Metric Mania

Metric Conversions
Ladder Method

Ladder Method

1
2
3

| KILO 1000 Units |
| HECTO 100 Units |
| DEKA 10 Units |
| Basic Unit |

To convert to a smaller unit, move decimal point to the right or multiply.

→

Meters Liters Grams

| DECI 0.1 Unit |
| CENTI 0.01 Unit |
| MILLI 0.001 Unit |

To convert to a larger unit, move decimal point to the left or divide.

←
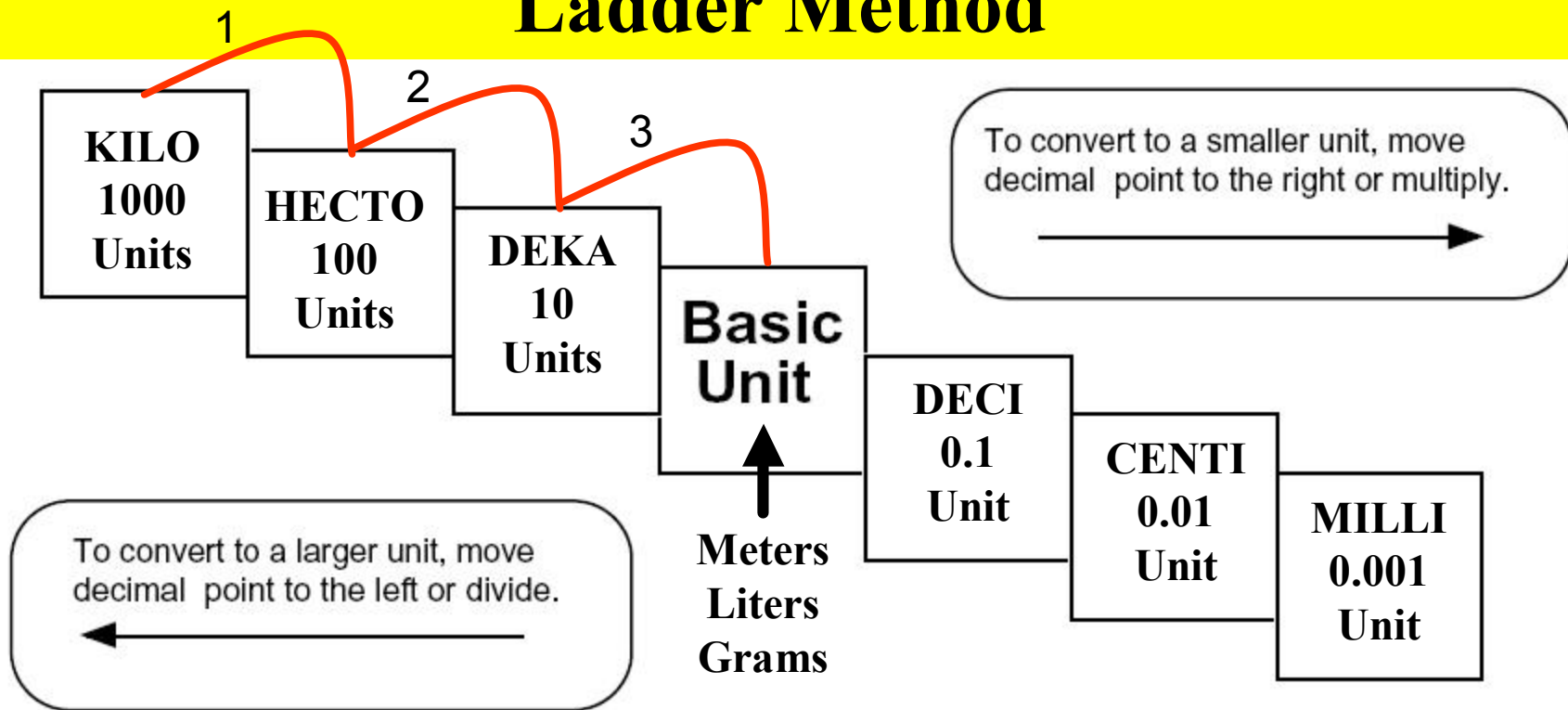
How do you use the "ladder" method?

1st – Determine your starting point.

