Things to Think About as We Start the Next Unit

- Where are the metals and the nonmetals located on the periodic table?
- What do you remember from grade 10 about ionic and molecular compounds?
- What do you know about acids and bases?

Unit 2 - Compounds

- Introduction
- Ionic Compounds
- Molecular Compounds
- Acids and Bases

NAMES
&
FORMULAS

Unit 2 - Compounds

COMPOUNDS are conventionally divided into three classes:

(1) **metal - nonmetal** (ionic compounds)

Ex. salt **NaCl**

(2) **nonmetal - nonmetal** (molecular compounds)

Ex. sulfur dioxide **SO_2**

(3) **metal - metal** (intermolecular compounds)

Ex. brass Cu - Zn

we will **not** be studying metal-metal

"tested"

Empirical Definitions

Ionic Compounds - solids at SATP
- when dissolved in water they conduct electricity
- no change in litmus paper

Molecular Compounds - solids, liquids and gases which, when dissolved in water, do not conduct electricity
- no change in litmus paper

ACIDS - when pure, resemble molecular substances
(can be solids, liquids or gases at SATP)
- in solution, their conductivity suggests a separate third class.
(do conduct electricity, but strength varies)
- in solution, make blue litmus turn red.

BASES - compounds whose aqueous solutions make red litmus turn blue.

FOUR STATES OF MATTER SUBSCRIPTS

(s) - solids
(l) - liquids
(g) - gases
(aq) - aqueous (dissolved in water)

$NaCl_{(aq)}$

Ex. $H_2O_{(l)}$

DIAGNOSTIC TESTS : [A] Conductivity Test
[B] Litmus Test

Periodic Table of the Elements

	I A	II A	III B	IV B	V B	VI B	VII B	VIII			I B	II B	III A	IV A	V A	VI A	VII A	0
1	1 H 1.00794																	2 He 4.0026
2	3 Li 6.941	4 Be 9.01218											5 B 10.811	6 C 12.011	7 N 14.0067	8 O 16.00	9 F 18.9984	10 Ne 20.1797
3	11 Na 22.9898	12 Mg 24.305											13 Al 27.98	14 Si 28.086	15 P 30.974	16 S 32.066	17 Cl 35.453	18 Ar 39.948
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba	57 * La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra	89 + Ac	104 Rf	105 Ha	106 106	107 107	108 108	109 109	110 110								

* Lanthanide Series	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
+ Actinide Series	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

Ionic Compounds

Formula unit - of an ionic compound is the smalle amount of the compound that has the composition giv by the chemical formula.

Ex. one Na^+ and one Cl^- form **NaCl**

one atom!

Monatomic ions - single atoms that have gained or lost electrons

Ex. Na^+ or F^-

Binary ionic compounds - are composed of monatomic ions.
Ex. $Na^+ + Cl^- \rightarrow NaCl$

many atoms!

Polyatomic ion - a cation or anion that is composed of a group of atoms with a net positive or negative charge.
Ex NO_3^-
(back of periodic table)

Multivalent ion - some atoms (transition elements) can form more than one ion, each with its own particular charge.
Ex. Fe^{+2} and Fe^{+3}

Hydrate - compounds that decompose at relatively low temperatures to yield water and another associated compound (us ionic)
- the water is loosely held to the ionic compound.
Ex. $Cu^{2+}SO_4^{2-} \cdot 5H_2O$
$CuSO_4 \cdot 5H_2O$

Anhydrous - the form of a hydrate with the water removed.
Ex $CuSO_{4(s)}$

Ionic Formulas
" The net electrical charge in a theoretical chemical formula is zero"
Therefore the sum of the charges on the positive ions (cations) must equal the sum of the electrical charges on the negative ions (anions)
Ex. Na_2O

$\{2*(+1)\} + \{1*(-2)\} = 0$

atoms charge atom charge

Exit Tickets

On the slip of paper provided, please write one or two sentences indicating what YOU think was the most important thing you learned or heard today.