

## 4<sup>th</sup> Grade Chapter 12

### “Relative Sizes of Measurement Units” Reteach Lessons 12.1-12.11

Name \_\_\_\_\_

Lesson 12.1  
Reteach

#### Measurement Benchmarks

You can use benchmarks to estimate measurements.

The chart shows benchmarks for customary units of measurement.

| Benchmarks for Some Customary Units   |   |   |   |   |   |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| about 1 foot  | about 1 yard  | about 1 cup   | about 1 gallon  | about 1 ounce   | about 1 pound   |

Here are some more examples of estimating with customary units.

- The width of a professional football is about 1 foot.
- A large fish bowl holds about 1 gallon of water.
- A box of cereal weighs about 1 pound.

The chart shows benchmarks for metric units of measurement.

| Benchmarks for Some Metric Units   |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
| about 1 centimeter   | about 1 meter  | about 1 milliliter   | about 1 liter  | about 1 gram   | about 1 kilogram   |

Here are some more examples of estimating with metric units.

- The width of a large paper clip is about 1 centimeter.
- A pitcher holds about 1 liter of juice.
- Three laps around a track is about 1 kilometer.

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Lesson 12.2  
Reteach

#### Customary Units of Length

A ruler is used to measure length. A ruler that is 1 foot long shows 12 inches in 1 foot. A ruler that is 3 feet long is called a yardstick. There are 3 feet in 1 yard.

**How does the size of a foot compare to the size of an inch?**

**Step 1** A small paper clip is about 1 inch long. Below is a drawing of a chain of paper clips that is about 1 foot long. Number each paper clip, starting with 1.



**Step 2** Complete this sentence.

In the chain of paper clips shown, there are 12 paper clips.

**Step 3** Compare the size of 1 inch to the size of 1 foot.

There are 12 inches in 1 foot.

So, 1 foot is 12 times as long as 1 inch.

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Lesson 12.3  
Reteach

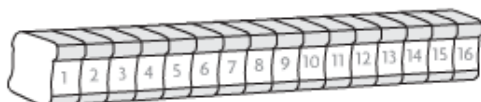
## Customary Units of Weight

**Ounces** and **pounds** are customary units of weight. A **ton** is a unit of weight that is equal to 2,000 pounds.

A slice of bread weighs about 1 ounce. Some loaves of bread weigh about 1 pound.

**How does the size of 1 ounce compare to the size of 1 pound?**

**Step 1** You know a slice of bread weighs about 1 ounce. Below is a drawing of a loaf of bread that weighs about 1 pound. Number each slice of bread, starting with 1.



**Step 2** Complete this sentence.

In the loaf of bread shown above, there are 16 slices of bread.

**Step 3** Compare the size of 1 ounce to the size of 1 pound.

There are 16 ounces in 1 pound.

So, 1 pound is 16 times as heavy as 1 ounce.

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Lesson 12.4  
Reteach

## Customary Units of Liquid Volume

**Liquid volume** is the measure of the space a liquid occupies. Some basic units for measuring liquid volume are **gallons**, **half gallons**, **quarts**, **pints**, **cups**, and **fluid ounces**. The table at the right shows the relationships among some units of liquid volume.

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

**How does the size of a gallon compare to the size of a pint?**

**Step 1** Use the information in the table.

Draw a bar to represent 1 gallon.

|          |
|----------|
| 1 gallon |
|----------|

**Step 2** The table shows that 1 gallon

is equal to 4 quarts. Draw a bar to show 4 quarts.

|         |         |         |         |
|---------|---------|---------|---------|
| 1 quart | 1 quart | 1 quart | 1 quart |
|---------|---------|---------|---------|

**Step 3** The table shows that 1 quart

is equal to 2 pints. Draw a bar to show 2 pints for each of the 4 quarts.

|        |        |        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 pint | 1 pint | 1 pint | 1 pint | 1 pint | 1 pint | 1 pint | 1 pint |
|--------|--------|--------|--------|--------|--------|--------|--------|

**Step 4** Compare the size of 1 gallon to the size of 1 pint.

There are 8 pints in 1 gallon.

So, 1 gallon is 8 times as much as 1 pint.

**Line Plots**

Howard gave a piece of paper with several survey questions to his friends. Then he made a list to show how long it took for his friends to answer the survey. Howard wants to know how many surveys took longer than  $\frac{2}{12}$  hour.