2nd – Count the "jumps" to your ending point.

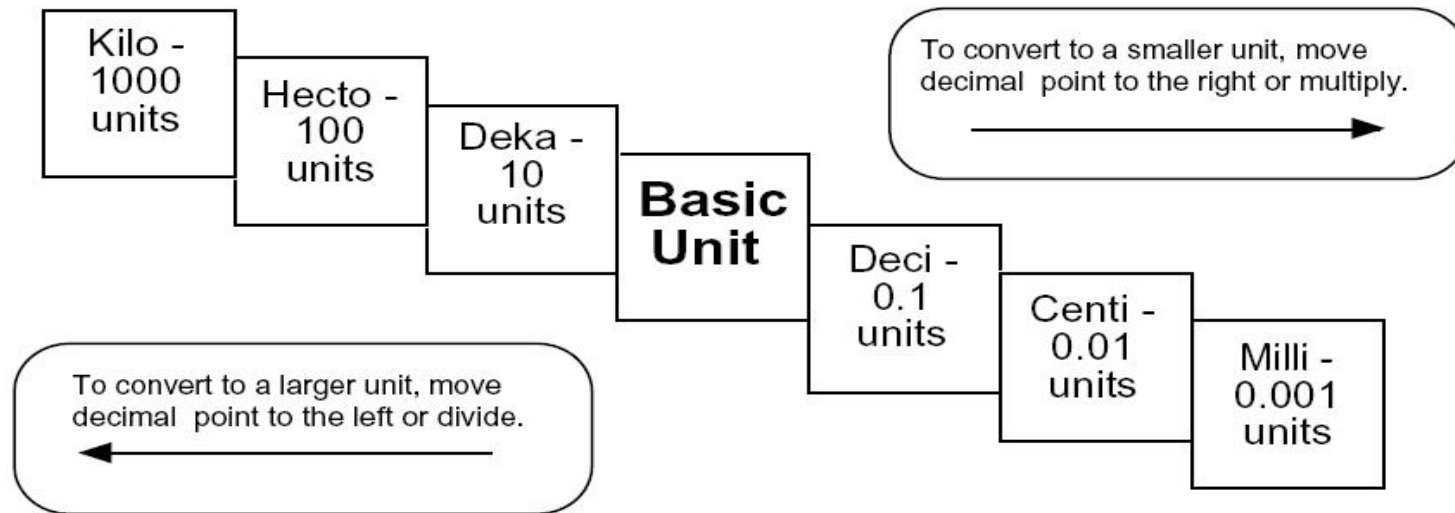3rd – Move the decimal the same number of jumps in the same direction.

4 km = _____ m

↑ Starting Point   ↑ Ending Point

How many jumps does it take?

$4.\,\_\,\_\,\_\, = 4000$ m

1 2 3

Conversion Practice

Kilo - 1000 units						
	Hecto - 100 units					
		Deka - 10 units				
			Basic Unit			
				Deci - 0.1 units		
					Centi - 0.01 units	
						Milli - 0.001 units

To convert to a smaller unit, move decimal point to the right or multiply.
→

To convert to a larger unit, move decimal point to the left or divide.
←

Try these conversions using the ladder method.

1000 mg = **1 g**   1 L = **1600 mL**   160 cm = **1600 mm**

14 km = **14000 m**   109 g = **.109 kg**   250 m = **.250 km**

Compare using <, >, or =.

56 cm **<** 6 m   7 g **>** 698 mg

Metric Conversion Challenge

Write the correct abbreviation for each metric unit.

1) Kilogram **kg**

2) Meter **m**

3) Gram **g**

4) Milliliter **ml**

5) Millimeter **mm**

6) Liter **L**

7) Kilometer **km**

8) Centimeter **cm**

9) Milligram **mg**

Try these conversions, using the ladder method.

10) 2000 mg = **2g**

11) 104 km = **104000m**

12) 480 cm = **4.8 m**

13) 5.6 kg = **5600 g**

14) 8 mm = **.8 cm**

15) 5 L = **5000 mL**

16) 198 g = **.198 kg**

17) 75 mL = **.075 L**

18) 50 cm = **.5 m**

19) 5.6 m = **560 cm**

20) 16 cm = **160 mm**

21) 2500 m = **2.5 km**

22) 65 g = **65000 mg**

23) 6.3 cm = **63 mm**

24) 120 mg = **.12 g**

Compare using <, >, or =.

