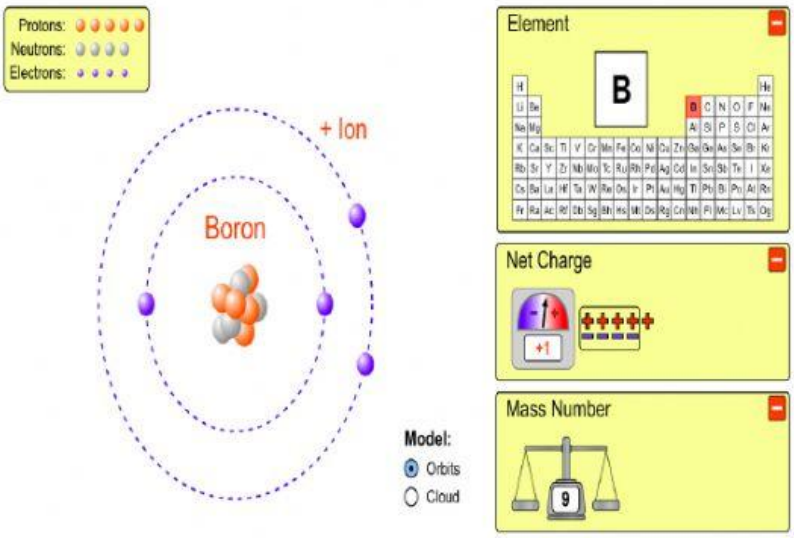
UNIT 1: ATOMIC STRUCTURE REVIEW



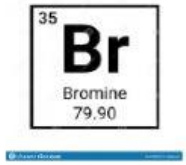
Based on the diagram shown to the left, fill out the numbers

$$^{A}_{Z}B^{C}$$

Z=___ is _____

A=___ is _____

C=___ is _____

Atom	# of protons	# of neutrons	# of electron	Mass #
$^{42}_{20}Ca^{+2}$				
S-34				
				

- Ions are atoms that are _____
- Isotopes of a given element differ by _____.
  This is because different isotopes of a given element have different numbers of _____ (protons, neutrons, electrons).

Cations are atoms that have a _____ (Positive/negative) charge obtained by _____(losing, gaining) electrons.

Anions are atoms that have a _____ (Positive/negative) charge obtained by _____ (losing, gaining) electrons.

LIVEWORKSHEETS

HALF LIFE CALCULATIONS

What is the half life of an element that degrades from 100g to 25g over 5000 years?

The half life of element X is 240 days. If I begin with a 23g sample how much would remain after 1200 days?

An element that has a half life of 10 days decays from 500 grams to 31.25 grams. How much time passed?

Radioactive Decay Problems

Identify the following examples as alpha, beta, or gamma decay.

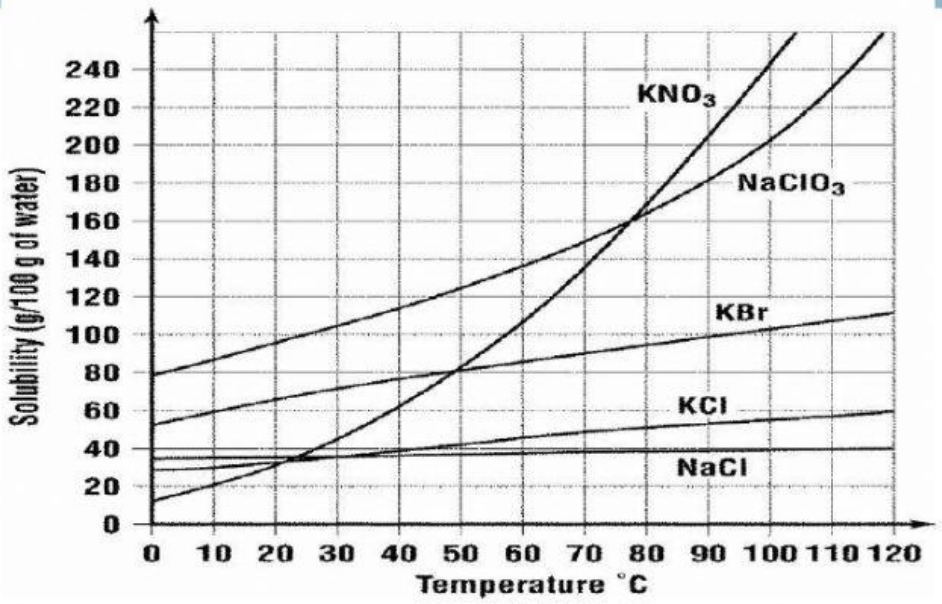
1. $^{233}_{92}U \rightarrow ^{4}_{2}He + ^{229}_{90}Th$ _____
2. $^{99}_{43}Tc \rightarrow ^{0}_{-1}e + ^{99}_{44}Ru$ _____
4. $^{202}_{81}Tl \rightarrow ^{202}_{81}Tl + ^{0}_{0}\gamma$ _____
5. $^{125}_{53}I \rightarrow ^{0}_{0}\gamma + ^{125}_{53}I$ _____

