Customary Length

You can convert one customary unit of length to another customary unit of length by multiplying or dividing.

Multiply to change from larger to smaller units of length.

Divide to change from smaller to larger units of length.

Customary Units of Length
1 foot (ft) = 12 inches (in.)
1 yard (yd) = 3 feet
1 mile (mi) = 5,280 feet
1 mile = 1,760 yards

Convert 3 feet to inches.

Step 1
Decide:
(Multiply) or Divide

feet $\longrightarrow$ inches
larger $\longrightarrow$ smaller

Step 2
Think:

1 ft = 12 in., so
3 ft = (3 × __12__) in.

Step 3
Multiply.
3 × 12 = 36

So, 3 feet = **36** inches.

Convert 363 feet to yards.

Step 1
Decide:
Multiply or (Divide)

feet $\longrightarrow$ yards
smaller $\longrightarrow$ larger

Step 2
Think:

3 ft = 1 yd,
so 363 ft = (363 ÷ __3__) yd.

Step 3
Divide.
363 ÷ **3** = **121**

So, 363 feet = **121** yards.

Convert.

1. 33 yd = ___**99**___ ft

2. 300 mi = **528,000** yd

3. 46 in. = __**3**__ ft __**10**__ in.

4. 96 yd = ___**288**___ ft

5. 48 ft = ___**16**___ yd

6. 2 mi 20 yd = ___**3,540**___ yd

Compare. Write <, >, or =.

7. 2 yd (**<**) 7 ft

8. 67 mi (**=**) 117,920 yd

9. 250 yd (**<**) 800 ft

10. 14 yd 2 ft (**>**) 16 ft

11. 34 ft 10 in. (**<**) 518 in.

12. 5 mi 8 ft (**>**) 8,800 yd

Customary Capacity

You can convert one unit of customary capacity to another by multiplying or dividing.

<u>Multiply</u> to change from <u>larger to smaller</u> units.

<u>Divide</u> to change from <u>smaller to larger</u> units.

Customary Units of Capacity
1 cup (c) = 8 fluid ounces (fl oz)
1 pint (pt) = 2 cups
1 quart (qt) = 2 pints
1 quart = 4 cups
1 gallon (gal) = 4 quarts

Convert 8 cups to quarts.

Step 1
Decide:
Multiply or (Divide)

cups   → quarts
smaller →   larger

Step 2
Think:

4 c = 1 qt,
so 8 c = (8 ÷ **4**) qt.

Step 3
Divide.

8 ÷ **4** = **2**

So, 8 cups = **2** quarts.

Convert 19 gallons to quarts.

Step 1
Decide:
(Multiply) or Divide

gallons → quarts
larger → smaller

Step 2
Think:

1 gal = 4 qt,
so 19 gal = (19 × **4**) qt.

Step 3
Multiply.

19 × **4** = **76**

So, 19 gallons = **76** quarts.

Convert.

1. 14 pt = **7** qt

2. 32 qt = **128** c

3. 7 c = **56** fl oz

4. 28 c = **14** pt

5. 9 gal = **36** qt

6. 16 c = **4** qt

Compare. Write <, >, or =.

7. 16 qt $>$ 60 c

8. 88 fl oz $=$ 11 c

9. 3 gal $>$ 10 qt

10. 36 qt $>$ 54 c

11. 66 fl oz $<$ 9 c

12. 16 gal $=$ 64 qt

Weight

You can convert one customary unit of weight to another by multiplying or dividing.

Multiply to change from <u>larger to smaller</u> units.

Divide to change from <u>smaller to larger</u> units.

| **Customary Units of Weight** |
| 1 pound (lb) = 16 ounces (oz)
1 ton (T) = 2,000 pounds |

Convert 96 ounces to pounds.

Step 1
Decide:
Multiply or (Divide)

ounces ⟶ pounds
smaller ⟶ larger

Step 2
Think:

16 oz = 1 lb
so 96 oz = (96 ÷ __16__) lb.