25) 63 cm ◯ 6 m   27) 5 g ◯ 508 mg   29) 1,500 mL ◯ 1.5 L

26) 536 cm ◯ 53.6 dm   28) 43 mg ◯ 5 g   30) 3.6 m ◯ 36 cm

1) <

2) >

3) =

4) =

5) <

6) >

Metric Mania
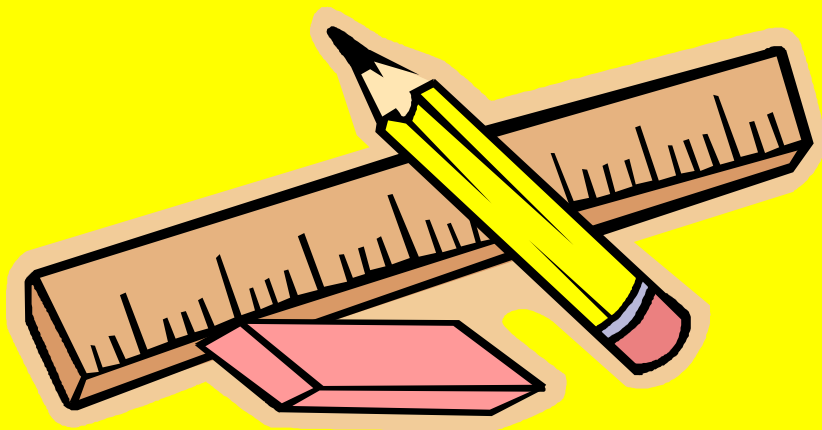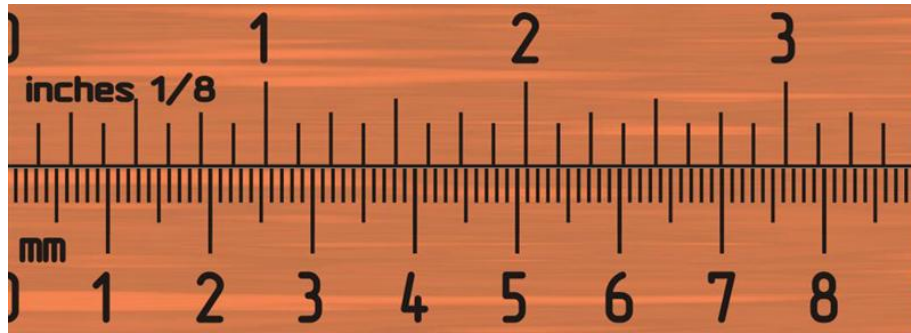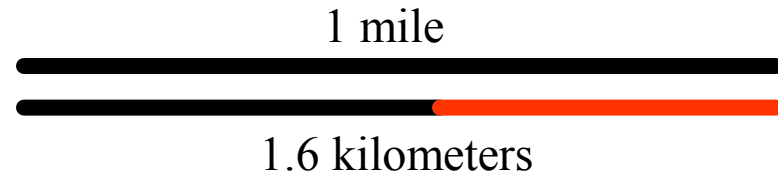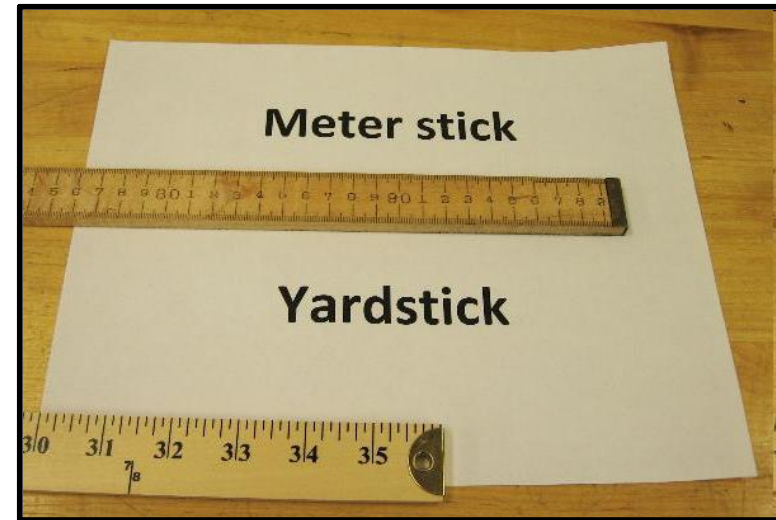
Lesson 1: Length

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

1 mile

1.6 kilometers

1 inch = 2.54 centimeters

Meter stick

Yardstick

1 yard = 0.9444 meters

The basic unit of length in the metric system in the **meter** and is represented by a lowercase **m**.