15. $^{184}_{74}W \rightarrow ^{4}_{2}He +$ _____ is an example of _____ decay.
16. $^{35}_{16}S \rightarrow$ _____ $+ ^{35}_{17}Cl$ is an example of _____ decay.
17. $^{210}_{82}Pb \rightarrow$ _____ $+ ^{206}_{80}Hg$ is an example of _____ decay.

LIVEWORKSHEETS

Solubility Curve Problems

Reading Solubility Graphs



a) Which Salt is most soluble at 90 degrees Celsius?

b) Which Salt undergoes the greatest change in solubility with an increase in temperature?

c) How many grams of KBr at 90 degrees Celsius are needed to form a saturated solution in…

   i) 100 grams of water _____ 200 grams of water _____

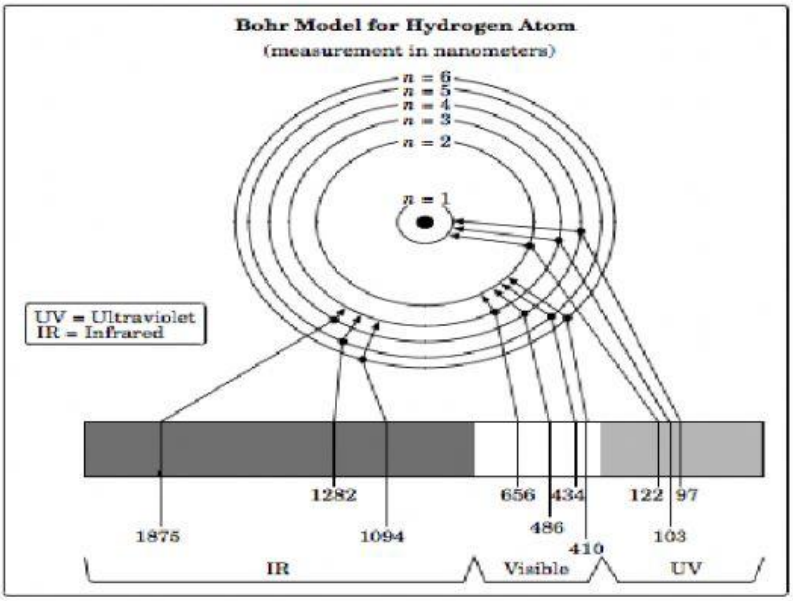
d) 100 grams of $NaClO_3$ at 50 degrees Celcius forms what type of solution?

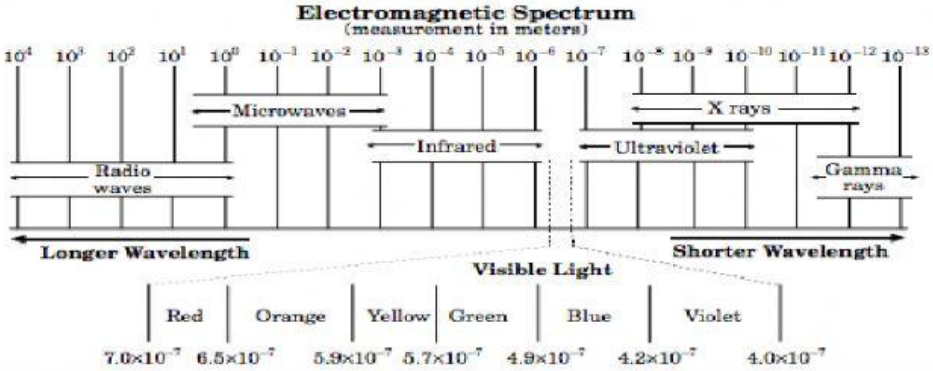
e) If I add 140 grams of KBr at 90 degrees Celsius in 100 grams of water, _____ grams of KBr will dissolve and _____ grams of KBr will remain undissolved.

