Measurements

Measurements are comparisons of properties against accepted standards, called units.

ENGLISH / US SYSTEM OF UNITS:

1 foot = 12 inches   1 yard = 3 feet   1 mile = 1760 yards

5280 ft = 1 mile

So what's the problem? The system is a mess. Units do not relate to one another in a sane manner.

Every kind of English unit has a DIFFERENT set of conversions from one unit to the other.

English units are nonstandard and difficult to use. Solution?

THE METRIC SYSTEM

Metric Base Units:

All metric units are made up of COMBINATIONS of BASE UNITS!

Length	meter	m
Mass	kilogram *	kg
Temperature	Kelvin	K
Time	second	s

* we usually treat the gram as if it's the base unit for mass!

- One meter is approximately 3.3 feet.
- One kilogram is approximately 2.2 pounds.

What about SIZE?

Metric units may be made larger or smaller by adding PREFIXES.

A few common metric prefixes:

mega-	10^6	M
kilo-	10^3	k
centi-	10^{-2}	c
milli-	10^{-3}	m
micro-	10^{-6}	μ

Bigger units

_____

smaller units

Applying prefixes

1 _____ m = _____ m

$1 \text{ km} = 10^3 \text{ m} \left(1000 \text{ m} \right) \quad 10 \times 10 \times 10$

$1 \text{ cm} = 10^{-2} \text{ m} \left(\frac{1}{100} \text{ m} \right) \quad \frac{1}{10} \times \frac{1}{10}$

Scaling units with metric prefixes ... examples

The distance between here and Columbia, SC is about 107,000 meters.
What metric unit would be best suited for a distance like this?

Km $Km = 10^3 m = 1000m$

$$107 \; Km$$

A piece of chalk is 0.080 meters long. What metric unit would be best
suited for this length?

cm $cm = 10^{-2} m = \dfrac{1}{100} m$

$$8.0 \; cm$$