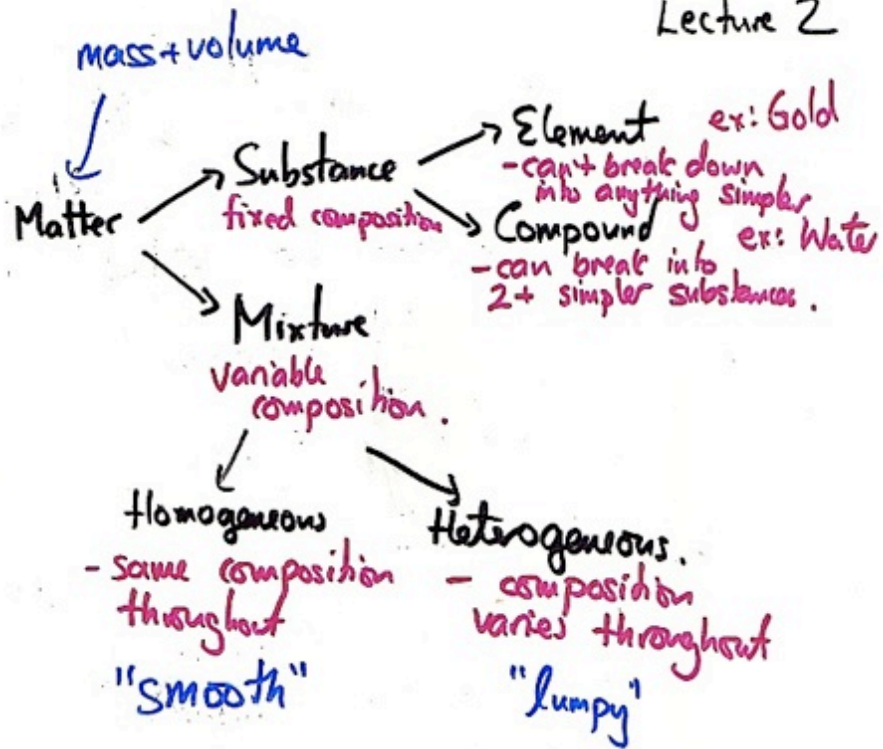


Chem 1141
8-24-11
Lecture 2



Elements

- Building blocks
- 118
- 1/2/3 abbreviation.

ex: Hydrogen: H

Helium: He ~~HE~~

↑ ↑
Capital lowercase

ex: Lead: Pb Plumbum
Gold: Au Aurum

Properties of Matter

2 types of properties

PHYSICAL

- can measure without changing identity of substance.

ex: m.p. / b.p. / density
melting point boiling point

CHEMICAL

- we change the identity of the substance.

ex: flammability / corrosion

Properties

Extensive - depend on size

ex: Mass

Intensive - do not depend on size

ex: Density
Temperature

Measurement

2 parts: # - unit

ex: 32°C , 12 g, $12.5^{\circ}/\text{mL}$

ex: Distance

m, mile, in, naut. miles
km, yards, ft, cubits, paces,
chains, furlongs, rods, ...

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Table 1.2 SI Base Units

Base Quantity	Name of Unit	Symbol
Length	meter	m
Mass	kilogram	kg
Time	second	s
Electrical current	ampere	A
Temperature	kelvin	K
Amount of substance	mole	mol
Luminous intensity	candela	cd

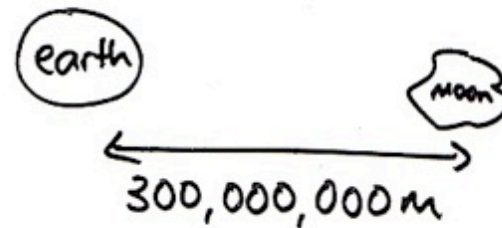
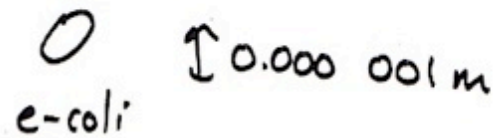
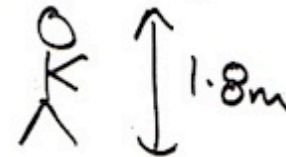
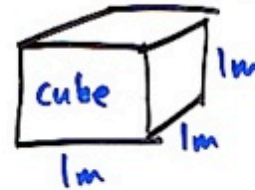


Table 1.3 Prefixes Used with SI Units

Prefix	Symbol	Meaning	Example
tera-	T	1,000,000,000,000, or 10^{12}	1 terameter (Tm) = 1×10^{12} m
giga-	G	1,000,000,000, or 10^9	1 gigameter (Gm) = 1×10^9 m
mega-	M	1,000,000, or 10^6	1 megameter (Mm) = 1×10^6 m
kilo-	k	1,000, or 10^3	1 kilometer (km) = 1×10^3 m
deci-	d	1/10, or 10^{-1}	1 decimeter (dm) = 0.1 m
centi-	c	1/100, or 10^{-2}	1 centimeter (cm) = 0.01 m
milli-	m	1/1,000, or 10^{-3}	1 millimeter (mm) = 0.001 m
micro-	μ	1/1,000,000, or 10^{-6}	1 micrometer (μ m) = 1×10^{-6} m
nano-	n	1/1,000,000,000, or 10^{-9}	1 nanometer (nm) = 1×10^{-9} m
pico-	p	1/1,000,000,000,000, or 10^{-12}	1 picometer (pm) = 1×10^{-12} m

Volume

No SI unit for volume!
- Derived unit!



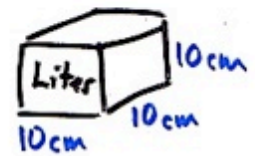
$$\begin{aligned}
 V &= l \times b \times h \\
 &= 1\text{m} \times 1\text{m} \times 1\text{m} \\
 &= 1\text{m} \times \text{m} \times \text{m} \\
 &= \text{m} \cdot \text{m} \cdot \text{m} \\
 &= \text{m}^3
 \end{aligned}$$

$V = 1\text{m}^3$

↑
Yag!!

derived unit!

too large!



$$\begin{aligned}
 V &= 10\text{cm} \times 10\text{cm} \times 10\text{cm} \\
 &= 1000\text{cm}^3 \\
 &= 1\text{ Liter} \\
 &= 1\text{ L} \\
 &= 1\text{ l}
 \end{aligned}$$