f) If I add 100 grams of KCl at 110 degrees Celcius in 100 grams of water, _____ grams of KCl will dissolve and _____ grams of KCl will remain undissolved.

LIVEWORKSHEETS

UNIT 2 EM SPECTRUM





Do microwaves or ultraviolet rays have a longer wavelength?_____

Does blue light or orange light have a higher energy?_____

Rank infrared, x-rays, and green light from lowest to highest frequency._____ _____ _____

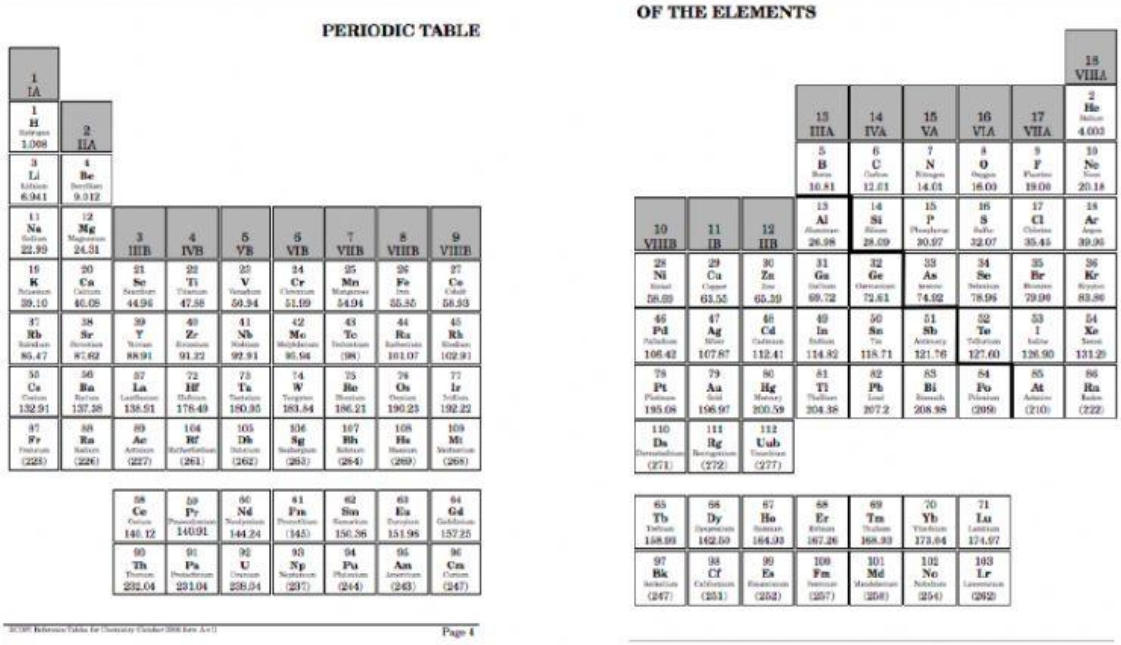
As an electron falls from n=4 energy level to n=2 energy level, it is in the _____ light spectrum and has a value of _____ nm. The colored light that is emitted is _____.

To emit a IR, an electron falls from n=6 energy level to n=? _____

As wavelength increases, frequency _____. As frequency increases, energy_____.