Metric Units

1 Kilometer (km) = 1000 meters

1 Meter = 100 Centimeters (cm)

1 Meter = 1000 Millimeters (mm)

Click the image to watch a short video about the meter.

Which is larger?

A. 1 meter or 105 centimeters   C. 12 centimeters or 102 millimeters

B. 4 kilometers or 4400 meters   D. 1200 millimeters or 1 meter

Measuring Length

How many millimeters are in 1 centimeter?

1 centimeter = 10 millimeters

0 cm   1   2   3
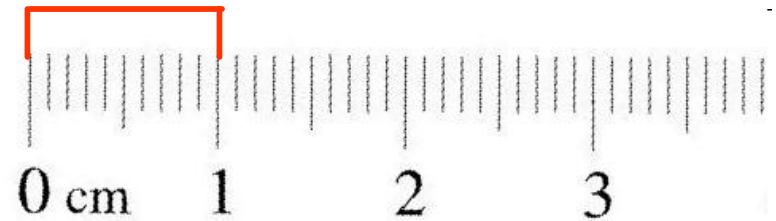
What is the length of the line in centimeters? _____cm

What is the length of the line in millimeters? _____mm

0 cm   1   2   3
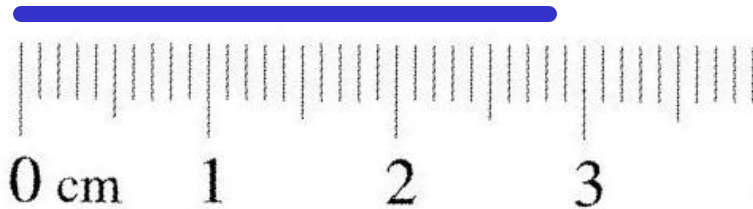
What is the length of the line to the nearest centimeter? _____cm

HINT: Round to the nearest centimeter – no decimals.

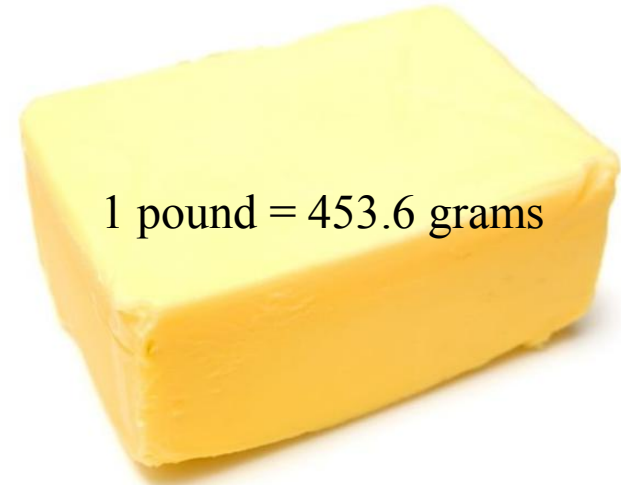Ruler: http://www.k12math.com/math-concepts/measurement/ruler-cm.jpg

Metric Mania

Lesson 2: Mass

English vs. Metric Units

Which is larger?

1. 1 Pound or 100 Grams

2. 1 Kilogram or 1 Pound

3. 1 Ounce or 1000 Milligrams

1 pound = 453.6 grams

1 ounce of gold = 28,349.5 milligrams
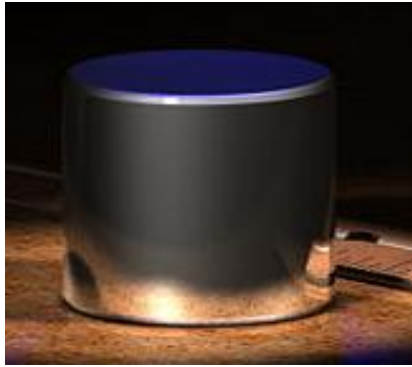
100 kilogram = 220 pounds

Mass refers to the amount of matter in an object.

