Number and Operations–Fractions

Proper Fractions on a Number Line

Once students develop their understanding of unit fractions, they can progress to other proper fractions. In this lesson, students will begin to count more than one fractional part on a number line. Using manipulatives will make the counting more concrete.

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

Talk About It

Discuss the Try It! activity.

■ **Ask:** *How many thirds are in one whole?* Have students use the Fraction Tower® Cubes and the number line to show that three thirds equal a whole, and have them write $\frac{3}{3}$ under the 1 on the number line. **Ask:** *What do we call 2 of the 3 pieces that make a whole?* Write $\frac{2}{3}$ on the board.

■ **Ask:** *What if Margot decided she wanted a shelf longer than $\frac{2}{3}$? What is the next division in thirds?* ($\frac{3}{3}$ or the whole) **Say:** *Look at the other Fraction Towers. Find one that you can use to make a tower longer than $\frac{2}{3}$ but shorter than a whole. Make the tower.* Guide students to find $\frac{3}{4}, \frac{4}{5}, \frac{5}{6},$ or $\frac{6}{8}$.

Solve It

With students, reread the problem. Have students draw a number line to represent the whole piece of wood and divide it into thirds. Have them count and label $\frac{2}{3}$.

More Ideas

For other ways to teach about proper fractions on a number line—

■ Have pairs use Fraction Tower Cubes with Fraction Tower Number Lines (BLM 9) to show fractions they create. Have one student choose a tower other than the one whole and use it to draw ticks on two of the number lines. Have the other student break the chosen tower into two parts. Have students mark and label each of the number lines with one of the fractional parts.

■ Have students reach into a bag filled with Fraction Tower Cubes and grab 2 handfuls of cubes. Have them match up all of the like pieces and draw each resulting fraction on a number line. Have them label the fractions.

Formative Assessment

Have students try the following problem.

Which fraction is circled?
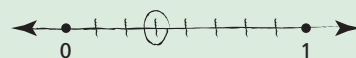
A. $\frac{3}{8}$ **B.** $\frac{5}{8}$ **C.** $\frac{4}{6}$ **D.** $\frac{3}{4}$

Try It! 30 minutes | Groups of 4

Here is a problem about proper fractions on a number line.

Margot is making a shelf from a board. She wants the shelf to be $\frac{2}{3}$ the length of the wood. Where should she cut the wood?

Introduce the problem. Then have students do the activity to solve the problem. Distribute Fraction Tower Cubes, Fraction Tower Number Lines (BLM 9), and pencils to students.

Materials
- Fraction Tower® Cubes (1 set per group)
- Fraction Tower Number Lines (BLM 9; 1 per group)
- pencils (1 per group)

1. Have students find the red whole Fraction Tower. **Say:** *Let's say this is Margot's piece of wood. She only wants to use $\frac{2}{3}$ of it.* **Ask:** *Which Fraction Tower can you use to show thirds?* Guide students to find the orange Fraction Tower. Have students put the two towers side by side to see that they are equal.
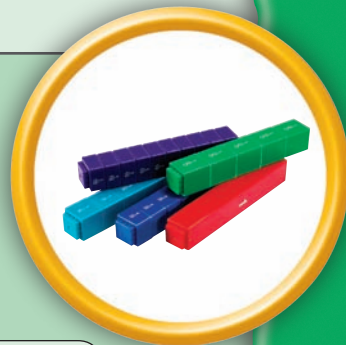
2. Say: *Lay the orange tower on the first number line on your paper so that the ends fit between 0 and 1.* Explain that the 3 pieces of the tower make up the whole and that 0 to 1 on the number line is the whole. Have students draw tick marks to partition the number line into thirds, using the orange tower as a guide.

⚠ Look Out!

Make sure students count and label ticks from left to right so they can see the progression of the fractions from 0 to 1.

3. Have students break the orange tower into 3 pieces, and discuss that 1 piece is $\frac{1}{3}$ of the whole. Have them lay one piece on the first section of the number line and label the first tick $\frac{1}{3}$. Then have them add a second piece to the tower. **Ask:** *How many thirds are there now?* Have students lay the tower on the number line and label the second tick $\frac{2}{3}$.

Use Fraction Towers and a number line to build each model. Mark and label the number line. Circle the fraction on the number line.
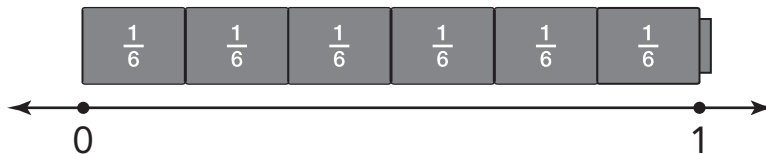
(Check students' work.)

1. $\frac{5}{8}$ number line divided into eighths with the $\frac{5}{8}$ label circled

| $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ |

0   1

2. $\frac{2}{6}$ number line divided into sixths with the $\frac{2}{6}$ label circled

| $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ |

0   1

Use Fraction Tower Cubes and a number line to model each fraction. Draw the model. Mark and label the number line. Circle the fraction on the number line.

3. $\frac{4}{5}$ model of fifths, number line divided into fifths with the $\frac{4}{5}$ label circled

0   1
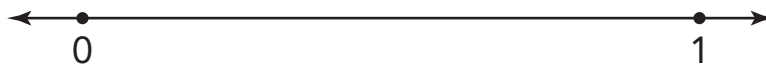
4. $\frac{3}{4}$ model of fourths, number line divided into fourths with the $\frac{3}{4}$ label circled

0   1

Mark and label the number line. Circle the fraction.

5. $\frac{7}{10}$ number line divided into tenths with the $\frac{7}{10}$ label circled

0   1

Challenge!   Using Fraction Tower Cubes, draw a number line and show a whole divided into 8 equal parts. Label the number line. Color $\frac{7}{8}$ of the whole. Write the fraction.

Challenge: Number line should be divided into 8 reasonably equal pieces with the first 7 pieces colored; $\frac{7}{8}$.

Name _____

Use Fraction Towers and a number line to build each model. Mark and label the number line. Circle the fraction on the number line.

1. $\frac{5}{8}$

| $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ |

0   1

2. $\frac{2}{6}$

| $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ |

0   1

Use Fraction Tower Cubes and a number line to model each fraction. Draw the model. Mark and label the number line. Circle the fraction on the number line.

3. $\frac{4}{5}$

0   1

4. $\frac{3}{4}$

0   1

Mark and label the number line. Circle the fraction.

5. $\frac{7}{10}$

0   1

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Name _____

Challenge!   Using Fraction Tower Cubes, draw a number line and show a whole divided into 8 equal parts. Label the number line. Color $\frac{7}{8}$ of the whole. Write the fraction.
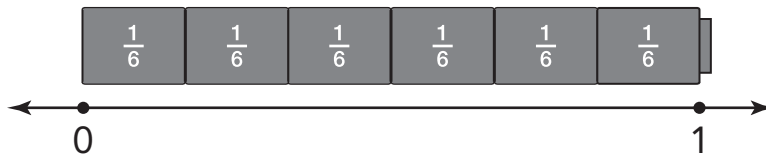
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Fraction Tower® Number Lines

Name _____

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<————————•————————————————————————————•————————>
         0                             1

<————————•————————————————————————————•————————>
         0                             1

<————————•————————————————————————————•————————>
         0                             1

<————————•————————————————————————————•————————>
         0                             1

<————————•————————————————————————————•————————>
         0                             1

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         0                             1
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