**Time for Survey Answers (in hours)**

$\frac{1}{12}$   $\frac{3}{12}$   $\frac{1}{12}$   $\frac{2}{12}$   $\frac{6}{12}$   $\frac{3}{12}$   $\frac{5}{12}$

**Make a line plot to show the data.**

**Step 1** Order the data from least to greatest.

$\frac{1}{12}$   $\frac{1}{12}$   $\frac{2}{12}$   $\frac{3}{12}$   $\frac{3}{12}$   $\frac{5}{12}$   $\frac{6}{12}$

**Step 2** Make a tally table of the data.

**Step 3** Label the fractions of an hour on the number line from least to greatest. Notice that  $\frac{4}{12}$  is included even though it is not in the data.

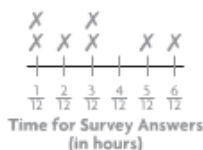
**Step 4** Plot an X above the number line for each piece of data. Write a title for the line plot.

**Step 5** Count the number of Xs that represent data points greater than  $\frac{2}{12}$  hour.

There are 4 data points greater than  $\frac{2}{12}$  hour.

So, 4 surveys took more than  $\frac{2}{12}$  hour.

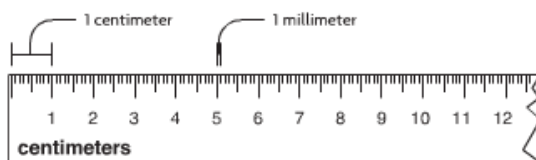
| Survey          |       |
|-----------------|-------|
| Time (in hours) | Tally |
| $\frac{1}{12}$  |       |
| $\frac{2}{12}$  |       |
| $\frac{3}{12}$  |       |
| $\frac{5}{12}$  |       |
| $\frac{6}{12}$  |       |

**Metric Units of Length**

Meters (m), **decimeters** (dm), centimeters (cm), and **millimeters** (mm) are all metric units of length. You can use a ruler and a meterstick to find out how these units are related.

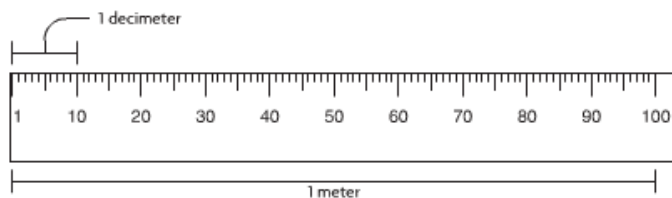
**Materials:** ruler, meterstick

**Step 1** Look at a metric ruler. Most look like the one below.



The short marks between each centimeter mark show millimeters.  
1 centimeter has the same length as a group of 10 millimeters.

**Step 2** Look at a meterstick. Most look like the one below.



1 decimeter has the same length as a group of 10 centimeters.

**Step 3** Use the ruler and the meterstick to compare metric units of length.

1 centimeter = 10 millimeters      1 decimeter = 10 centimeters  
1 meter = 10 decimeters      1 meter = 100 centimeters

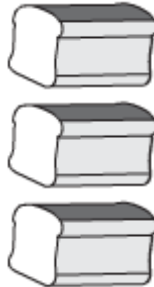
Name \_\_\_\_\_

## Metric Units of Mass and Liquid Volume

Mass is the amount of matter in an object. Metric units of mass include grams (g) and kilograms (kg). 1 kilogram represents the same mass as 1,000 grams.

One large loaf of bread has a mass of about 1 kilogram. Jacob has 3 large loaves of bread. About how many grams is the mass of the loaves?

$$\begin{aligned} 3 \text{ kilograms} &= 3 \times \underline{1,000} \text{ grams} \\ &= \underline{3,000} \text{ grams} \end{aligned}$$



Liters (L) and milliliters (mL) are metric units of liquid volume. 1 liter represents the same liquid volume as 1,000 milliliters.

A large bowl holds about 2 liters of juice. Carmen needs to know the liquid volume in milliliters.

$$\begin{aligned} 2 \text{ liters} &= 2 \times \underline{1,000} \text{ milliliters} \\ &= \underline{2,000} \text{ milliliters} \end{aligned}$$

Name \_\_\_\_\_

## Units of Time

Some analog clocks have an hour hand, a minute hand, and a **second** hand.

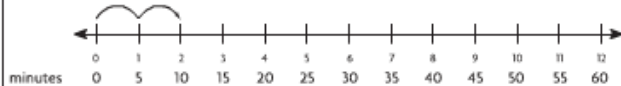
There are 60 seconds in a minute. The second hand makes 1 full turn every minute. There are 60 minutes in an hour. The minute hand makes 1 full turn every hour. The hour hand makes 1 full turn every 12 hours.



You can think of the clock as unrolling to become a number line.



The hour hand moves from one number to the next in 1 hour.



The minute hand moves from one number to the next in 5 minutes.