The base unit of mass in the metric system in the **gram (g)**

Kilogram Prototype

Metric Units

1 Kilogram (km) = 1000 Grams (g)

1 Gram (g) = 1000 Milligrams (mg)

Click the image to watch a short video about mass.

Which is larger?

A. 1 kilogram or 1500 grams   C. 12 milligrams or 12 kilograms
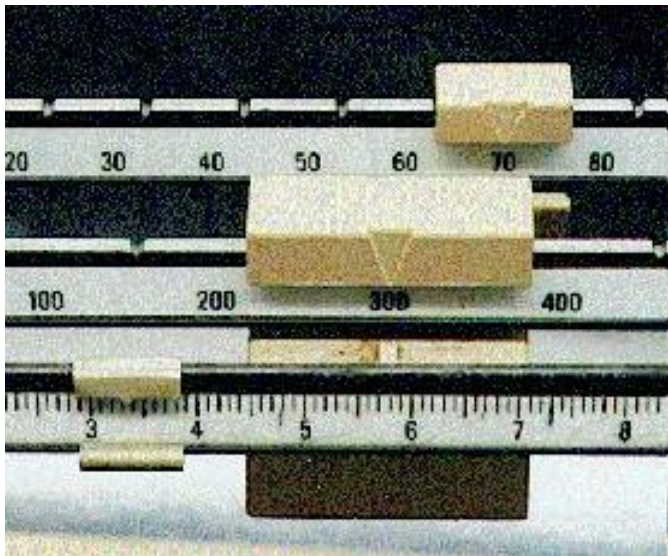
B. 1200 milligrams or 1 gram   D. 4 kilograms or 4500 grams

Kilogram Prototype Image - http://en.wikipedia.org/wiki/Kilogram

Measuring Mass
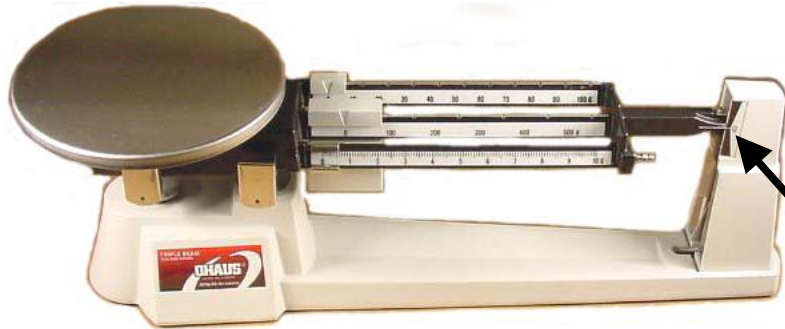
We will be using **triple-beam balances** to find the mass of various objects.

The objects are placed on the scale and then you move the weights on the beams until you get the lines on the right-side of the scale to match up.

Once you have balanced the scale, you add up the amounts on each beam to find the total mass.

What would be the mass of the object measured in the picture?

_**300**_ + _**70**_ + _**3.4**_ = _**373.4**_ g

Measuring Mass – Triple-Beam Balance

1st – Place the film canister on the scale.

2nd – Slide the large weight to the right until the arm drops below the line. Move the rider back one groove. Make sure it "locks" into place.

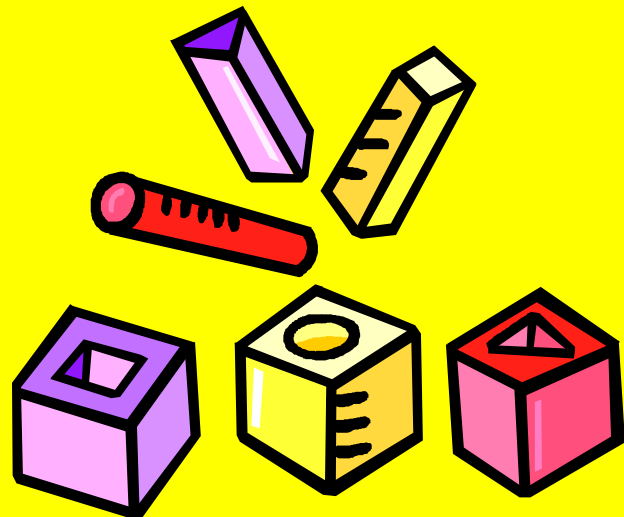3rd – Repeat this process with the top weight. When the arm moves below the line, back it up one groove.

