Eureka Math

4th Grade
Module 7
Lesson 12

At the request of elementary teachers, a team of Bethel & Sumner educators met as a committee to create Eureka slideshow presentations. These presentations are not meant as a script, nor are they required to be used. Please customize as needed. Thank you to the many educators who contributed to this project!

Directions for customizing presentations are available on the next slide.

Icons

Read, Draw, Write

Learning Target

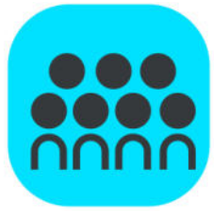
Personal White Board

Problem Set

Manipulatives Needed

Fluency

Think Pair Share



Whole Class

Individual

Partner

Small Group

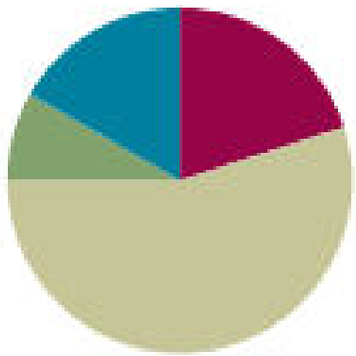
Small Group Time

Lesson 12

Objective: Use measurement tools to convert mixed number measurements to smaller units.

Suggested Lesson Structure

Fluency Practice	(12 minutes)
Application Problem	(5 minutes)
Concept Development	(33 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Use measurement tools to convert mixed number measurements to smaller units.

Gallon container, quart container, colored water, rulers, yardsticks

Complete Length Units

2 feet How many more feet are needed to make a yard?

1 foot

1 foot How many more feet are needed to make a yard?

2 feet

50 cm How many more centimeters are needed to make a meter?

50 cm

75 cm How many more centimeters are needed to make a meter?

25 cm

27 cm How many more centimeters are needed to make a meter?

73 cm

Complete Length Units

900 meters How many more meters are needed to make a kilometer?

100 meters

750 meters How many more meters are needed to make a kilometer?

250 meters

250 meters How many more meters are needed to make a kilometer?

750 meters

168 meters How many more meters are needed to make a kilometer?

832 meters

Complete Length Units

11 inches How many more inches are needed to make a foot?

1 inch

5 inches How many more inches are needed to make a foot?

7 inches

8 inches How many more inches are needed to make a foot?

4 inches

Complete One with Fractional Units

$\frac{2}{3}$

How many more thirds complete 1?

1 third

$\frac{1}{3}$

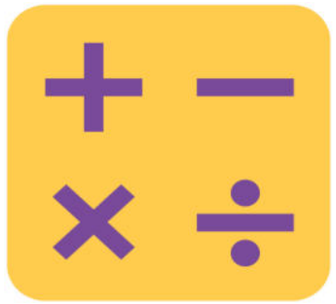
How many more thirds complete 1?

2 thirds

$\frac{1}{4}$

How many more fourths complete 1?

3 fourths



Complete One with Fractional Units

$\frac{2}{10}$

How many more tenths complete 1?

8 tenths

$\frac{5}{10}$

How many more tenths complete 1?

5 tenths

$\frac{9}{12}$

How many more twelfths complete 1?

