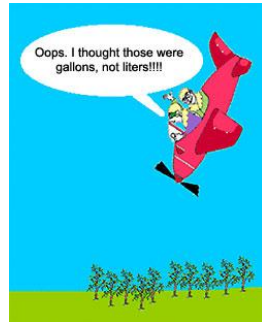


Oops, we used the wrong units

- In Canada, a plane ran out of fuel because the pilot mistook liters for gallons! The passengers were lucky that the captain was better as a glider pilot than he was with units. He landed the plane safely without power on an emergency airstrip.



<http://www.brainpop.com/science/matterandchemistry/measuringmatter/>

The Time NASA Lost a Mars Orbiter Because of a Metric System Mixup

Using the metric system onboard a spacecraft and imperial on the ground can have disastrous consequences.



Remember the Mars Climate Orbiter incident from 1999?

The Metric System

- To avoid confusion and mistakes, scientists all over the world use the metric system.



The Metric System

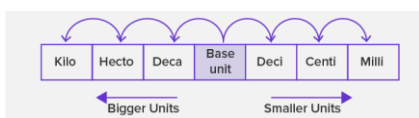
- It is based on three standard units called base units: meters (m), grams (g), and liters (L).



- It uses prefixes (or multiples of 10) to tell how large or small a measurement is.

Prefixes

- Milli-** Used to measure very small objects (penny)
- Centi-** Used to measure small objects (Book)
- Kilo-** Used to measure large objects



Common Prefixes used with SI Units

Prefix	Symbol	Meaning	Order of Magnitude
<i>giga-</i>	G	1 000 000 000	10^9
<i>mega-</i>	M	1 000 000	10^6
<i>kilo-</i>	k	1 000	10^3
<i>hecto-</i>	h	100	10^2
<i>deka-</i>	da	10	10^1
	base unit	1	10^0
<i>deci-</i>	d	0.1	10^{-1}
<i>centi-</i>	c	0.01	10^{-2}
<i>milli-</i>	m	0.001	10^{-3}
<i>micro-</i>	μ	0.000 001	10^{-6}
<i>nano-</i>	n	0.000 000 001	10^{-9}


Example Units of Measure

Base Unit (m, g, L) + Prefix (if required)

- g = _____
- kg = _____
- km = _____
- Mm = _____
- mm = _____
- cL = _____

To help you remember:

King Henry Died Unexpectedly Drinking Chocolate Milk

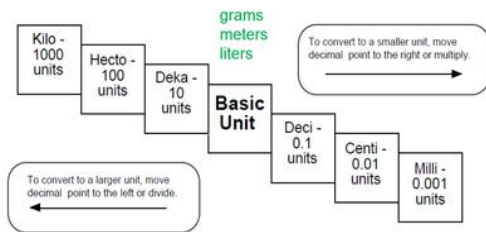


Kilo	Hecto	Deka	Unit	Deci	Centi	Milli
1,000	100	10	Meter Liter Gram	.1	.01	.001

largest to smallest = multiply smallest to largest = divide

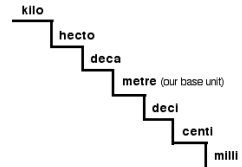
Converting Metric Units

- To easily change from one prefix to another, simply move the decimal.



Quick Conversions

- 10 cm = _____ mm
- 175 cm = _____ mm
- 2.5 mm = _____ cm
- .039 mm = _____ cm



Quick Conversions

- 25 kg = _____ g
- 175 g = _____ kg
- 1000 mL = _____ L
- 19 cL = _____ hL