LIVEWORKSHEETS

UNIT 2 Periodic Table Properties



PERIODIC TABLE OF THE ELEMENTS

1 IA																	18 VIIIA
1 H Hydrogen 1.008	2 IIA											13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.81	6 C Carbon 12.01	7 N Nitrogen 14.01	8 O Oxygen 16.00	9 F Fluorine 19.00	10 Ne Neon 20.18
11 Na Sodium 22.99	12 Mg Magnesium 24.31	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 VIIIB	9 VIIIB	10 VIIIB	11 IB	12 IIB	13 Al Aluminum 26.98	14 Si Silicon 28.09	15 P Phosphorus 30.97	16 S Sulfur 32.07	17 Cl Chlorine 35.45	18 Ar Argon 39.95
19 K Potassium 39.10	20 Ca Calcium 40.08	21 Sc Scandium 44.96	22 Ti Titanium 47.88	23 V Vanadium 50.94	24 Cr Chromium 51.99	25 Mn Manganese 54.94	26 Fe Iron 55.85	27 Co Cobalt 58.93	28 Ni Nickel 58.69	29 Cu Copper 63.55	30 Zn Zinc 65.39	31 Ga Gallium 69.72	32 Ge Germanium 72.61	33 As Arsenic 74.92	34 Se Selenium 78.96	35 Br Bromine 79.90	36 Kr Krypton 83.80
37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.91	46 Pd Palladium 106.42	47 Ag Silver 107.87	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.76	52 Te Tellurium 127.60	53 I Iodine 126.90	54 Xe Xenon 131.29
55 Cs Cesium 132.91	56 Ba Barium 137.38	57 La Lanthanum 138.91	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.84	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)
87 Fr Francium (223)	88 Ra Radium (226)	89 Ac Actinium (227)	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (263)	107 Bh Bohrium (264)	108 Hs Hassium (269)	109 Mt Meitnerium (268)	110 Ds Darmstadtium (271)	111 Rg Roentgenium (272)	112 Uub Ununbium (277)						

58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.96	64 Gd Gadolinium 157.25
90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.04	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)

65 Tb Terbium 158.93	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93	68 Er Erbium 167.26	69 Tm Thulium 168.93	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.97
97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (254)	103 Lr Lawrencium (262)

Page 4

Group 1A represents your _____.

- These elements have __ valence electron.
- These are your _____
- Elements in group 1A _____ electron to form a ___ _____ (cation, anion).

Group 2A represents your _____.

- These elements have __ valence electrons.
- These are your _____
- Elements in group 2A _____ electron to form a ___ _____ (cation, anion).

Group 7A represents your _____.

- These elements have __ valence electrons.
- These are your _____
- Elements in group 7A _____ electron to form a ___ _____ (cation, anion).

Group 8A represents your _____.

- These elements have __ valence electrons.
- These are your _____
- Elements in group 8A _____ electrons to form a _____

Metals are on the _____ side of the staircase. Nonmetals are on the _____ side.

Elements that are in the same _____share similar characteristics because they have the same number of _____ (valence electrons, energy levels).

- ____ is the element symbol for the element that is located in group 5A and period 4.
- Which of the following is a metal? _____.
- What does the period # represent for an element? _____.

