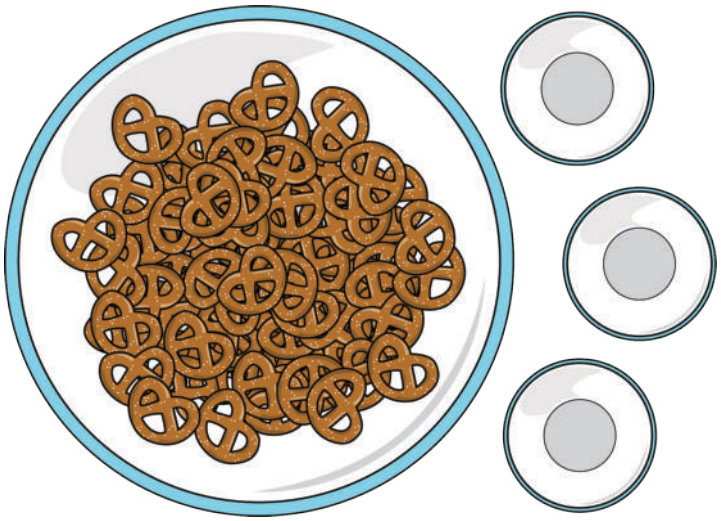
- $120 \div 12$

- $120 \div 6$

- $120 \div 3$

- $120 \div 2$

10.1: Share Pretzels



Order the situations from greatest to least based on the number of pretzels each student will get. Be prepared to explain your reasoning.

3 students equally share 42 pretzels.
14 students equally share 42 pretzels.
3 students equally share 24 pretzels.
3 students equally share 45 pretzels.
7 students equally share 42 pretzels.
3 students equally share 6 pretzels.
6 students equally share 42 pretzels.

10.2: Division Patterns

1. Find the value of each expression.

   a. $36 \div 3$

   b. $12 \div 3$

   c. $9 \div 3$

   d. $6 \div 3$

   e. $3 \div 3$

   f. $1 \div 3$

2. What patterns do you notice?

3. Why is the quotient getting smaller?

4. What do you know about this expression: $\frac{1}{3} \div 3$?

5. Draw a diagram to represent $\frac{1}{3} \div 3$.

Lesson 11: Divide Unit Fractions by Whole Numbers

- Let’s divide a unit fraction by a whole number.

Warm-up: Number Talk: Double the Divisor

Find the value of each expression mentally.

- $72 \div 4$
- $36 \div 4$
- $4 \div 4$
- $1 \div 4$

11.1: More Macaroni and Cheese

Jada and her 2 sisters equally share $\frac{1}{2}$ a pan of macaroni and cheese.

1. Draw a diagram to represent the situation.

2. Explain how this expression represents the situation: $\frac{1}{2} \div 3$

3. How much of the whole pan of macaroni and cheese will each person get?

11.2: More People Share

1. 4 people equally share $\frac{1}{2}$ a pan of macaroni and cheese.
   a. Draw a diagram to represent the situation.

   b. Explain how your diagram represents $\frac{1}{2} \div 4$.

   c. How much of the whole pan of macaroni and cheese did each person get? Be prepared to explain your reasoning.

2. 5 people equally share $\frac{1}{2}$ a pan of macaroni and cheese.

a. Draw a diagram to represent the situation.

b. Explain how your diagram represents $\frac{1}{2} \div 5$.

c. How much of the whole pan of macaroni and cheese did each person get? Be prepared to explain your reasoning.

3. How are the problems the same? How are they different?

Lesson 17: Interpret Diagrams

- Let’s compare products without multiplying.

Warm-up: Estimation Exploration: Fraction of a Whole Number

$$\frac{5}{3} \times 9{,}625$$

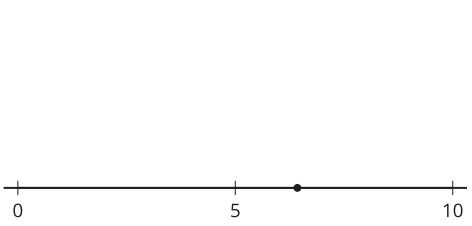
Record an estimate that is:

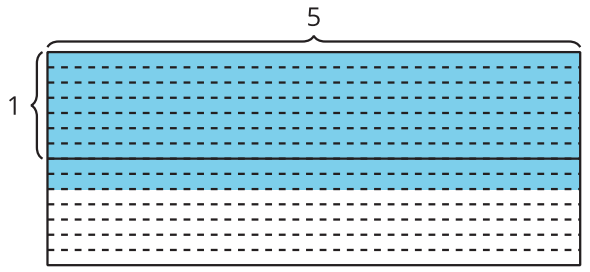
too low	about right	too high

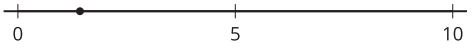
17.1: Match the Diagram

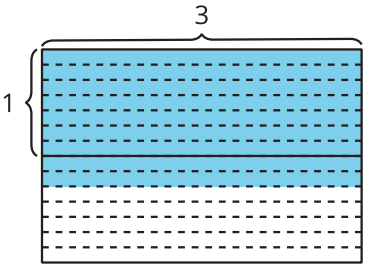
1. Match the expressions and diagrams.

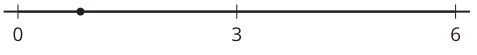
$\frac{2}{7} \times 3$ $\frac{9}{7} \times 3$ $\frac{2}{7} \times 5$ $\frac{9}{7} \times 5$

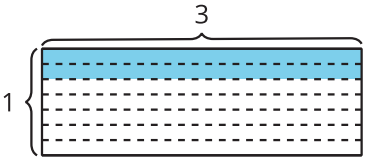


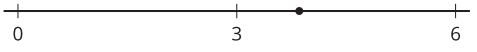


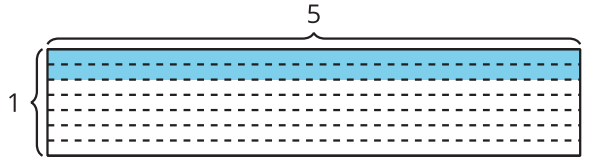












2. Write $<$ or $>$ in each blank to make the inequality true.

a. $\frac{2}{7} \times 3 \_\_\_\_ 3$

b. $\frac{9}{7} \times 3 \_\_\_\_ 3$

c. $\frac{2}{7} \times 5 \_\_\_\_ 5$

d. $\frac{9}{7} \times 5 \_\_\_\_ 5$

17.2: Who Ran Farther?

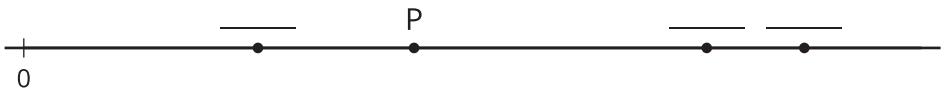
- Priya ran to her grandmother's house.
- Jada ran twice as far as Priya.
- Han ran $\frac{6}{7}$ as far as Priya.
- Clare ran $\frac{14}{8}$ as far as Priya.
- Mai ran $\frac{3}{5}$ times as far as Priya.

1. Which students ran farther than Priya? _____

2. Which students did not run as far as Priya? _____

3. List the runners in order from shortest distance run to longest. Explain or show your reasoning.

4. The point P represents how far Priya ran. Write the initial of each student in the blank that shows how far they ran. One of the students will be missing.



5. Label the distance for the missing student on the number line above.