3 twelfths

Application Problem

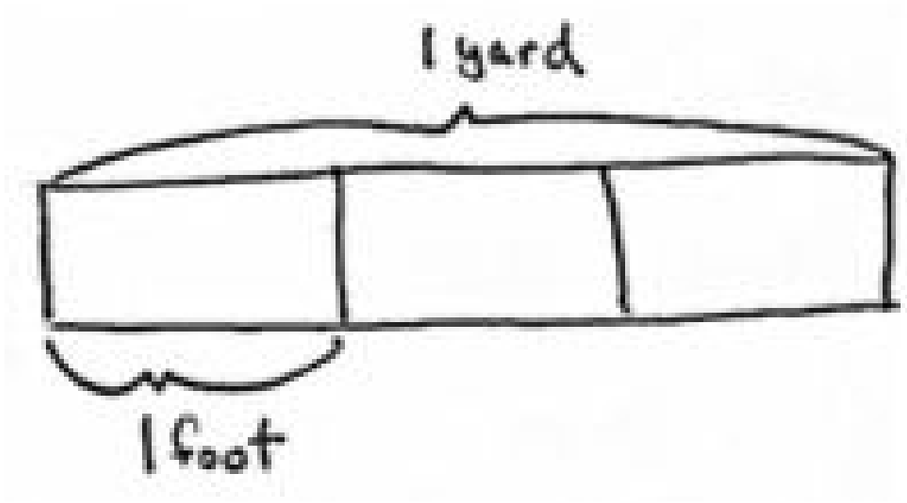
A rectangular tile has a width of 1 foot 6 inches and a length of 2 feet. What is the perimeter of the tile?

Identify ⅓ yard as 1 foot, and use this equivalence to solve problems.

Groups of 3

1 yard is how many feet? Use your ruler and yardstick to measure to verify your answer.

Look at problem 1 on your problem set. Draw a tape diagram to represent 1 yard decomposed into 3 feet.



1 unit on the tape diagram is ⅓ yard. Why is that?

Identify ⅓ yard as 1 foot, and use this equivalence to solve problems.

Use your ruler and yardstick to show ⅓ yard.

⅓ yard is how many feet? 1 foot

As a group, use your rulers to show ⅔ yard. ⅔ yard is how many feet? 2 feet

As a group, use your rulers to show 3/3 yard. 3/3 yard is how many feet? 3 feet

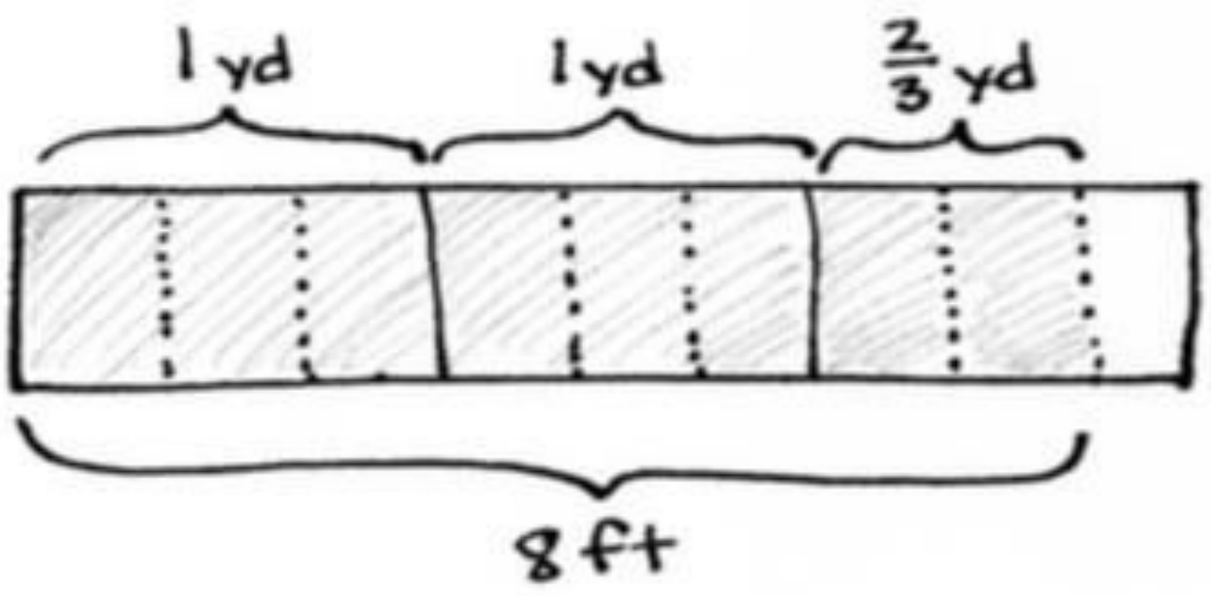
Go back to your problem set and complete problem 1.