LIVEWORKSHEETS

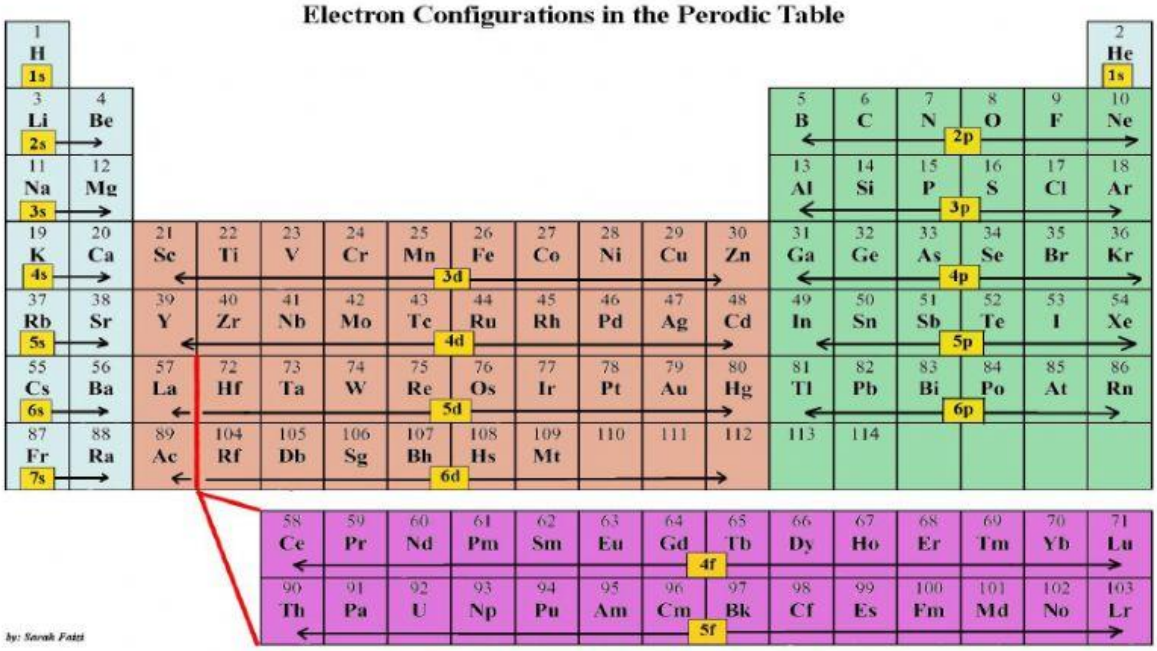
Ionization energy is the _____
The element _____ has the highest ionization energy.

Electronegativity is the _____
The element ____ has the highest electronegativity.

Atomic radius is the _____
The element ____ has the highest atomic radius.

Which of the following elements from the following list would not be a metalloid? Provide the element symbol

- Al, B, Si, Ge, As, Sb, Te



What is the electron configuration for Arsenic?

Draw the bohr model for Arsenic.

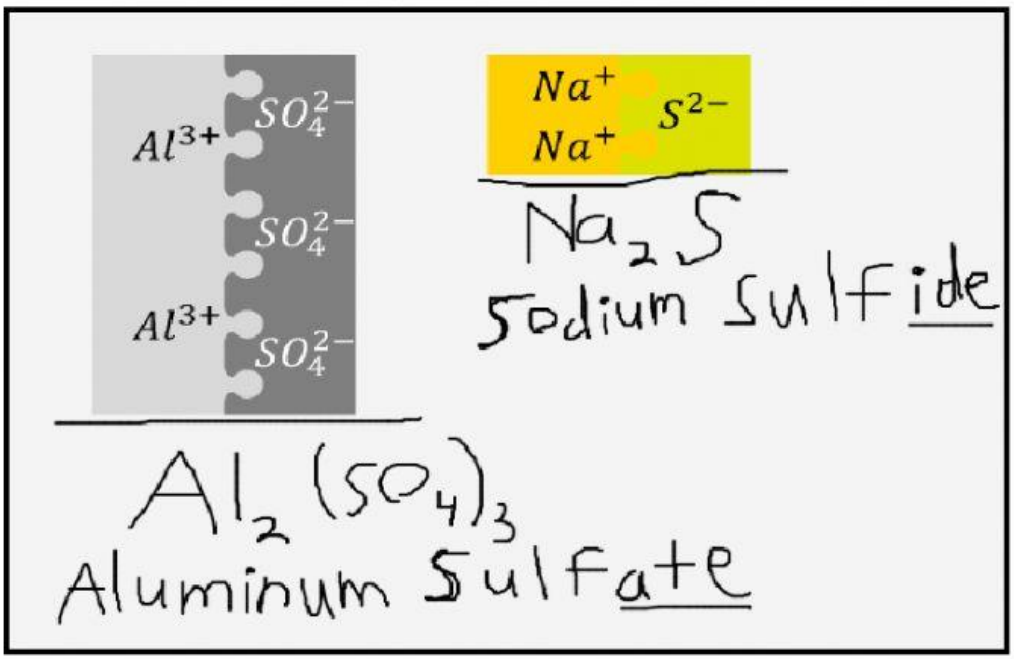
- How many electrons are in the 1st energy level?
- How many electrons are in the 2nd energy level?
- How many electrons are in the 3rd energy level?
- How many electrons are in the 4th energy level?
- How many valence electrons are there?
- What is the symbol of the element that reacts similar to Arsenic and is in period 5?
- What is the name of the element that would be used in the noble gas (shortcut) configuration?

