Dimensions Math Grade 4 Chapter 10 Measurement

Home Connection

In 3rd grade, students learned the definitions of area and perimeter, and how to find the area and perimeter of composite shapes made up of rectangles. In this chapter, the concept of area and perimeter will extend to more complex figures.

Students will also learn to find an unknown side length of a rectangle, given total area or perimeter.

Students should recall the units of area and square units. They should also recall that the area of a rectangle can be found my multiplying the length of the two adjacent sides.

Students will also use their measurement conversion skills to convert one or both side lengths into different units to find the perimeter or area.

For example:
How many square feet is this rectangle?

2 yds

1 yd.

Students need to recognize that in order to put the answer in square feet, they must first convert yards to feet.
2 yd x 1 yd = 6 ft x 3 ft
= 18 ftType equation here.

Units of Measurement

New conversions formally introduced in this chapter include the following.
<u>Length:</u>

- 1,000 millimeters = 1 meter
- 12 inches = 1 foot
- 3 feet = 1 yard
- 5,280 feet = 1 mile

Weight:

- 16 ounces = 1 pound

Capacity:

- 8 fluid ounces = 1 cup
- 2 cups = 1 pint
- 4 cups = 1 quart
- 4 quarts = 1 gallon

Conversions

There are two main methods for computing with compound measurements in the metric system.

Method 1:
Perform the computations on each of the compound units separately, then convert as needed.

2 kg 700 g × 3

2 kg   700 g

2 kg 700g x 3=
2kg x 3= 6 kg
700 g x 3= 2,100 g = 2kg 100g
6kg + 2kg 100g = 8kg 100g

Method 2:
Convert the compound measurements to a single measurement unit, perform the computation, and then express the answer in compound units.

$$\begin{array}{r} 2{,}700 \\ \times \quad 3 \\ \hline 8{,}100 \end{array}$$

2 kg 700g x 3=
2 kg 700g = 2,700kg
2,700 g x 3= 8,100g= 8kg 100g

Converting measurements

Students are introduced to strategies for converting between customary units of length, weight, or capacity. This can be challenging for students since customary conversion rates vary, unlike metric conversions which all use base 10.

Students will use multiplication to convert inches to feet, ounces to pounds, and hours to minutes:

For example:
If 1 hour = 60 minutes, then 2 hours = 2 x 60= 120 minutes

Students will continue to use mental math strategies previously learned to quickly convert these measurements.

Tip: Have your student think of "making the next ____________". For example, rather than making the next ten or the next hundred when adding, they will now make the next unit of measurement. Examples include: make the next foot and make the next pound. Notice the example problems provided.

Method 1:
Students can first add the inches: 7 + 9 = 16 and then convert 16 inches to 1foot and 4 inches.
3ft 7in + 9in= 3ft 16in = 4ft 4in

Method 2:
They can consider how many inches in would take make the next foot, and decompose the inches with this in mind.

3 ft 7 in + 9 in = 4 ft 4 in

5 in 4 in

Sometimes, students may have to work backwards as in this example using time measurements:
How long is 165 minutes in hours and minutes?
1 hour = 60 minutes
2 hours = 120 minutes
165 minutes = 120 minutes + 45 minutes = 2 hours and 45 minutes

Important to note
The reason students should work the problem this way instead of just dividing 165 by 60, is that students at this point do not have experience with two-digit division. They need to think in terms of multiplication to solve these conversion problems.

Fractions and Measurement

In the final lessons of this chapter, students will apply their knowledge of finding the product of a whole number and fraction, and of a whole number and mixed number to measurement.

Example: How many inches are in $\frac{2}{3}$ of a foot?

1 ft = 12 inches

$\frac{2}{3}$ ft = $\frac{2}{3}$ x 12 in = 8 inches

Students will also learn how to express a whole number as a fraction of a larger unit of measurement.

Example: 8 inches is what fraction of a foot?

$\frac{8 \text{ inches}}{12 \text{ inches}} = \frac{2}{3}$ of a foot

Here's an example with mixed numbers.

Example: How many seconds are in $3\frac{3}{5}$ minutes?

3 minutes = 3 x 60 seconds = 180 seconds

$\frac{3}{5}$ minutes = $\frac{3}{5}$ x 60 seconds = 36 seconds

180 seconds + 36 seconds = 216 seconds

There are 216 seconds in $3\frac{3}{5}$ minutes.

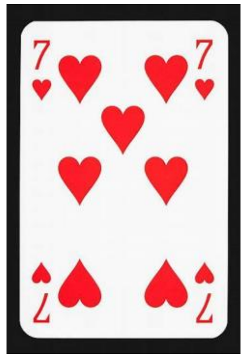
What Can We Do At Home?

Materials: Deck of playing cards with face cards removed.

Shuffle the cards and place them facedown on the middle of the table. Players take turns being the dealer. On his turn, the dealer chooses a unit: meter, kilogram, or liter, and a corresponding smaller unit of measurement. The dealer then turns over the top card.

The other players convert the number on the card to an equal amount in the smaller measurement.

Example: The dealer calls meters to millimeters and turns a 7 card face up.



The first player to say 7,000 millimeters collects the card.

The winner is the player with the most cards at the end of the game.

Possible conversions:

- km to m
- m to cm
- m to mm
- kg to g
- L to mL