Identify ⅓ yard as 1 foot, and use this equivalence to solve problems.

In your groups, figure out how many feet are in 1 ⅔ yards.

Explain your thinking.

Draw a tape diagram for Problem 2 on the Problem Set to show that $2\frac{2}{3}$ yards is equal to 8 feet. If you finish early, figure out how many feet are equal to $7\frac{1}{3}$ yards and $35\frac{2}{3}$ yards.



Identify ¼ gallon as 1 quart, and use this equivalence to solve problems.

How many quarts equal a gallon? *4 quarts*

This gallon container is marked to show the 4 quarts. Watch as I pour 1 quart into another container.

This gallon container is marked to show fourths. One quart of water is in this gallon container. What fraction of a gallon is filled?

¼ gallon is equal to 1 quart. Why?

Identify ¼ gallon as 1 quart, and use this equivalence to solve problems.

One quart of water is in this gallon container. Now I am going to pour another quart of water in the container.

What fraction of a gallon is filled now?

$\frac{2}{4}$ gallon

What is another way to say 2/4 of a gallon?

$\frac{1}{2}$ gallon

After I pour another quart of water into this container, what fraction of a gallon is filled now?

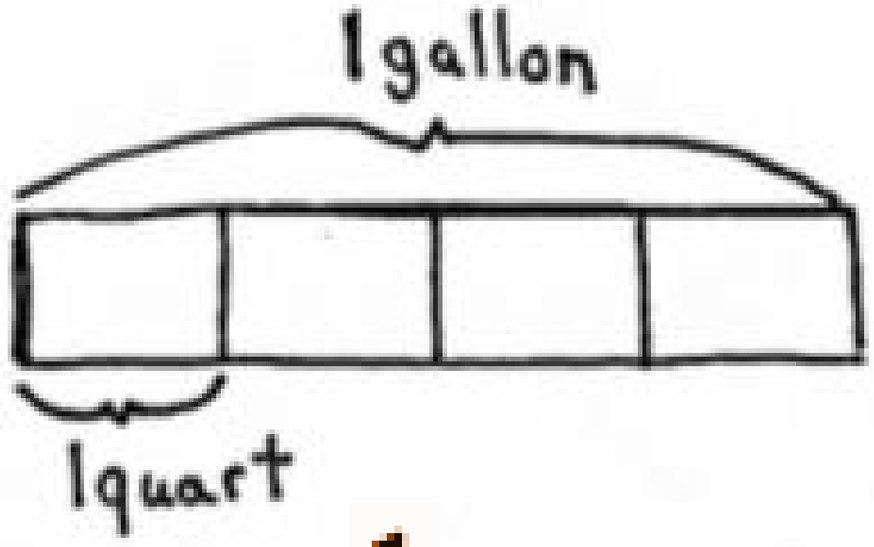
¾ gallon

After I pour another quart of water into this container, what fraction of a gallon is filled now?

4/4 gallon

Identify ¼ gallon as 1 quart, and use this equivalence to solve problems.

Draw a tape diagram to show 4 quarts equals 1 gallon.



We have divided the gallon into 4 equal parts. What fraction represents 1 quart?

