Announcements

Wednesday, August 26, 2009

MasteringChemistry (MC) login information is on the course webpage

Upcoming MC due dates (all at 11:59 pm):

- Intro: Fri Sep 4 (not for credit)
- Ch 1: Fri Sep 4
- Ch 2: Fri, Sep 18
- Ch 3: Fri, Sep 25

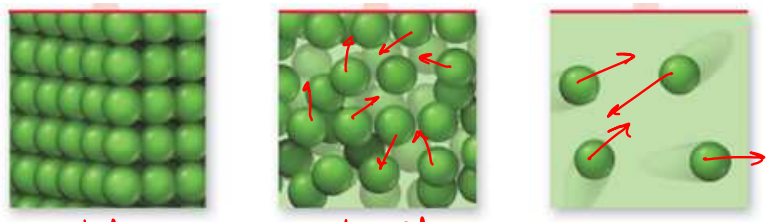
Spreadsheet 1 lab due in D2L dropbox by next Monday (Aug 31) before lab. See lab report submission guidelines (handed to you in lab, and on class webpage).

D2L Discussions are open - start by introducing yourself, then remember you need at least one post per chapter in the chapter discussions for participation points.

Chapter 1: Classifying matter

Matter has: mass + volume

The physical states of matter:



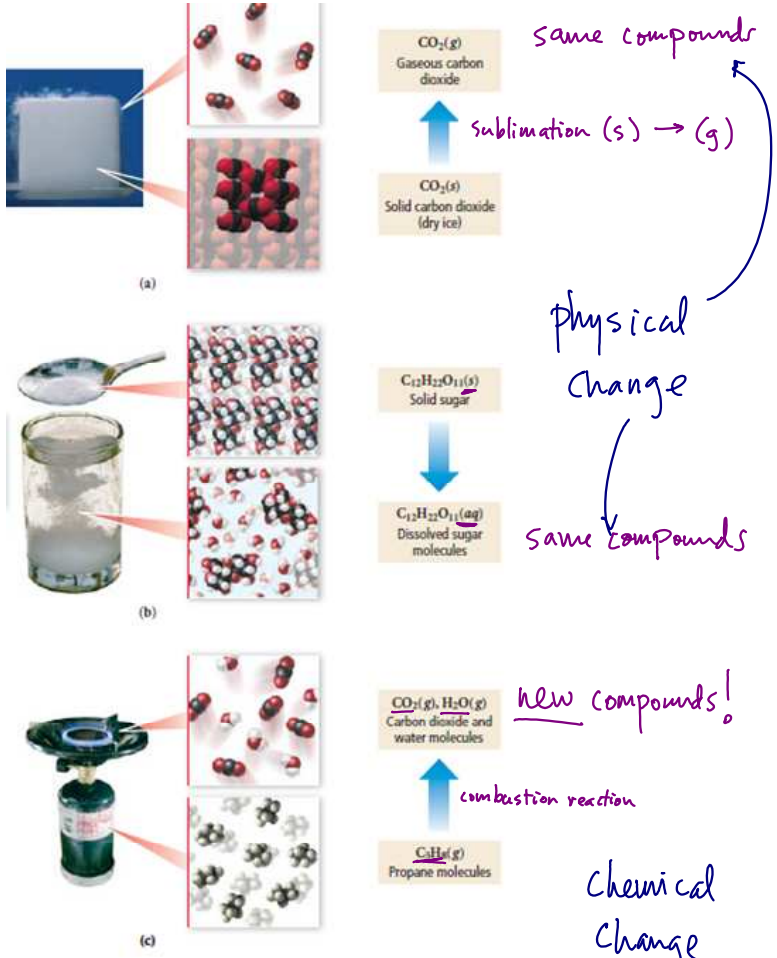
solid liquid gas

	Rigid/ Fluid?	Compressible?	Molecular view
Solid	rigid	no	locked in place structured; close-packed
Liquid	fluid	no	moving freely; close-packed
Gas	fluid	yes	moving freely; far apart

Types of matter

sugar compound sucrose $C_{12}H_{22}O_{11}$ ← fixed ratio ← chemical formula
iron element
carbon dioxide compound CO_2
saltwater homogeneous mix (soln)
gravel heterogeneous
Kool Aid powder heterogeneous
Mixed Kool Aid homogeneous
vodka homogeneous
tap water homogeneous
deionized water compound H_2O

Physical and chemical changes



Energy

↳ capability to do work

Work : force x distance

Potential energy : based on position
based on composition (fuels)

Kinetic energy : energy of motion

Thermal energy : heat , energy transfer

Chemical energy : type of potential energy
contained in molecules

Measurement

SI Units: standard metric units
divided by tens

Quantity	Unit	Symbol
length	meter	m
mass	kilogram	kg
time	second	s
temperature	kelvin	K

Temperature is the measure of: molecular motion

Units: **K scale** kelvin 0 K absolute zero (molecules stop moving)

°C scale degree Celsius

Same size scale

Converting K and °C:

$K = {}^{\circ}C + 273.15$

$0\,K = -273.15\,^{\circ}C$

$^{\circ}C = K - 273.15$

$0\,^{\circ}C = H_2O$ freezing/melting point

°F scale: ($0\,^{\circ}F$ fp of saturated saltwater)

size of unit

$$^{\circ}F = \left(^{\circ}C \times \frac{9\,^{\circ}F}{5\,^{\circ}C}\right) + 32$$

where zero is

$^{\circ}F = 1.8\,(^{\circ}C) + 32$

$$^{\circ}C = \frac{(^{\circ}F - 32)}{1.8}$$

these eqns given on conversion sheet for exams / quizzes

memorize these

Prefix	Symbol	Decimal Equivalent	Power of 10
			pos
mega-	M	1,000,000	Base x 10^{6}
kilo-	k	1,000	Base x 10^{3}
deci-	d	0.1	Base x 10^{-1}
centi-	c	0.01	Base x 10^{-2}
milli-	m	0.001	Base x 10^{-3}
micro-	μ or mc	0.000 001	Base x 10^{-6}
nano-	n	0.000 000 001	Base x 10^{-9}
pico	p	0.000 000 000 001	Base x 10^{-12}
			neg

makes unit larger ↑

makes unit smaller ↓

base unit: no prefix

μ (mu)

$\mu = 10^{-6}$

$1\ \mu m = 1 \times 10^{-6}\ m$

$1\ m = 10^{6}\ \mu m$

swapping the relationship uses the inverse exponent

larger # = smaller unit