4th – Slide the small weight on the front beam until the lines match up.
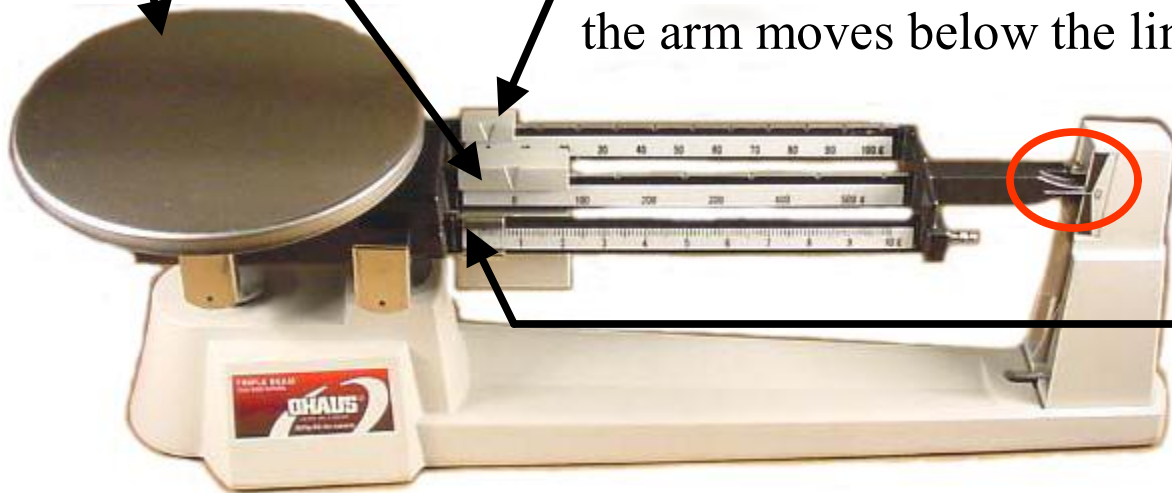
5th – Add the amounts on each beam to find the total mass to the nearest tenth of a gram.

Metric Mania

Lesson 3: Volume

English vs. Metric Units

Which is larger?

A. 1 liter or 1 gallon

B. 1 liter or 1 quart

C. 1 milligram or 1 fluid ounce

1 fl oz = 29.573 ml

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

1 gallon = 3.79 liters

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

1 quart = 0.946 liters

Volume is the amount of space an object takes up.

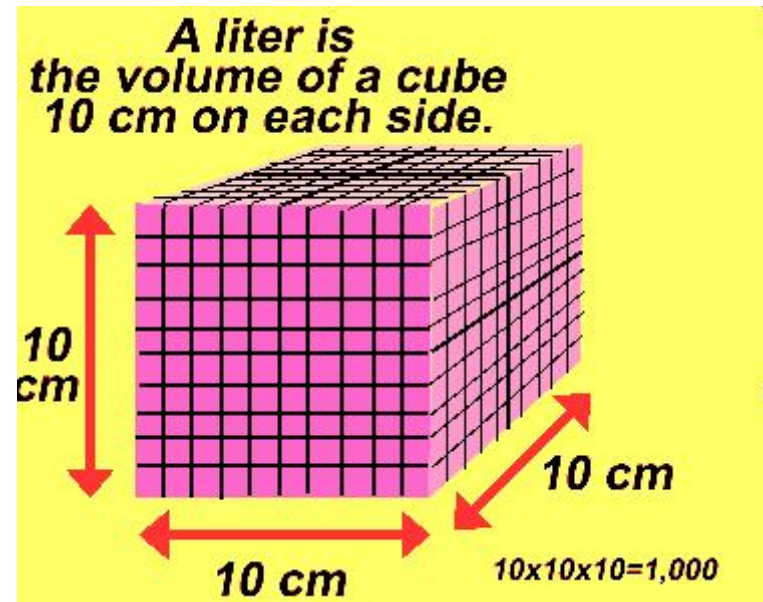The base unit of volume in the metric system is the **liter** and is represented by **L or l**.