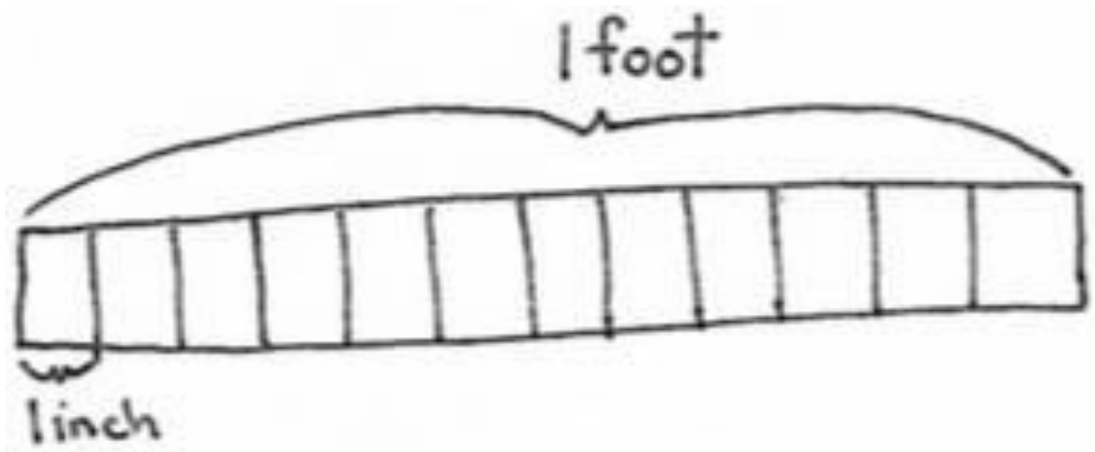
$\frac{1}{4}$

Draw the tape diagram for problems 3 and 4 of your problem set.

Identify 1/12 foot as 1 inch, and use this equivalence to solve problems.

Look at your rulers. 1 foot equals how many inches? 12 inches

Draw a tape diagram where the tape represents 1 foot and each unit represents 1 inch.



1 unit represents 1 inch. 1/12 foot equals how many inches?
Tell me the complete number sentence.

$\frac{1}{12}$ foot = 1 inch

$\frac{2}{12}$ foot? 2 inches.

Identify 1/12 foot as 1 inch, and use this equivalence to solve problems.

With your partner, complete the chart:

Fraction of a foot	Number of inches
3/12 foot	*3 inches*
4/12 foot	*4 inches*
5/12 foot	*5 inches*
6/12 foot	*6 inches*
7/12 foot	*7 inches*

Fraction of a foot	Number of inches
8/12 foot	*8 inches*
9/12 foot	*9 inches*
10/12 foot	*10 inches*
11/12 foot	*11 inches*
12/12 foot	*12 inches*

Identify 1/12 foot as 1 inch, and use this equivalence to solve problems.

Some of these fractions can be expressed in larger units. Shade 1 half foot of your tape diagram.

How many inches are equal to ½ foot? 6 inches

Talk to your partner. Instead of just using the tape diagram, how can we use what we know about finding equivalent fractions to find the number of twelfths equal to ½ foot?

Compare your answers to these students answers.

I know 2 times 6 is 12, so I can multiply the numerator by the same factor: $\frac{1 \times 6}{2 \times 6} = \frac{6}{12}$

A half is decomposed into 6 smaller parts: $\frac{1}{2}$ foot $= \frac{6}{12}$ foot

Identify 1/12 foot as 1 inch, and use this equivalence to solve problems.

Again, how many inches are equal to ½ or 6/12 foot? 6 inches

Work with your partner to find how many inches are equal to ¼ foot. How did you figure it out?

Compare your answers to these student answers.

To find one fourth, we just cut the half in half on the tape diagram to see 1 fourth is equal to 3 inches

We set it up as an equivalent fraction $\frac{1}{4} = \frac{\quad}{12}$

Four times 3 is 12, so that meant the numerator would be 3, too.

Identify 1/12 foot as 1 inch, and use this equivalence to solve problems.

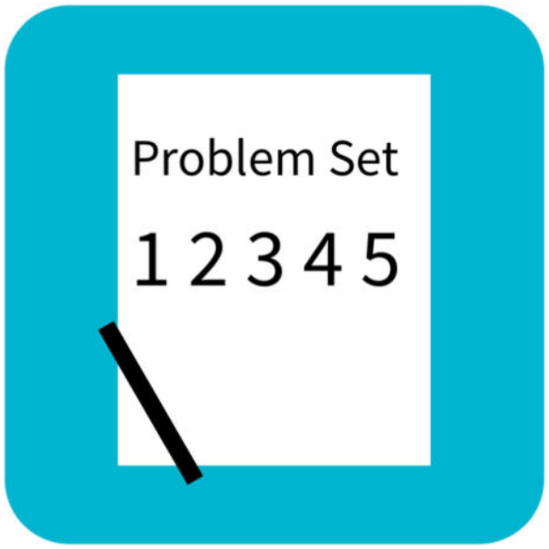
How many inches are equal to 4 ½ feet?

