**Chapter 1 – The Nature of Science**

Section 2 – Standards of Measurement

About how much is 1 kilogram? \_\_\_\_\_\_\_\_\_\_\_\_\_ It’s hard to say, that’s why there needs to be a standard



* A STANDARD is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that people \_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to compare measurements

* National prototype kilogram K20, one of two prototypes

stored at the US National Institute of Standards and Technology

in Gaithersburg, Maryland

* Two systems of measurement:

**English Metric – (*SI units – International System*)**

* Examples: (SI units underlined)
  + **Length** – \_\_\_\_\_\_\_\_\_ (milli, centi, kilo)
  + **Volume** – \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (milli, kilo)
  + **Temperature** – \_\_\_\_\_\_\_\_\_\_\_\_ (not indicated by degrees)
  + **Mass** – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (milli, kilo)
  + **Time** – \_\_\_\_\_\_\_\_\_\_\_\_, minutes, hours
* What makes this a better system?
  + Converting between units is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, because it is in

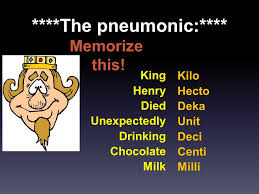
**MULTIPLES of \_\_\_\_\_\_\_\_\_\_**

* Examples:
  + Length – feet, yards, miles
  + Volume – gallons, cups, quarts, cubic feet/inches
  + Temperature - degrees Fahrenheit or Celsius
  + Weight – pounds, ounces
  + Time – seconds, minutes, hours
* What makes this system difficult?
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + What makes converting so easy in the metric system?

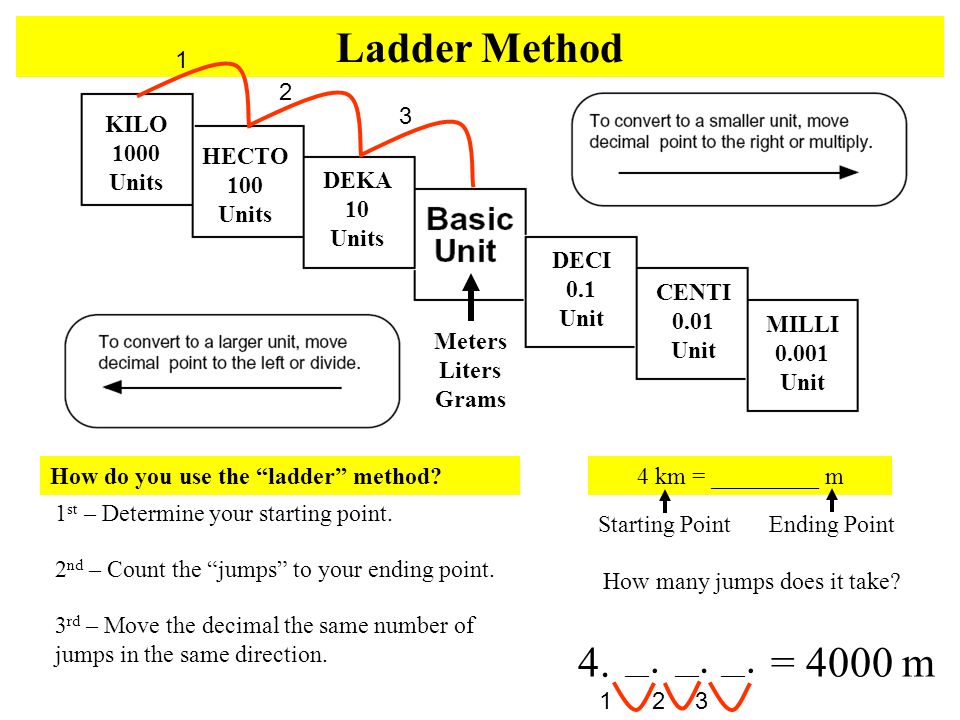
USING **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** that represent the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the unit (multiples of 10)

* + So we simply move the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ right or left depending on what we are starting with and where we are going to
    - Move it \_\_\_\_\_\_\_ if you are converting from a large unit to a smaller unit (the number will get \_\_\_\_\_\_\_\_\_\_\_\_\_\_)
    - Move it \_\_\_\_\_\_\_\_\_\_\_ if you are converting from small unit to a larger unit (the number will get \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
    - This is accomplished by **\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by 10s**



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Examples: Practice converting

Convert 3.2 L to mL

Answer – **\_\_\_\_\_\_\_\_\_\_\_\_**

Convert 5380 mg to g

Answer - **\_\_\_\_\_\_\_\_\_\_\_\_**

Convert 2.32 km to cm

Answer – **\_\_\_\_\_\_\_\_\_\_\_\_**

Definition review:



**Matter** – anything that has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Volume** – the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an object \_\_\_\_\_\_\_\_\_\_\_

**Mass** – the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an object

**Density** – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Density = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Density is a **derived unit** – it is made up of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ unit, like cm2 or mi/hr

Example: What is the density of a wood block with a mass of 500g and it takes up 2.5 liters of space? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Temperature** – Kelvin is the SI unit of temperature (no degrees when using Kelvin)

Kelvin = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Celsius = ⁵⁄₉(°F – 32)

Fahrenheit = ⁹⁄₅°C + 32

Convert standard body temp to °Celsius, then to Kelvin

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_