Metric Units

1 liter (L) = 1000 milliliters (mL)

1 milliliter (mL) = 1 cm^3 (or cc) = 1 gram*

A liter is the volume of a cube 10 cm on each side.

10 cm
10 cm
10 cm
10x10x10=1,000

Which is larger?

A. 1 liter or 1500 milliliters

B. 200 milliliters or 1.2 liters

C. 12 cm^3 or 1.2 milliliters*

* When referring to water
Liter Image: http://www.dmturner.org/Teacher/Pictures/liter.gif
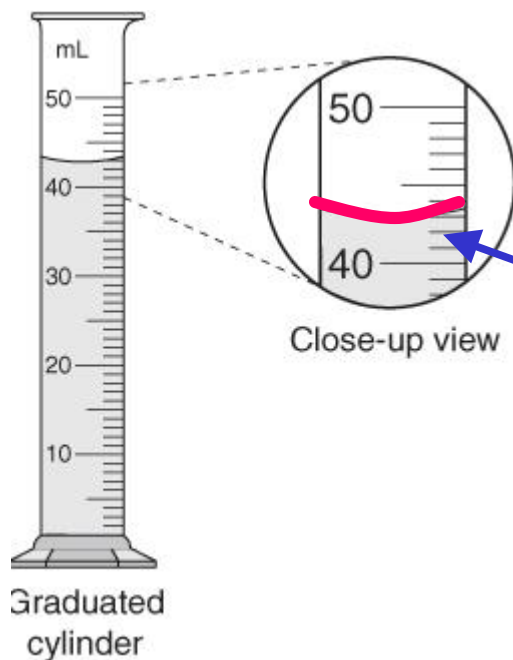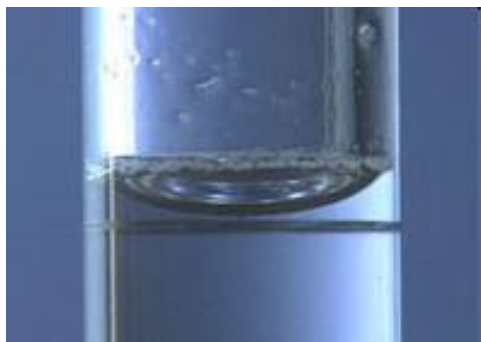
Volume of Liquids

We will be using **graduated cylinders** to find the volume of liquids and other objects.

Read the measurement based on the bottom of the **meniscus** or curve.

HINT: make sure you are **eye-level** with the level of the water.

What is the volume of water in the cylinder? __**43**__ mL

What causes the meniscus?

A concave meniscus occurs when the molecules of the liquid attract those of the container. The glass attracts the water on the sides.
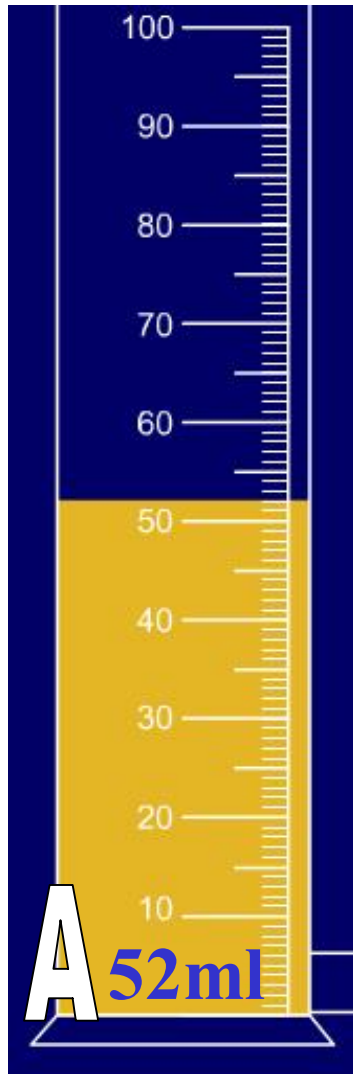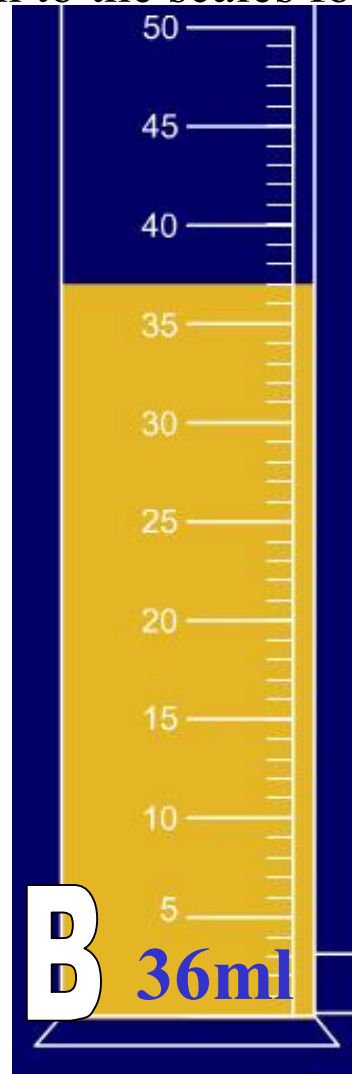
Measuring Liquid Volume