Use the table at the right to change between units of time.

1 hour = 60 minutes, or  $60 \times 60$  seconds, or 3,600 seconds.

So, 1 hour is 3,600 times as long as 1 second.

1 day = 24 hours, so 3 days =  $3 \times 24$  hours, or 72 hours.

1 year = 12 months, so 5 years =  $5 \times 12$  months, or 60 months.

### Units of Time

1 minute = 60 seconds  
1 hour = 60 minutes  
1 day = 24 hours  
1 week = 7 days  
1 year = 12 months  
1 year = 52 weeks

Name \_\_\_\_\_

Lesson 12.9  
Reteach**Problem Solving • Elapsed Time**

Opal finished her art project at 2:25 P.M. She spent 50 minutes working on her project. What time did she start working on her project?

| Read the Problem  |   |   |
|---|---|---|
| What do I need to find?   | What information do I need to use?                            | How will I use the information?   |
| I need to find Opal's start time.   | End time: <u>2:25 P.M.</u><br>Elapsed time: <u>50</u> minutes | I can draw a diagram of a clock.<br>I can then count back 5 minutes at a time until I reach 50 minutes. |
| Solve the Problem   |   |   |
| <p>I start by showing 2:25 P.M. on the clock.<br/>Then I count back 50 minutes by 5s.</p> <p><b>Think:</b> As I count back, I go past the 12.<br/>The hour must be 1 hour less than the ending time.<br/>The hour will be <u>1 o'clock</u>.<br/>So, Opal started on her project at <u>1:35 P.M.</u></p> |   |   |



Name \_\_\_\_\_

Lesson 12.10  
Reteach**Mixed Measures**

Gabrielle's puppy weighs 2 pounds 7 ounces. What is the weight of the puppy in ounces?

**Step 1** Think of 2 pounds 7 ounces as 2 pounds + 7 ounces.

**Step 2** Change the pounds to ounces.

Think: 1 pound = 16 ounces

So, 2 pounds =  $2 \times 16$  ounces, or 32 ounces.

**Step 3** Add like units to find the answer.

$$\begin{array}{r} 32 \text{ ounces} \\ + 7 \text{ ounces} \\ \hline 39 \text{ ounces} \end{array}$$

So, Gabrielle's puppy weighs 39 ounces.

Gabrielle played with her puppy for 2 hours 10 minutes yesterday and 1 hour 25 minutes today. How much longer did she play with the puppy yesterday than today?

**Step 1** Subtract the mixed measures. Write the subtraction with like units lined up.

Think: 25 minutes is greater than 10 minutes.

$$\begin{array}{r} 2 \text{ hr } 10 \text{ min} \\ - 1 \text{ hr } 25 \text{ min} \\ \hline \end{array}$$

**Step 2** Rename 2 hours 10 minutes to subtract.

1 hour = 60 minutes

So, 2 hr 10 min = 1 hr + 60 min + 10 min, or 1 hr 70 min.

$$\begin{array}{r} 1 \quad 70 \\ 2 \text{ hr } 10 \text{ min} \\ - 1 \text{ hr } 25 \text{ min} \\ \hline 0 \text{ hr } 45 \text{ min} \end{array}$$

**Step 3** Subtract like units.

1 hr - 1 hr = 0 hr; 70 min - 25 min = 45 min

So, she played with the puppy 45 minutes longer yesterday than today.

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Lesson 12.11  
Reteach

## Algebra • Patterns in Measurement Units

Use the relationship between the number pairs to label the columns in the table.

|   |    |
|---|----|
| ? | ?  |
| 1 | 8  |
| 2 | 16 |
| 3 | 24 |
| 4 | 32 |

**Step 1** List the number pairs. 1 and 8; 2 and 16; 3 and 24; 4 and 32

**Step 2** Describe the relationship between the numbers in each pair.

The second number is 8 times as great as the first number.

**Step 3** Look for a relationship involving 1 and 8 in the table below.

| Length  | Weight                                      | Liquid Volume   | Time   |
|---|---|---|--|
| 1 foot = 12 inches<br>1 yard = 3 feet<br>1 yard = 36 inches | 1 pound = 16 ounces<br>1 ton = 2,000 pounds | 1 cup = 8 fluid ounces<br>1 pint = 2 cups<br>1 quart = 2 pints<br>1 gallon = 4 quarts | 1 minute = 60 seconds<br>1 hour = 60 minutes<br>1 day = 24 hours<br>1 week = 7 days<br>1 year = 12 months<br>1 year = 52 weeks |

So, the label for the first column is Cups

The label for the second column is Fluid Ounces