How many twelfths in ¾ foot?

How many inches in ¾ foot?

How many inches in 2 ¾ feet?

Solve Problems 5 and 6 in your problem set using equivalent fractions or a tape diagram.



Problem Set

Name _____ Date _____

1. Draw a tape diagram to show 1 yard divided into 3 equal parts.

   a. $\frac{1}{3}$ yd = _____ ft

   b. $\frac{2}{3}$ yd = _____ ft

   c. $\frac{3}{3}$ yd = _____ ft

2. Draw a tape diagram to show $2\frac{2}{3}$ yards = 8 feet.

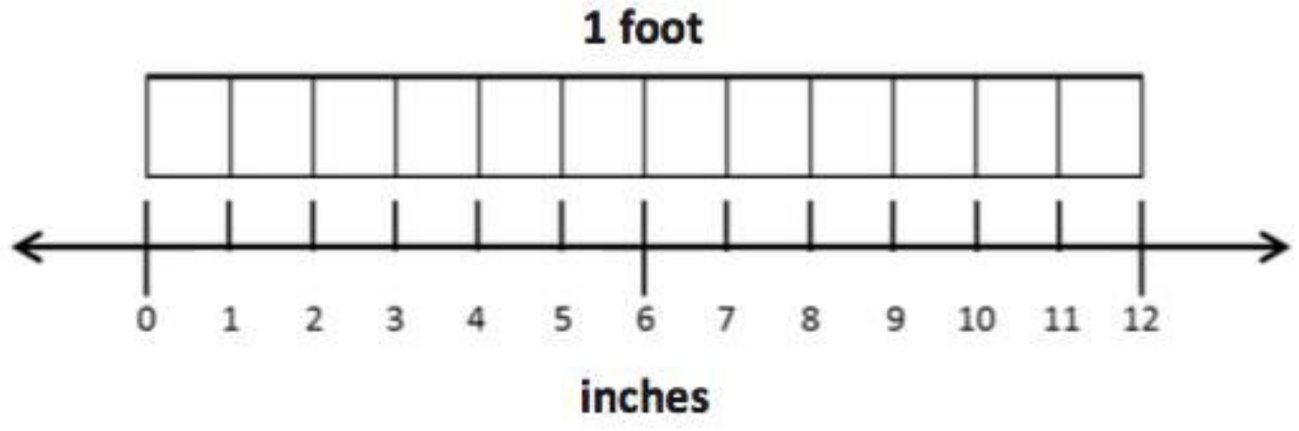
Debrief

- How is Problem 1(a), $\frac{1}{3}$ yard = 1 foot, a similar statement to Problem 5(a), $\frac{1}{12}$ foot = 1 inch?
- Explain to your partner how to solve Problem 6(b).
- How can knowing that 8 gallons equals 32 quarts help you check to make sure your answer to Problem 6(d) is reasonable?
- How could your answer to Problem 6(g) help you figure out Problem 6(h)?
- How could we rewrite the dimensions of the tile from the Application Problem using a mixed number instead of mixed units of feet and inches?

Exit Ticket

Name _____ Date _____

1. Solve the problems using whatever tool works best for you.



a. $\frac{\quad}{12}$ ft = $\frac{1}{2}$ ft = _____ in

b. $\frac{\quad}{12}$ ft = $\frac{3}{4}$ ft = _____ in

2. Solve.

a. $1\frac{1}{3}$ yd = _____ ft

b. $5\frac{3}{4}$ gal = _____ qt