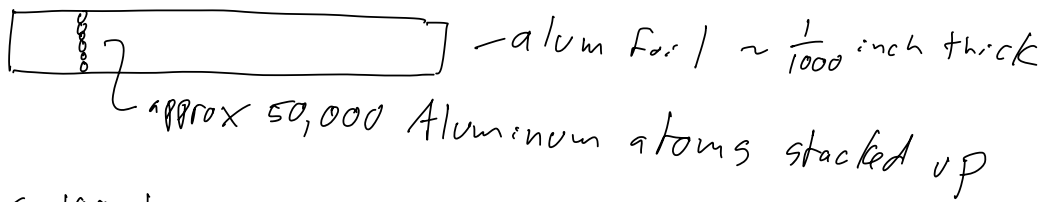


Chemistry - matter undergoing change

CHEM 103 - mostly matter

Matter composed of small building blocks called atoms



Approx 100 types of atoms each with own properties

Elements - matter with only 1 type of atom

Compounds - matter w/ more than 1 type of atom

molecules - more than 1 atom connected

water molecule - one water molecule containing
2 H atoms
1 O atoms

oxygen molecule - 2 O atoms

Chemical formula describes number and type of atoms
involved in molecule H_2O

Pure substance vs mixture

only 1 type
of element/compound

more than 1 compound/element

mixtures - homogeneous vs heterogeneous

vanilla
ice cream

chocolate chip

States of matter - determined by interactions
between "pieces" of matter

Solid - strong interactions, pieces locked in place

Liquid - medium interactions

Gas - weak interaction

Other ways to categorize matter

Mass } extensive
Volume }

Density } intensive
Color }
Taste }

Change - Chemical vs Physical

↓
results
in different
substance

↓
doesn't result in different
substance

Tools for chemistry - Units, scientific notation, dimensional analysis

mass - gram

volume - liter

length - meter

energy - Joule

nano $\xleftarrow{\div 1000}$ micro $\xleftarrow{\div 1000}$ milli $\xleftarrow{\div 1000}$ base $\xrightarrow{\times 1000}$ kilo $\xrightarrow{\times 1000}$ mega $\xrightarrow{\times 1000}$ giga

300,000,000 or 3×10^8

0.0000005 or 5×10^{-7}

300,000,000,000 or 3×10^{11}

Dimensional analysis - use relationships to convert one thing to another

Ex: How many inches in 3.5 m

meters $\xrightarrow{?}$ inches

meters $\xrightarrow{\uparrow}$ centimeters $\xrightarrow{\uparrow}$ inches
 $1\text{ m} = 100\text{ cm}$ $2.54\text{ cm} = 1\text{ in}$

$$3.5 \cancel{\text{ m}} \times \frac{100 \cancel{\text{ cm}}}{1 \cancel{\text{ m}}} \times \frac{1 \text{ in}}{2.54 \cancel{\text{ cm}}} = 137.8 \text{ in}$$

Ex: Grapes cost \$2.49 per pounds

If you have \$10.50 how many kg of grapes can you buy?

\$ $\rightarrow$ pounds grapes $\rightarrow$ kg grapes
 $1\text{ pound} = \$2.49$ $1\text{ kg} = 2.2\text{ pounds}$

$$\cancel{\$}10.50 \times \frac{\text{pounds grapes}}{\cancel{\$}2.49} \times \frac{1}{2.2} \frac{\text{kg}}{\cancel{\text{pounds}}} = 1.92 \text{ kg of grapes}$$