Step 3
Divide.

96 ÷ __16__ = __6__

So, 96 ounces = __6__ pounds.

Convert 4 pounds to ounces.

Step 1
Decide:
(Multiply) or Divide

pounds ⟶ ounces
larger ⟶ smaller

Step 2
Think:

1 lb = 16 oz,
so 4 lb = (4 × __16__) oz.

Step 3
Multiply.

4 × __16__ = __64__

So, 4 pounds = __64__ ounces.

Convert.

1. 14 lb = __224__ oz

2. 12,000 lb = __6__ T

3. 2 T = __4,000__ lb

4. 7 lb = __112__ oz

5. 22 lb = __352__ oz

6. 16 oz = __1__ lb

Compare. Write <, >, or =.

7. 1 T ⟨ < ⟩ 3,000 lb

8. 3 lb ⟨ > ⟩ 43 oz

9. 5 T ⟨ = ⟩ 10,000 lb

10. 3 T ⟨ = ⟩ 6,000 lb

11. 6 lb ⟨ = ⟩ 96 oz

12. 16 T ⟨ > ⟩ 6,400 lb

Multistep Measurement Problems

An ice cream parlor donated 6 containers of ice cream to a local elementary school. Each container holds 3 gallons of ice cream. If each student is served 1 cup of ice cream, how many students can be served?

Step 1 Record the information you are given.

There are __6__ containers of ice cream.

Each container holds __3__ gallons of ice cream.

Step 2 Find the total amount of ice cream in the 6 containers.

6 × 3 gallons = __18__ gallons of ice cream

Step 3 Convert from gallons to cups.

There are __4__ quarts in 1 gallon, so 18 gallons = __72__ quarts.

There are __2__ pints in 1 quart, so 72 quarts = __144__ pints.

There are __2__ cups in 1 pint, so 144 pints = __288__ cups.

So, __288__ students can be served 1 cup of ice cream.

Solve.

1. A cargo truck weighs 8,750 pounds. The weight limit for a certain bridge is 5 tons. How many pounds of cargo can be added to the truck before it exceeds the weight limit for the bridge?

   1,250 pounds

2. A plumber uses 16 inches of tubing to connect each washing machine in a laundry to the water source. He wants to install 18 washing machines. How many yards of tubing will he need?

   8 yards

3. Larry has 9 gallons of paint. He uses 10 quarts to paint his kitchen and 3 gallons to paint his living room. How many pints of paint will be left?

   28 pints

4. Ketisha is practicing for a marathon by running around a track that is 440 yards long. Yesterday she ran around the track 20 times. How many miles did she run?

   5 miles

Metric Measures

The metric system is based on place value. To convert between units, you multiply or divide by a power of 10. You **multiply** to change larger units to smaller units, such as liters to centiliters. You **divide** to change smaller units to larger units, such as meters to kilometers.

Convert 566 millimeters to decimeters.

• Think about how the two units are related.

  1 decimeter = 100 millimeters

• **Think:** Should I multiply or divide?

  Millimeters are smaller than decimeters.

  So divide, or move the decimal point left for each power of 10.

Metric Units of Length
1 centimeter (cm) = 10 millimeters (mm)
1 decimeter (dm) = 10 centimeters (cm)
1 meter (m) = 1,000 millimeters (mm)
1 kilometer (km) = 1,000 meters (m)

$$566 \div 100 = \underline{5.66}$$

millimeters   mm in 1 dm   total decimeters

So, 566 mm = **5.66** dm.

				5 •	6	6
kilo- (k)	hecto- (h)	deka- (da)	meter liter gram	deci- (d)	centi- (c)	milli- (m)

Complete the equation to show the conversion.

