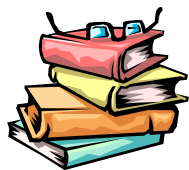


Measurement: Scientific Notation, Units, Prefixes and Conversions

Targets: Scientific Notation, Significant Figures, Dimensional Analysis and SI Units

Number Trivia (PowerPoint)



Mind Bender to introduce chemistry as a problem solving course:

4 books are resting on a shelf. Volumes I, II, III, IV. Each book is 2 inches wide, the binding is 1/6" of an inch. If a bookworm is to eat from volume I, page one to volume IV, last page, how many inches must it eat? (A: 5 inches)

Math Toolbox 1.1, 1.2 and 1.3 (pp. 36-41)

Eames, Video: Powers of 10

SI Units, Prefixes and Scientific Notation: Expressing large or small numbers as a product of a number between 1 and 10 and the appropriate power of 10.

Ex. $125 = 1.25 \times 100 = 1.25 \times 10^2$

Ex. 90 000 000 000 \$ (Bill Gates worth) = 9×10^{10} \$

Calculator Usage (Entering and Interpreting display)

$5 = 5 \times 10^0$

Rewrite: 4560×10^3 or 0.0024×10^{-3} correct scientific notation

Powers of 10 and Prefix ruler:

10^9	10^6	10^3	10^0	10^{-1}	10^{-2}	10^{-3}	10^{-6}	10^{-9}
Giga	Mega	kilo	1	deci	centi	milli	micro	nano
G	M	k		d	c	m	μ	n

Units and Prefix Conversions:

SI (International System) of units. 1960, Standard units for measurements

Quantity	Name	Abbreviation
Mass	kilogram	kg
Length	meter	m
Time	second	s
Temperature	Kelvin	K (upper case)
Amount of substance	mole	mol

In practice: Give prefix and unit for:

$1/10^{\text{th}}$ base SI unit of time $1/1\,000\,000$ of SI unit of length

10^3 times SI unit of length $1\,000\,000\,000$ times SI unit of amount of substance

10^{-3} of SI base unit of mass 10^6 times SI unit of temperature

Perform Conversions (teacher lead) in class.

$2.5 \text{ cm} = \underline{\hspace{2cm}} \text{ m}$

$1.4 \text{ kg} = \underline{\hspace{2cm}} \text{ g}$

$6.3 \times 10^{-4} \text{ m} = \underline{\hspace{2cm}} \mu\text{m}$

$0.05 \text{ ns} = \underline{\hspace{2cm}} \text{ s}$

$340 \text{ mg} = \underline{\hspace{2cm}} \text{ g}$

$4.2 \times 10^9 \text{ Gmol} = \underline{\hspace{2cm}} \text{ nmol}$

Practice calculator usage with scientific notation. Ex. $4.5 \times 10^5 \text{ kg} = \underline{\hspace{2cm}} \text{ g}$ or $560 \times 10^3 \text{ Mg} = \underline{\hspace{2cm}} \text{ mg}$

Homework: Practice Worksheet (Conversions and Scientific Notation)