Name: _____ Block: ____ Date: _____

Periodic Trends Worksheet

	I A	II A	Group B	III A	IV A	V A	VI A	VII A	VIII A
# of Valence Electrons	1	2	2	3	4	5	6	7	8
Charge	1+	2+	vary	3+	4±	3−	2−	1−	
Bonding Capacity	1	2	vary	3	4	3	2	1	0
Shape – if central atom	X·	·X·	Great imitators	·X·	·X·	·X·	·X:	·X:	
Resulting Bond Angle		180°	follow group w/ the same charge	120°	109.5°	107°	105°		
Name of Shape		linear		trigonal planar	tetrahedral	pyramidal	bent		

Types of Bonds

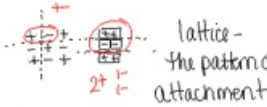
Covalent bond – Sharing of valence e⁻ – forms molecules

ionic bond – transfer of valence e⁻ – creates ions – forms compounds

metallic bond – the attraction between 2 (or more) metallic ions in which the e⁻ flow freely between ions (sea of e⁻)

Ionic Compound:

1. composed entirely of ions.
2. high melting points
3. brittle – shatter + cleave
4. most will dissolve in water + become free ions.
5. will form electrolytes when dissolved in water



lattice – the pattern of attachment

Single atom ion = monatomic ion

Covalently bonded atoms that are a group w/ a charge polyatomic ions

Compounds are written as the empirical formula
- uses simplest ratio

Covalent Molecules:

1. do not create electrolytes
2. low melting points
3. made of covalent bonds
4. written w/ molecular formulas

Molecular Formulas – list all atoms present (NOT the simplest ratio)

glucose $C_6H_{12}O_6$ ← molecular formula

ribose $C_5H_{10}O_5$ ←

empirical formula CH_2O — will not differentiate between molecules

Difference in Electronegativity		Type of Bond	
0.49 or less	NPC	non-polar covalent bond	perfect sharing
0.5 to 1.9	PC	polar covalent bond	one element does not share e⁻ well
2.0 or greater	I	ionic bond	

① Determine the 2 elements that are bonded.
② Find the E.N. value for both and subtract
③ look answer up on chart

Examples

Compound/molecule	Lewis Dot	Molecular Shape	name of Shape	Type of bond
H_2O			bent	3.5 O − 2.1 H = 1.4 (PC)
$CaCl_2$			linear	3.0 Cl − 1.0 Ca = 2.0 (I)
O_2			linear	3.5 O − 3.5 O = 0.0 (NPC)
NH_3 ammonia			pyramidal	3.0 N − 2.1 H = 0.9 (PC)
CH_4 methane			tetrahedral	2.5 C − 2.1 H = 0.4 (NPC)
NaCl			linear	3.0 − 0.9 = 2.1 (I)

VSEPR – valence shell electron pair repulsion

a natural (or unbonded pair) of e⁻ have greater repulsion than a bonded pair.