Lesson 1: Length
English vs. Metric Units

Which is longer?
A. 1 mile or 1 kilometer
B. 1 yard or 1 meter
C. 1 inch or 1 centimeter

\[
\begin{align*}
1 \text{ mi} & = 1.6 \text{ km} \\
3 \text{ yd} & = 39.25 \text{ in} \\
1 \text{ in} & = 2.54 \text{ cm}
\end{align*}
\]
English vs. Metric Units

Which is longer?
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B. 1 yard or 1 meter
C. 1 inch or 1 centimeter

1 mile
1.6 kilometers
English vs. Metric Units

Which is longer?
A. 1 mile or 1 kilometer
B. 1 yard or 1 meter
C. 1 inch or 1 centimeter

1 mile = 1.6 kilometers

1 yard = 0.9444 meters
English vs. Metric Units

Which is longer?

A. 1 mile or 1 kilometer
B. 1 yard or 1 meter
C. 1 inch or 1 centimeter

1 mile
1.6 kilometers

1 yard = 0.9444 meters

1 inch = 2.54 centimeters
The basic unit of length in the metric system is the **meter** and is represented by a lowercase **m**.

Standard: The **distance** traveled by **light** in absolute vacuum in \( \frac{1}{299,792,458} \) of a second.

### Metric Units
- 1 Kilometer (km) = 1000 meters
- 1 Meter = 100 Centimeters (cm)
- 1 Meter = 1000 Millimeters (mm)

### Which is larger?
- A. 1 meter or 105 centimeters
- B. 4 kilometers or 4400 meters
- C. 12 centimeters or 102 millimeters
- D. 1200 millimeters or 1 meter
How many millimeters are in 1 centimeter?

1 centimeter = 10 millimeters

What is the length of the line in centimeters? \( \frac{2.8}{2.8} \) cm
What is the length of the line in millimeters? \( \frac{28}{28} \) mm

What is the length of the line to the nearest centimeter? ________ cm
HINT: Round to the nearest centimeter – no decimals.
Choosing the Appropriate Unit

Choose the appropriate unit of length for the following

- Length of a guitar
- Length of your shoe
- Height of the Willis Tower
- Length of an ant
- Diameter of a half-dollar
- Distance between Lexington, KY and Houston, TX
- Diameter of a round wastepaper basket
- Diameter of a pencil
- Your waist size
- Your height
Choosing the Appropriate Unit

Choose the appropriate unit of area for the following:

- Grand Canyon National Park
- The top of a kitchen table
- The floor of the classroom
- A person's property with an average sized lot
- The cover of this book
- A football field
- An ice skating rink
- A dime
- A lens in eyeglasses
- A dollar bill
A square meter is how many times as large as a square centimeter?
Metric Mania

Lesson 2: Volume
Which is larger?
A. 1 liter or 1 gallon
B. 1 liter or 1 quart
C. 1 milliliter or 1 fluid ounce

1 liter = 3.82 liters
1 quart = 0.95 liters
1 fluid ounce = 30 milliliters
Which is larger?
A. 1 liter or 1 gallon
B. 1 liter or 1 quart
C. 1 milliliter or 1 fluid ounce

1 gallon = 3.79 liters

It would take approximately 3 ¾ 1-liter bottles to equal a gallon.
Which is larger?
A. 1 liter or 1 gallon
B. 1 liter or 1 quart
C. 1 milliliter or 1 fluid ounce

1 gallon = 3.79 liters

It would take approximately 3 ¾ 1-liter bottles to equal a gallon.

1 quart = 0.946 liters
English vs. Metric Units

Which is larger?
A. 1 liter or 1 gallon
B. 1 liter or 1 quart
C. 1 milliliter or 1 fluid ounce

1 gallon = 3.79 liters
It would take approximately 3 ¾ 1-liter bottles to equal a gallon.

1 fl oz = 29.573 ml
1 12-oz can of soda would equal approximately 355 ml.

1 quart = 0.946 liters
**Metric Units**

**Volume** is the amount of space an object takes up. The base unit of volume in the metric system is the liter and is represented by L or l.

Standard: 1 liter is equal to one cubic decimeter (or cm³) = 1 gram*.

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**1 liter (L) = 1000 milliliters (mL)**

**Which is larger?**

A. 1 liter or 1500 milliliters
B. 200 milliliters or 1.2 liters
C. 12 cm³ or 1.2 milliliters*

* When referring to water
Choose the Appropriate Unit

Choose the appropriate unit of volume for the following:

- The oil that flows through the Alaskan pipeline in a day (kL)
- A carton of milk (L)
- A truckload of topsoil (m3)
- A drug dosage for an IV (mL)
- Sand in a paper cup (cc)
- A dime (mL)
- Water in a drinking glass (L)
- Water in a water bed (m3)
- Space available in a refrigerator (m3)
- Concrete used to lay the foundation for a basement (dal / kL)
A swimming pool is 18m by 9m and has a uniform depth of 3m. Find the volume of the pool in cubic meters and in kiloliters.

\[18 \times 9 \times 3 = 486 \text{ m}^3 + 486 \text{ kL}\]

\[1 \text{ kL} = 1000 \text{ cm}^3\]

\[0.001 \text{ kL} = 10 \times 10 \times 10 \text{ cm}^3 = 1 \times 1 \times 1 \text{ m}^3\]

\[0.001 \text{ kL} = 0.001 \text{ m}^3\]

\[\text{KL} = \text{m}^3\]
If a nurse is administering 3cc of a drug to a patient, how many milliliters is she administering?

3ml
You have a hot water heater with a radius of 50 centimeters and a height of 148 centimeters. What is the capacity in liters of the hot water heater?

\[
V_{\text{cyl}} = \pi r^2 h \\
= \pi (50)^2 \cdot 148 \\
= 1,162,389.282 \text{ cm}^3 \\
1 \text{ L} = 1000 \text{ cm}^3 \\
= 1162.4\text{ L}
\]
• How many times larger is a cubic meter than a cubic centimeter?

\[
\begin{array}{cccc}
100 \\
1,000 \\
1,000,000
\end{array}
\]

• How many times larger is a cubic dekameter than a cubic meter?

\[
\begin{array}{cccc}
10 \\
10 \\
1,000
\end{array}
\]