LIVEWORKSHEETS

UNIT 3 Bonding

Ionic Bonding occurs when a _____ (metal, nonmetal) decides to _____ (transfers, shares) electrons with a _____(metal, nonmetal). The metal would form a _____ (positive cation, negative anion) since the metal _____(loses, gains) electrons. The nonmetal would form a _____ (positive cation, negative anion) since the nonmetal _____(loses, gains) electrons.

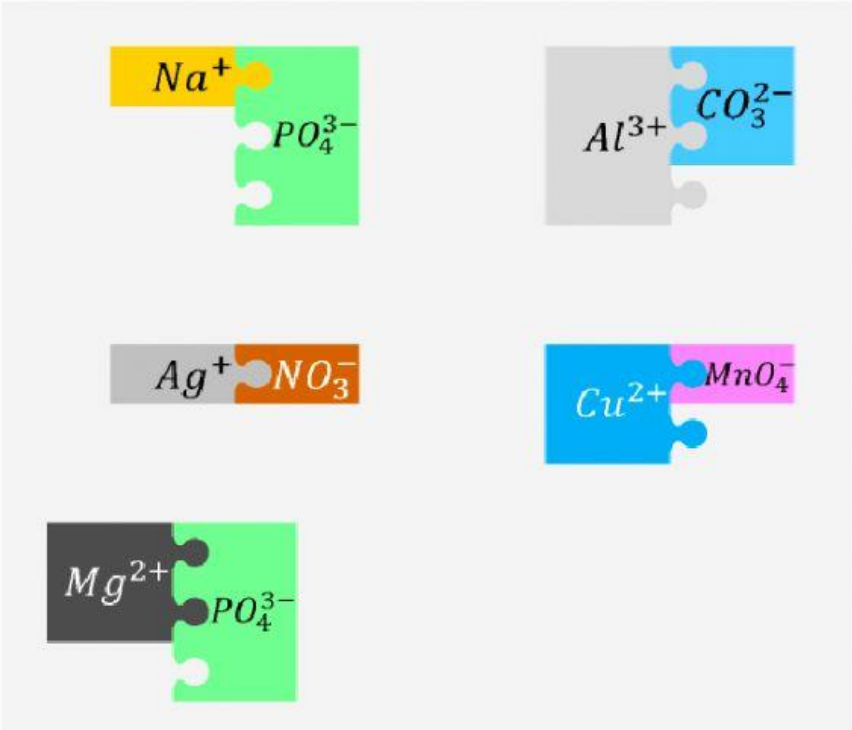
Reference the two examples of the ionic bonds drawn below.



As can be seen from the **ionic bond between Aluminum and Sulfate**, Aluminum Sulfate is formed when two Aluminum atoms each _____ (lose three, gain 3) electrons and three SO_4 molecules each _____ (gain 2, lose 2) electrons. The sum of the charge of the ions add up to **zero** to form a _____ (stable, reactive) compound. Because SO_4 is a polyatomic ion, the name of SO_4 is given on your _____ (polyatomic ion chart, periodic table) in your reference packet. The ending of the name of this ion is _____ (changed to ide, not changed).

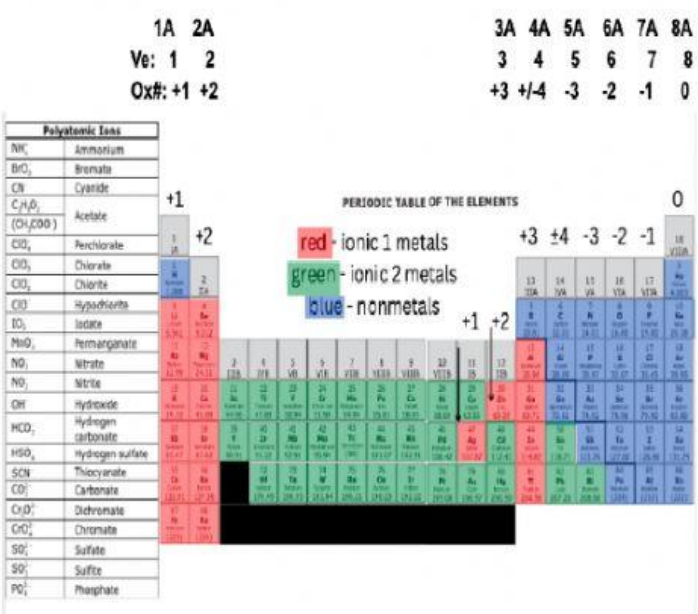
As can be seen from the **ionic bond between Sodium and Sulfur**, Sodium sulfide is formed when two Sodium atoms each _____ (lose 1, gain 1) electron and one sulfur atom _____ (gain 2, lose 2) electrons. The sum of the charge of the ions add up to **zero** to form a _____ (stable, reactive) compound. Because S is a nonmetal on the periodic table, the name of S is given on your _____ (reference packet, periodic table) and the ending is _____ (changed to ide, not changed).