What is the volume of water in each cylinder?
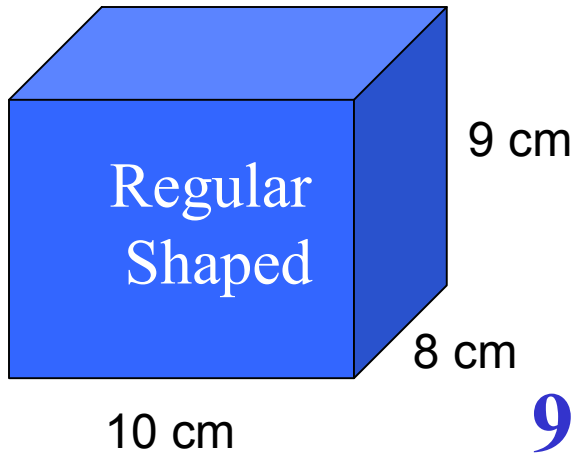Pay attention to the scales for each cylinder.

A **52ml**

Units of 10

B **36ml**

Units of 5

C **23ml**
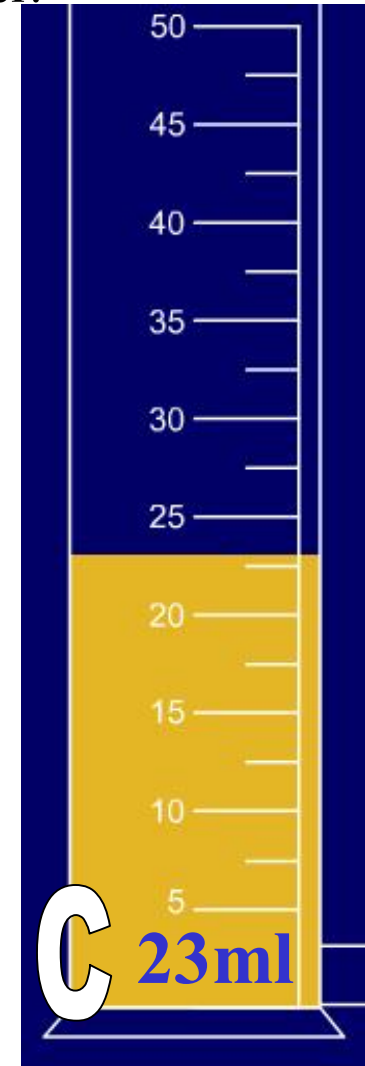
Units of 5

Measuring Solid Volume

Regular Shaped

9 cm

8 cm

10 cm

We can measure the volume of **regular object** using the formula **length x width x height**.

___**9**___ x ___**8**___ x ___**10**___ = ___**720cm³**___

We can measure the volume of irregular object using

The Water Displacement Method.

Amount of H_2O with object = ___**275**___

About of H_2O without object = ___**200**___

Difference = Volume = **75ml**