Fraction Operations and Models

Lesson 10 Full Containers and Leftovers

Standards 6.NS.A.1

Learning target I can write and solve a fraction-division equation for a situation.

Materials Fraction strips, blank fraction bars, pencils.

Lesson Flow 50 Minutes

0–5 Activate prior knowledge. Read the learning target. Ask students what they already know about full containers and leftovers. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. Identify the total amount and the size of one group. Use total ÷ group size for the number of groups. A quotient may include a partial group; if the question asks for full servings, use only the whole-number part. Work through the two examples on the attached instruction page. Have students name the first step before showing it.

17–22 Guided practice. Revisit worked Example 2 with its solution covered. Students propose the next step and explain why it is valid; uncover and compare with the worked solution.

22–45 Independent classwork. Assign the attached 10 questions in order. Check items 1–3 for entry-level understanding, 4–6 for connected procedures, 7–8 for representation and explanation, and 9–10 for application or justification. Ask students to use the instruction-page notes area or extra grids for longer work.

45–50 Check understanding. Use classwork question 10 as an exit discussion: A jug contains 1 1/2 L. Each full bottle needs 3/8 L. How many full bottles can be filled, and how much liquid remains? Compare the result with the answer key and ask a student to defend the method.

Support and Extension

Support Model item 1 together with the listed tools, then have students attempt item 2 independently. Watch for taking the reciprocal of the dividend, confusing a partial group with a fraction of the whole, and rounding full-container counts upward.

Extension Ask students to solve a final item another way, draw a second representation, or create a related problem with a checked answer.

Next step Record which students can explain the target independently. Begin the next teaching session with a brief correction for any recurring error.

Name _____ Date _____

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Learning target I can write and solve a fraction-division equation for a situation.

Learn and Discuss

Identify the total amount and the size of one group. Use total ÷ group size for the number of groups. A quotient may include a partial group; if the question asks for full servings, use only the whole-number part.

Example 1 A ribbon is 1/4 m long. Each piece is 1/4 m. How many piece-lengths are in the ribbon? Include any fractional piece.
Solution 1 piece-lengths. 1/4 ÷ 1/4 = 1/4 × 4 = 1.
Example 2 A jug contains 1/2 L. Each full bottle needs 1 L. How many full bottles can be filled, and how much liquid remains?
Solution 0 bottles; 1/2 L left. 1/2 ÷ 1 = 1/2 × 1 = 1/2. Only whole bottles count; subtract the liquid used.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Full Containers and Leftovers

Name _____ Show calculations, models, and units.

1. A ribbon is 1/2 m long. Each piece is 1/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

2. A ribbon is 1 m long. Each piece is 1/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

3. A ribbon is 3/4 m long. Each piece is 1/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

4. A ribbon is 1 1/2 m long. Each piece is 1 m. How many piece-lengths are in the ribbon? Include any fractional piece.

5. A ribbon is 1 1/5 m long. Each piece is 3/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

6. A ribbon is 1 1/3 m long. Each piece is 1/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

7. A jug contains 2 L. Each full bottle needs 1 L. How many full bottles can be filled, and how much liquid remains?

8. A jug contains 1/4 L. Each full bottle needs 2/5 L. How many full bottles can be filled, and how much liquid remains?

9. A jug contains 1 L. Each full bottle needs 1/2 L. How many full bottles can be filled, and how much liquid remains?

10. A jug contains 1 1/2 L. Each full bottle needs 3/8 L. How many full bottles can be filled, and how much liquid remains?

Full Containers and Leftovers

Fraction Operations and Models

1. 1 piece-lengths
Reasoning 1/2 ÷ 1/2 = 1/2 × 2 = 1.

2. 2 piece-lengths
Reasoning 1 ÷ 1/2 = 1 × 2 = 2.

3. 3/2 piece-lengths
Reasoning 3/4 ÷ 1/2 = 3/4 × 2 = 3/2.

4. 3/2 piece-lengths
Reasoning 3/2 ÷ 1 = 3/2 × 1 = 3/2.

5. 4/5 piece-lengths
Reasoning 6/5 ÷ 3/2 = 6/5 × 2/3 = 4/5.

6. 8/3 piece-lengths
Reasoning 4/3 ÷ 1/2 = 4/3 × 2 = 8/3.

7. 2 bottles; 0 L left
Reasoning 2 ÷ 1 = 2 × 1 = 2. Only whole bottles count; subtract the liquid used.

8. 0 bottles; 1/4 L left
Reasoning 1/4 ÷ 2/5 = 1/4 × 5/2 = 5/8. Only whole bottles count; subtract the liquid used.

9. 2 bottles; 0 L left
Reasoning 1 ÷ 1/2 = 1 × 2 = 2. Only whole bottles count; subtract the liquid used.

10. 4 bottles; 0 L left
Reasoning 3/2 ÷ 3/8 = 3/2 × 8/3 = 4. Only whole bottles count; subtract the liquid used.