

# **Homework Help for Math Out of the Box**

## **Developing Measurement Benchmarks: Inside and Outside**

**Information about homework assignments is provided to help parents and other homework helpers with the mathematics ideas that are being developed. The homework help includes definitions of key vocabulary, questions to ask that will help students connect to the classroom investigations, problem solving examples, and other helpful explanations.**

### **Homework 4A1 follows Lesson 4**

The U.S. customary units are a system of weights and measures used in the United States that are based on an earlier system developed in England. The basic units of length are the inch, foot, yard, and mile.

The first metric system was developed in France. This system was developed to relate to the number system of tens. Today, the metric system is the International System of Units, and its basic unit of length is the meter. The government agency that sets the standards for measurement systems in the United States is the National Institute of Standards and Technology (NIST). More information about units of measurement can be found at the NIST website.

Fourth grade students should have many opportunities to estimate and measure lengths of objects and distances in both systems.

### **Homework 4A2 follows Lesson 6**

Perimeter is the distance around a figure. Units of length, including both customary and metric, should be used to measure around figures and areas. Measurements of perimeters can also be made with steps, lengths of string, and other nonstandard units.

### **Homework 4B1 follows Lesson 8**

Area is the measurement of a surface. Measurements of area are units of length squared. For example, a rectangular table might have a surface of 18 square feet.

Fourth graders should explore the perimeters and areas of a variety of figures including rectangles, squares, and irregular polygons.

### **Homework 4B2 follows Lesson 10**



Units of length are also used to measure volume. With volume, the units are cubed. A small box might have a volume of 25 cubic centimeters.

As area and volume are explored, a foundation is laid for the development of formulas for area and volume.

### Homework 4C1 follows Lesson 11

There are many temperature scales, with the Fahrenheit and Celsius systems the most commonly used in the United States. Students should be able to connect benchmark temperatures to everyday life.

Benchmark Temperature	Celsius Scale	Fahrenheit Scale
Water Freezes	0° C	32° F
Comfortable Indoor Temperature	20° C	68° F
Normal Body Temperature	37° C	98.6° F
Hot Day	40° C	100° F

### Homework 4C2 follows Lesson 14

To help fourth graders with elapsed time, use everyday questions such as the following:

How long were we in the grocery store?

How long is the trip to school each morning?

How much time elapsed between the beginning and end of homework?

### Homework 4D1 follows Lesson 16

The U.S. Customary System has both a dry and a liquid set of capacity units. If the units need to be distinguished, the words “liquid” or “fluid” are used with the unit. Commonly used metric units include milliliters and liters.

U.S. Customary System Units of Capacity	Metric Units of Capacity
1 quart = 2 pints = 4 cups ½ quart = 1 pint = 2 cups ¼ quart = 1 cup  4 quarts = 1 gallon	1 liter = 1,000 milliliters



## Homework 4D1 follows Lesson 20

The terms mass and weight are used interchangeably in everyday life. Mass is a measure of the amount of matter in an object, and weight is the measure of the force exerted on the object by gravity. On the earth, the mass and weight of an object are about the same. Ounces, pounds, and tons are customary units and grams and kilograms are metric units.

