

6. Discuss the similarity between multiplying a whole number times a whole number and multiplying a whole number times a fraction, and illustrate with examples. In both of the following products, the number "5" indicates how many times the whole number 7 will occur and how many times the fraction $\frac{1}{3}$ will occur.

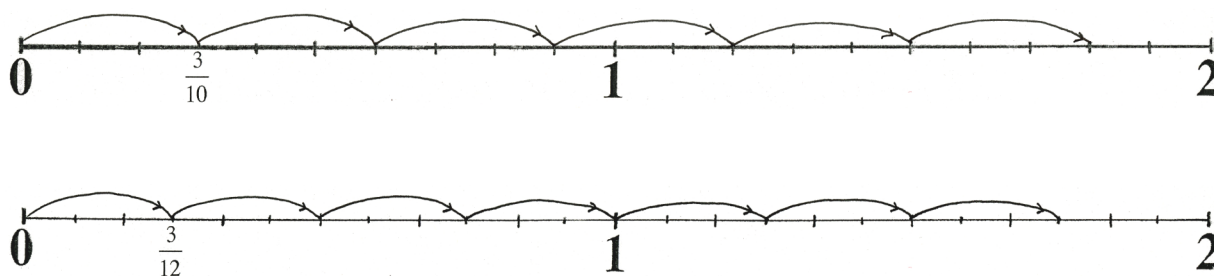
$$5 \cdot 7 = 7 + 7 + 7 + 7 + 7 \quad \text{and} \quad 5 \cdot \frac{1}{3} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$$

That is, multiplication by a whole number can be computed as repeated addition whether a whole number is multiplied times a whole number, or a whole number is multiplied times a fraction. This will help students make sense of products when multiplying a whole number times a fraction.

activity
sheets,
pencils
and
paper

Activity 2 Products of fractions on number lines

1. Distribute the activity sheet "Whole Numbers Times Fractions on Number Lines" to students. The first two examples of number lines from his activity sheet are completed here.



Once the activity sheet is completed, discuss how jumps on the number line illustrate repeated addition of fractions, and repeated addition can be written as a whole number times a fraction.

➤ For 6 jumps of size $\frac{3}{10}$, the distance on the number line is

$$\frac{3}{10} + \frac{3}{10} + \frac{3}{10} + \frac{3}{10} + \frac{3}{10} + \frac{3}{10} = \frac{18}{10}$$

Also discuss that any number of jumps of the same size can be represented as a whole number times the numerator of the fraction to obtain the total distance on the number line. Cite examples.

➤ For 6 jumps of size $\frac{3}{10}$, the total distance on the number line is

$$6 \cdot \frac{3}{10} = \frac{6 \cdot 3}{10} = \frac{18}{10} = 1 \frac{8}{10}$$

Fraction
Bars and
Die

Game: Each player in turn selects a *Fraction Bar* and rolls a die. The player's score is the number from the die times the fraction from the bar rounded to the nearest whole number. For the roll of the die and the bar shown here, the player scores 4 points: $5 \cdot \frac{3}{4} = \frac{15}{4} = 3 \frac{3}{4}$ which rounds to 4. The first player to score 11 points wins the game.



$$5 \times \frac{3}{4} = \frac{15}{4} = 3 \frac{3}{4}$$

INDEPENDENT PRACTICE and ASSESSMENT

Worksheets 4.NF.4 #4 and #5

Whole Numbers Times Fractions on Number Lines

1. This number line shows 6 jumps of size $\frac{3}{10}$, starting at the 0 point.

a. Write the mixed number under the line for the point after 6 jumps.

b. Write the improper fraction and mixed number to complete the following equations:

$$\frac{3}{10} + \frac{3}{10} + \frac{3}{10} + \frac{3}{10} + \frac{3}{10} + \frac{3}{10} = \underline{\quad} = \underline{\quad}, \quad \text{and } 6 \cdot \frac{3}{10} = \underline{\quad} = \underline{\quad}$$

2. Starting at the 0 point on the following number line draw 7 jumps of size $\frac{3}{12}$.

a. Write the mixed number under the line for the point after 7 jumps.

b. Write improper fraction and mixed number to complete the following equations:

$$\frac{3}{12} + \frac{3}{12} + \frac{3}{12} + \frac{3}{12} + \frac{3}{12} + \frac{3}{12} + \frac{3}{12} = \underline{\quad} = \underline{\quad}, \quad \text{and } 7 \cdot \frac{3}{12} = \underline{\quad} = \underline{\quad}$$

3. Starting at the 0 point on the following number line draw 3 jumps of size $\frac{3}{6}$.

a. Write the mixed number under the line for the point after 3 jumps.

b. Write the improper fraction and mixed number: $\frac{3}{6} + \frac{3}{6} + \frac{3}{6} = \underline{\quad} = \underline{\quad}$, and $3 \cdot \frac{3}{6} = \underline{\quad} = \underline{\quad}$

4. Starting at the 0 point on the following number line draw 3 jumps of size $\frac{3}{5}$.

a. Write the mixed number under the line for the point after 3 jumps.

b. Write the improper fraction and mixed number: $\frac{3}{5} + \frac{3}{5} + \frac{3}{5} = \underline{\quad} = \underline{\quad}$, and $3 \cdot \frac{3}{5} = \underline{\quad} = \underline{\quad}$