

Objective

Divide a whole number by a unit fraction.

Common Core State Standards

- 5.NF.7b** Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.

Number and Operations—Fractions

Dividing a Whole Number by a Fraction

Students will build upon their understanding of multiplying a fraction by a whole number to now divide a whole number by a fraction. Using concrete models and real-world situations will help students visualize the relationship between multiplying and dividing whole numbers by fractions.

Try It! Perform the Try It! activity on the next page.

Talk About It

Discuss the Try It! activity.

- Write $3 \div \frac{1}{4}$ on the board. **Ask:** What do the three whole towers represent? Why did you divide the three towers into fourths? What does each fourth represent?
- Say:** You know that multiplication and division are inversely related. Write, If $12 \times \frac{1}{4} = 3$, then $3 \div \frac{1}{4} = 12$. **Ask:** How can you use this to help you divide a whole number by a fraction?

Solve It

Reread the problem with students. Have them draw the tower pieces on the Fraction Towers BLM and number them 1–12 to answer the problem and write the equation.

More Ideas

For other ways to teach dividing a whole number by a unit fraction—

- Have students use Fraction Tower® Equivalency Cubes to divide whole numbers by unit fractions. Encourage students to color each fractional segment a different color. Have them write the equation as a division problem and then as a multiplication problem.
- For additional problems involving whole numbers divided by unit fractions, have students use Deluxe Rainbow Fraction® Circles. Encourage students to write the equation as a division problem and then as a multiplication problem.

Formative Assessment

Have students try the following problem.

Wanda has 12 feet of ribbon with which to tie party bags. If she cuts $\frac{1}{3}$ foot of ribbon for each bag, how many pieces of ribbon can she cut?

- A. 4 B. 24 C. 15 D. 36

Try It! 15 minutes | Groups of 4

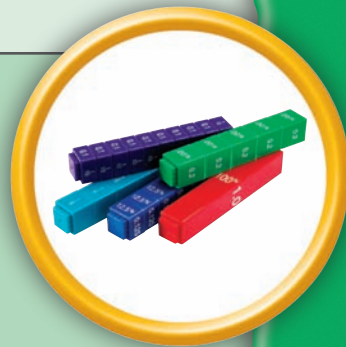
Here is a problem about dividing a whole number by a fraction.

Jin has 3 cups of potting soil, small peat pots, and a package of seeds. If he puts $\frac{1}{4}$ cup of soil and a seed in each peat pot, how many peat pots can he fill with the soil?

Introduce the problem. Then have students do the activity to solve the problem. Distribute Fraction Tower Equivalency Cubes, Fraction Tower sheets, and pencils to students.

Materials

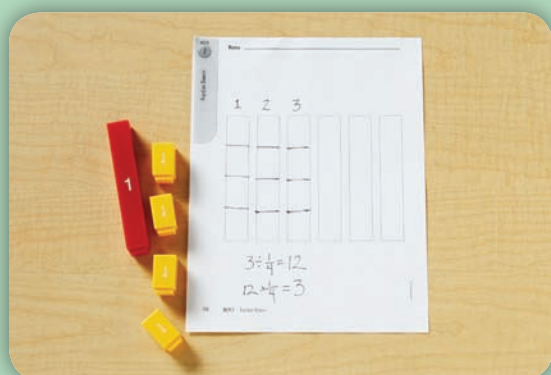
- Fraction Tower® Equivalency Cubes (1 set per group)
- Fraction Towers (BLM 7)
- pencils



1. Ask: How many cups of soil does Jin have? How much does he want to put in each pot? Explain to students that they will use three Fraction Tower outlines to represent the three cups of soil. Have them find the tower that represents fourths and use it to mark off $\frac{1}{4}$ sections on three outlines. Have students write $3 \div \frac{1}{4}$.



2. Ask: How many fourths are there in one whole tower? Three whole towers? How many peat pots can Jin fill with $\frac{1}{4}$ cup of soil in each? Have students write $3 \div \frac{1}{4} = 12$.



3. Say: Our towers show $3 \div \frac{1}{4} = 12$. You also know that multiplication and division have an inverse relationship. You can use this to think of the problem as $12 \times \frac{1}{4} = 3$. Have students write the number sentence, $12 \times \frac{1}{4} = 3$.

Look Out!

Watch for students who draw four lines on the towers instead of three and end up dividing the towers into fifths instead of fourths.

Use Fraction Towers to model the problem. Write the quotient.

(Check students' work.)

1. Hugo has 4 sheets of green card stock he wants to cut into Earth Day bookmarks. How many bookmarks can he make if each one is $\frac{1}{8}$ of a sheet?



$$4 \div \frac{1}{8} = \underline{32}$$

Using Fraction Towers, model the problem. Sketch the model. Write the equation that shows the solution.

(Check students' models.)

2. How many $\frac{2}{3}$ foot pieces of fabric can be cut from 4 yards of fabric?

$$\underline{12} \div \frac{\underline{2}}{\underline{3}} = \underline{18}$$

Divide.

3. $4 \div \frac{1}{5} = \underline{20}$

4. $8 \div \frac{1}{4} = \underline{32}$

5. $6 \div \frac{3}{8} = \underline{16}$

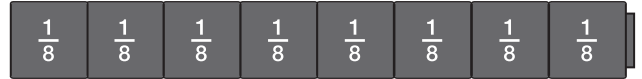
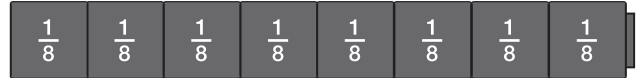
6. $15 \div \frac{3}{10} = \underline{50}$

7. $9 \div \frac{1}{3} = \underline{27}$

8. $9 \div \frac{3}{8} = \underline{24}$

Use Fraction Towers to model the problem. Write the quotient.

- Hugo has 4 sheets of green card stock he wants to cut into Earth Day bookmarks. How many bookmarks can he make if each one is $\frac{1}{8}$ of a sheet?



$$4 \div \frac{1}{8} = \underline{\hspace{2cm}}$$

Using Fraction Towers, model the problem. Sketch the model. Write the equation that shows the solution.

- How many $\frac{2}{3}$ foot pieces of fabric can be cut from 4 yards of fabric?

$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Divide.

3. $4 \div \frac{1}{5} = \underline{\hspace{2cm}}$

4. $8 \div \frac{1}{4} = \underline{\hspace{2cm}}$

5. $6 \div \frac{3}{8} = \underline{\hspace{2cm}}$

6. $15 \div \frac{3}{10} = \underline{\hspace{2cm}}$

7. $9 \div \frac{1}{3} = \underline{\hspace{2cm}}$

8. $9 \div \frac{3}{8} = \underline{\hspace{2cm}}$

Name _____

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