GRADE 4 SUPPLEMENT

Set D10 Measurement: Conversions

Includes

Skills & Concepts

★ Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml.
★ Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit.
★ Record measurement equivalents in a two-column table.
★ Interpret a multiplication equation as a comparison.
★ Generate a number pattern that follows a given rule.

Bridges in Mathematics Grade 4 Supplement
Set D10 Measurement: Conversions

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set D10 ★ Activity 1

ACTIVITY

Converting Measurements

Overview
Students explore the structure and relationships while demonstrating fluency with measurement conversions. They use a two-column chart to convert from larger to smaller units, and smaller to larger units and then record the equivalent measurements.

Skills & Concepts
★ Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml.

★ Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit.

★ Record measurement equivalents in a two-column table.

★ Interpret a multiplication equation as a comparison.

★ Generate a number pattern that follows a given rule.

You'll Need
★ Converting Measurements Teacher Master D10.1 (1 copy for display)

★ White boards and markers or journal paper

★ Word Resource cards for units of measurements (meter, centimeter, kilogram, gram, liter, pound, ounce, inch, foot, yard) optional

Instructions for Converting Measurements

1. Invite students to consider some standard units of length privately, and then pair-share their ideas. Likely your students will mention inches, feet and yards, and centimeters and meters. Post word resource cards for a reference, if available.

2. Display the first scenario and ask students to consider what operation they would use to convert 4 feet into inches.

> **Student** *Well, I remember that 1 foot is 12 inches, so I skip counted, 12, 24, 36, and 48 on a number line.*
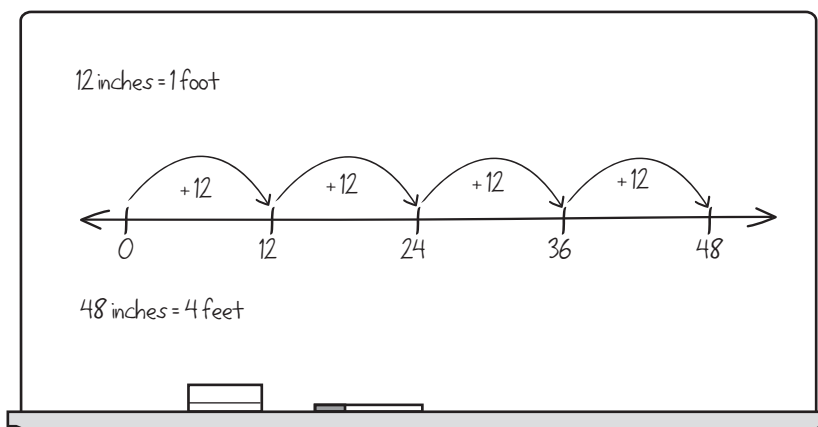
Activity 1 Converting Measurements (cont.)

Teacher   *So I might set that up as a t-chart like this:*

Feet	Inches
1 foot	12 inches
2 feet	24 inches
3 feet	36 inches
4 feet	48 inches

Student   *I thought of it as 4 × 12 or 48 inches. I doubled 12, and then doubled 24 to get 48. I used a double-double strategy.*

Teacher *I wonder what else you notice about these numbers? Turn and share your thinking with your neighbor.*

Students   *They are all even numbers! They are multiples of 12. It grows by 12 each time. I wonder what the next one would be?*

3. Post the second situation and ask students to work it out on their white boards. 13 feet of rope, how many yards? If you have some students that figure it out quickly, ask them to convert 13 feet to inches.

4. Invite students to share their mental math, number line and function tables as strategies for this scenario.

Teacher   *I'm wondering how you solved this one?*

Student *I know that 3 feet equal 1 yard, and 6 feet equal 2 yards, 9 feet equal 3 yards, and 12 feet equal 4 yards. I knew I was getting close. 13 feet is equal to 4 yards, and then you have 1 foot left over. I made a number line like Ajay did.*
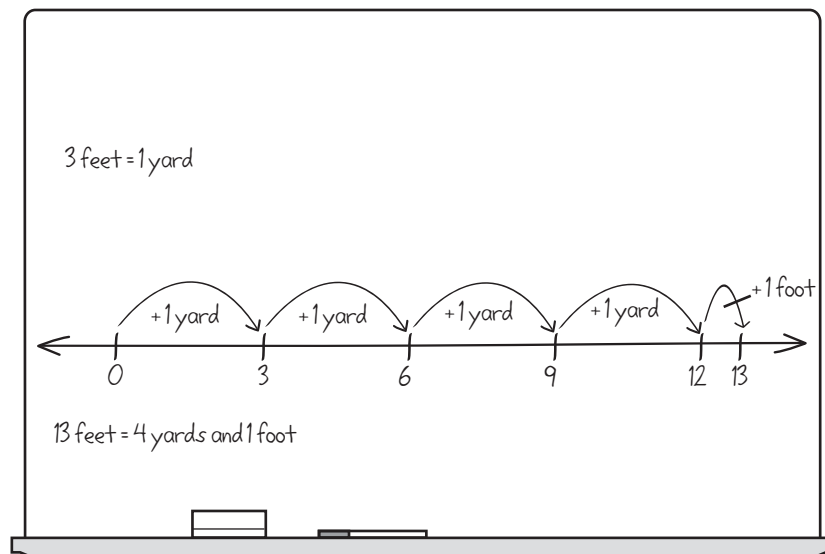
Activity 1 Converting Measurements (cont.)