1. 115 km ⊗ 10 = **1,150** hm

115 km ⊗ 100 = **11,500** dam

115 km ⊗ 1,000 = **115,000** m

2. 418 mL ÷ 10 = **41.8** cL

418 mL ÷ 100 = **4.18** dL

418 mL ÷ 1,000 = **0.418** L

Convert.

3. 40 m = **4,000** cm

4. 500 mL = **5, or 5.00** dL

5. 6 kg = **6,000** g

6. 5,000 cL = **50, or 50.00** L

7. 4 kg = **40** hg

8. 200 mm = **20, or 20.0** cm

Problem Solving • Customary and Metric Conversions

You can use the strategy *make a table* to help you solve problems about customary and metric conversions.

Jon's faucet is dripping at the rate of 24 centiliters in a day. How many milliliters of water will have dripped from Jon's faucet in 24 hours?

Read the Problem

What do I need to find?

I need to find **how many milliliters of water will have dripped from Jon's faucet in 24 hours.**

What information do I need to use?

I need to use **the number of cL that have dripped in 24 hr and the number of mL in a cL.**

How will I use the information?

I will make a table to show the relationship between the number of **centiliters** and the number of **milliliters**.

Conversion Table				
	L	**dL**	**cL**	**mL**
1 L	1	10	100	1,000
1 dL	$\frac{1}{10}$	1	10	100
1 cL	$\frac{1}{100}$	$\frac{1}{10}$	1	10
1 mL	$\frac{1}{1,000}$	$\frac{1}{100}$	$\frac{1}{10}$	1

I can use the Conversion Table to find the number of milliliters in 1 centiliter.

There are **10** milliliters in 1 centiliter.

cL	1	2	4	24
mL	10	20	40	240

So, **240** milliliters of water will have dripped from Jon's faucet in 24 hours.

Make a table to help you solve the problems. **Check students' tables.**

1. Fernando has a bucket that holds 3 gallons of water. He is filling the bucket using a 1-pint container. How many times will he have to fill the pint container in order to fill the bucket?

24 times

2. Lexi has a roll of shelf paper that is 800 cm long. She wants to cut the paper into 1-m strips to line the shelves in her pantry. How many 1-meter strips can she cut?

8 strips

Elapsed Time

You can solve elapsed time problems by converting units of time.

Starting at 4:20 P.M., Connie practiced piano for 90 minutes. At what time did Connie stop practicing piano?

Units of Time
60 seconds (s) = 1 minute (min)
60 minutes = 1 hour (hr)
24 hours = 1 day (d)
7 days = 1 week (wk)
52 weeks = 1 year (yr)
12 months (mo) = 1 year
365 days = 1 year

Convert 90 minutes to hours and minutes. Then find the end time.

Step 1 To convert minutes to hours, divide.

$90 \div 60$ is 1 r 30

90 min = _____**1**_____ hr _____**30**_____ min

Step 2 Count forward by hours until you reach 1 hour.

$4:20 \rightarrow 5:20 = 1$ hour

Step 3 Count forward by minutes until you reach 30 minutes.

$5:20 \rightarrow 5:30 = 1$ hour 10 minutes
$5:30 \rightarrow 5:40 = 1$ hour 20 minutes
$5:40 \rightarrow 5:50 = 1$ hour 30 minutes

Connie stops practicing piano at **5:50 P.M.**

Convert.

1. 480 min = _____**8**_____ hr   **2.** 4 d = _____**96**_____ hr   **3.** 125 hr = __**5**__ d __**5**__ hr

Find the start, elapsed, or end time.

4. Start time: 7:15 A.M.

Elapsed time: 2 hr 20 min

End time: **9:35 A.M.**

5. Start time: 6:28 A.M.

Elapsed time: **3 hr 40 min**

End time: 10:08 A.M.

6. Start time: **2:05 P.M.**

Elapsed time: 5 hr 50 min

End time: 7:55 P.M.

7. Start time: 5:24 P.M.

Elapsed time: 6 hr

End time: **11:24 P.M.**