LIVEWORKSHEETS



Write the chemical names and chemical formulas for the following compounds based on the charge of the ions

Write either the correct chemical formula or the correct chemical name.



Na_2CO_3 _____

_____ Calcium phosphate

Rb_2S _____

_____ Lithium Sulfide

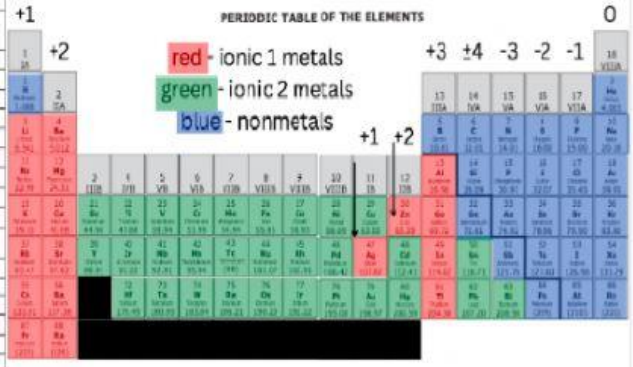
$Al(ClO_3)_3$ _____

_____ Aluminum Chloride

LIVEWORKSHEETS

	1A	2A	3A	4A	5A	6A	7A	8A
Ve:	1	2	3	4	5	6	7	8
Ox#:	+1	+2	+3	+/-4	-3	-2	-1	0

Polyatomic Ions	
NH_4^+	Ammonium
BrO_3^-	Bromate
CN^-	Cyanide
$C_2H_3O_2^-$ (CH_3COO^-)	Acetate
ClO_4^-	Perchlorate
ClO_3^-	Chlorate
ClO_2^-	Chlorite
ClO^-	Hypochlorite
IO_3^-	Iodate
MnO_4^-	Permanganate
NO_3^-	Nitrate
NO_2^-	Nitrite
OH^-	Hydroxide
HCO_3^-	Hydrogen carbonate
HSO_4^-	Hydrogen sulfate
SCN^-	Thiocyanate
CO_3^{2-}	Carbonate
$Cr_2O_7^{2-}$	Dichromate
CrO_4^{2-}	Chromate
SO_4^{2-}	Sulfate
SO_3^{2-}	Sulfite
PO_4^{3-}	Phosphate



Looking at the above periodic table…

- We use our rules for ionic bonding when the first element is _____.
  - This means sum of the charges of the ions add up to
  - The ending of the nonmetal changes to ide
- When the first element is green, we apply these same ionic bonding rules but make sure to put a _____ in the chemical _____ to denote the _____ of the metal.
- When the first element is blue, we use _____ to denote how many of each atom there are.

Covalent Bonding occurs when a _____ (metal, nonmetal) decides to _____ (transfers,shares) electrons with a _____(metal, nonmetal). We draw Lewis Structures to show how electrons are **shared** between nonmetals. Because covalent bonds do not contain a metal, they have _____ and are very _____. When we write the chemical formulas of covalent compounds, we simply look at the _____ to see how many of each element the compound contains. When we write the chemical names of covalent bonds, we use the prefixes on both the first and second elements to denote how many of each atom there are. The only exception is that we don't use _____ on the first. The

Write the prefixes for the following numbers

1	5	3	2	6	7	4	10	8	9

LIVEWORKSHEETS