Student *I decided to try a t-chart … I went passed 12, and figured I didn't have enough for 5 yards, so it has to be 4 yards and then you have 1 more foot.*

Yards	Feet
1 yard	3 feet
2 yards	6 feet
3 yards	9 feet
4 yards	12 feet
5 yards	15 feet

Students *Hey, this time it grows by 3 times as much, and the numbers are odd and then even. Cool. So 10 yards are going to be 30 feet. 50 yards are going to be 150 feet. I get it.*

Teacher *Can I show you another way of keeping track? Sometimes mathematicians use pairs of numbers like this…*(1 yard, 3 feet), (2, 6), (3, 9), (4, 12) *to keep track of their conversions. Would you turn and talk to your partner? What is the next pair of numbers in this sequence?* (5 yards, ? feet)

5. Continue through the measurement situations, monitoring the strategies that student use to keep track of their thinking. Share efficient, flexible and accurate ways of converting measurement units.

Extension
Challenge: Students who understand the concept can create multi-step riddles for one another to solve using units of measure. For example: *I am 16 inches from foot to knee and 37 inches from knee to head. How tall am I in feet and inches?*

INDEPENDENT WORKSHEET

Assign Set D10, Independent Worksheet 1, Equivalent Tables (page D10.5) and Independent Worksheet 2 Conversion Tables (page D.10.7) for additional practice with converting measurements.

Scenarios

1 A critter dug a four-foot tunnel in the back yard. How many inches did he dig?

2 If I have 13 feet of rope, how many yards do I have?

3 The lunchroom table measured six feet long. How many inches is that?

4 You want to build a fence for your new puppy. The fence needs to be 16 yards long. The wood for the fence is sold in foot long units. How many feet of fencing will you need to build your fence?

5 You and a friend are making a poster. You need two yards of ribbon to put around the edge of the poster. You have a piece of ribbon that is 60 inches long. Do you have enough to go around the poster?

NAME _____   DATE _____

Set D10 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

Equivalent Tables

1 Complete the table below and record at least two mathematical observations about the rule and relationship between the measurement conversions.

Meters (m)	Centimeters (cm)
1 m	100 cm
2 m	
	300 cm
4 m	
	500 cm
	600 cm
7 m	

I noticed:

2 A very large bag of frozen vegetables weighs 64 ounces (oz.). How many pounds (lb.) is this? Create a table to show your thinking

Ounces (oz.)	Pounds (lb.)
16 oz.	1 lb.

Show your thinking another way

(Continued on next page.)

NAME _____   **DATE** _____

Equivalent Tables (cont.)

3 Additional Practice

6 ft 7 in = _____ in	30 ft = _____yd _____ft
1 yd 2 ft = _____ft	32 in = _____ft _____in
2 ft 4 in = _____in	8 ft 6 in = _____inches

NAME _____   DATE _____

Set D10 ★ Independent Worksheet 2

INDEPENDENT WORKSHEET

Conversion Tables

1 Use >, <, or = to compare.

12 inches _____ 1 foot	36 inches _____ 2 feet
48 inches _____6 feet	60 inches _____3 feet
4 feet _____36 inches	5 feet _____72 inches

2 The milliliter (ml) is a metric unit of volume that is equal to $\frac{1}{1,000}$ of a liter. 1,000 ml = 1 liter. Use this information to solve the problems below.

a To make enough chocolate pudding for your family, you need 300 milliliters (ml) of milk. How many liters (l) will this be? Show your thinking.

_____ liters of milk

b How many liters of milk would you need if you tripled the recipe for chocolate pudding for a party?

_____liters of milk

(Continued on next page.)

NAME _____   DATE _____

Conversion Tables (cont.)

3 Kilo is a prefix for thousand. 1 kilometer = 1,000 meters. Use this information to help solve the problem below.

Dan is on a road trip. He sees a sign that says 212 kilometers (km) to the nearest gas station. How many meters (m) away is the gas station? Show your thinking.

The gas station is _____ meters away.

4 Remember the prefix kilo? 1 kilogram = 1,000 grams. Use this information to help solve the following problem.

Mom weighed the bag of carrots and said it weighed 2.7 kilograms (kg). How many grams (g) is this? Show your thinking.

The bag of carrots weighed _____ grams