

MONDAY, FEBRUARY 25th

DO NOW

- In your notebooks, to be checked, solve this problem...

There are 2000 pounds in 1 ton.
These are units of Weight!

Know:

$$2000lb = 1ton$$

Asked: How many pounds are in 32,000 tons?

TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!
 - Today's **QP** = QP QUIZ PREP = Lewis DOT Diagrams are designed to SHOW the "Valence Electrons" in an Element! Using this and your Jot-Down Notes DRAW Lewis Diagrams for Beryllium, Bromine, & Xenon!
2. Open books, **WORK** on today's **AO**!
3. ***HW** = Read & Do Pg. 194-195!

TODAY'S ACADEMIC OBJECTIVE

Today you will **POWER UP** your Scientific Minds by preparing to **IONIZE** some Atoms into **CRYSTALS**!

SCIENCE QUIZ ALERT

- Students, listen UP!!!

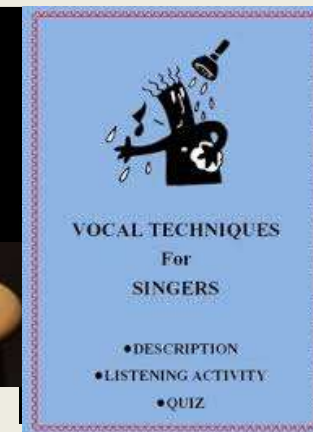


– We will be having a **VOCAL QUIZ** on to help us LEARN the Chemical Symbols for some COMMON Chemical Elements!

– This quiz will require you to STUDY your Periodic Tables!

– You are responsible for learning the NAME that goes with these 12 Chemical Element SYMBOLS!

- Sr, Ba, Zr, V, Cr, Pu, Ga, Ge, Sb, Bi, Se, and At!



PERIODIC TABLE: ELEMENT NAME ORIGINS

12	→	ATOMIC NUMBER
Mg	→	CHEMICAL SYMBOL
Magnesium	→	CHEMICAL NAME
24.305	→	ATOMIC MASS

SCIENCE QUIZ ALERT



VOCAL TECHNIQUES

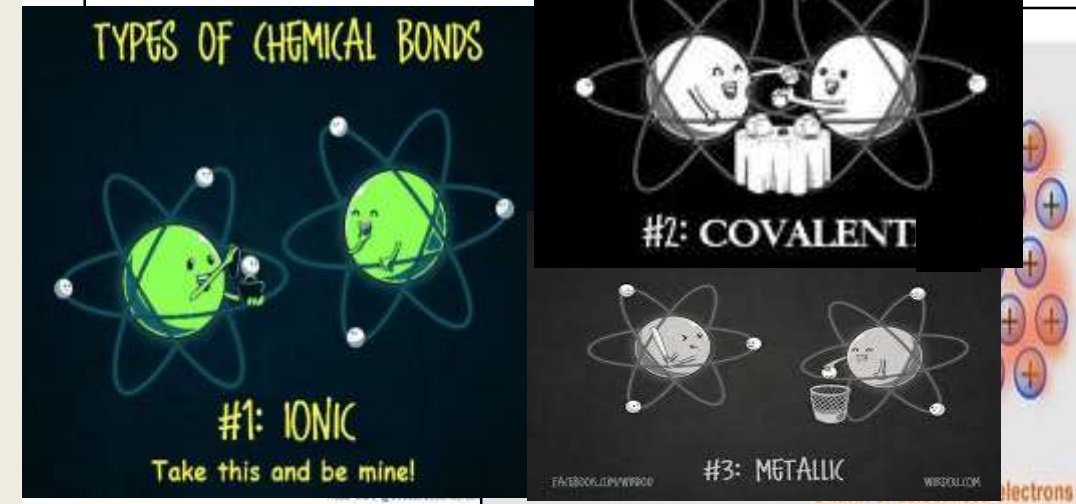
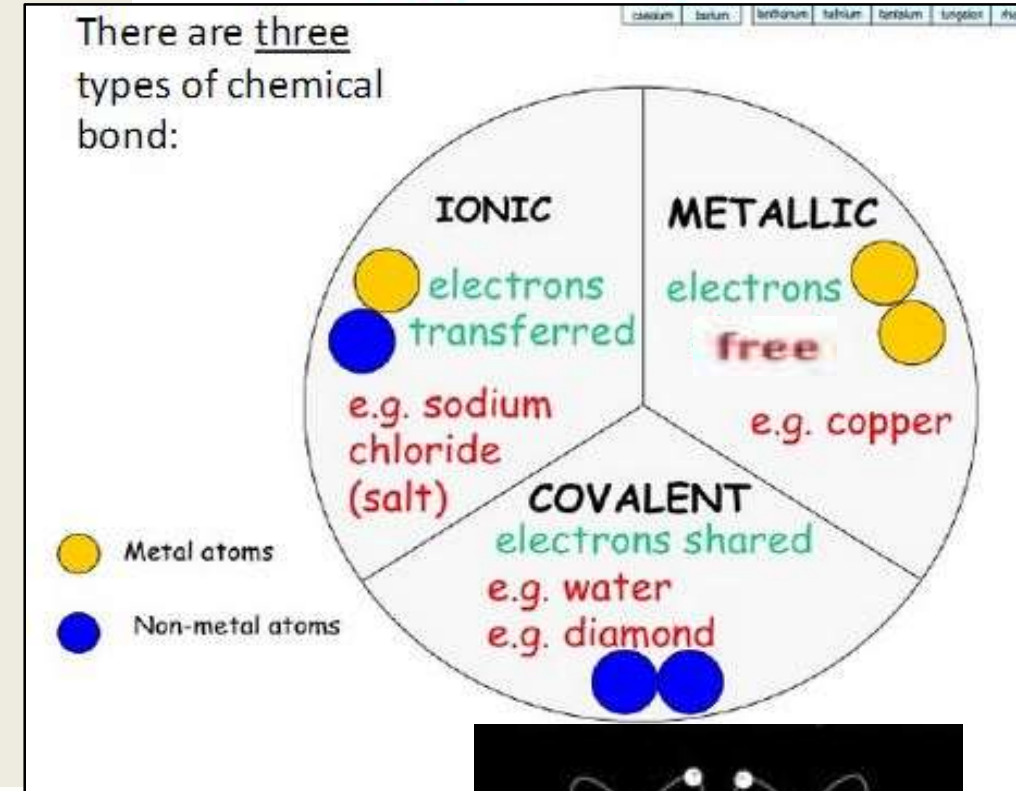
Periodic Table of the Elements

1 H Hydrogen 1.008																	18 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.613	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.798
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.757	52 Te Tellurium 127.6	53 I Iodine 126.905	54 Xe Xenon 131.294
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.227	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine [209]	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103 Actinides	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [293]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown

57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.242	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967
89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]

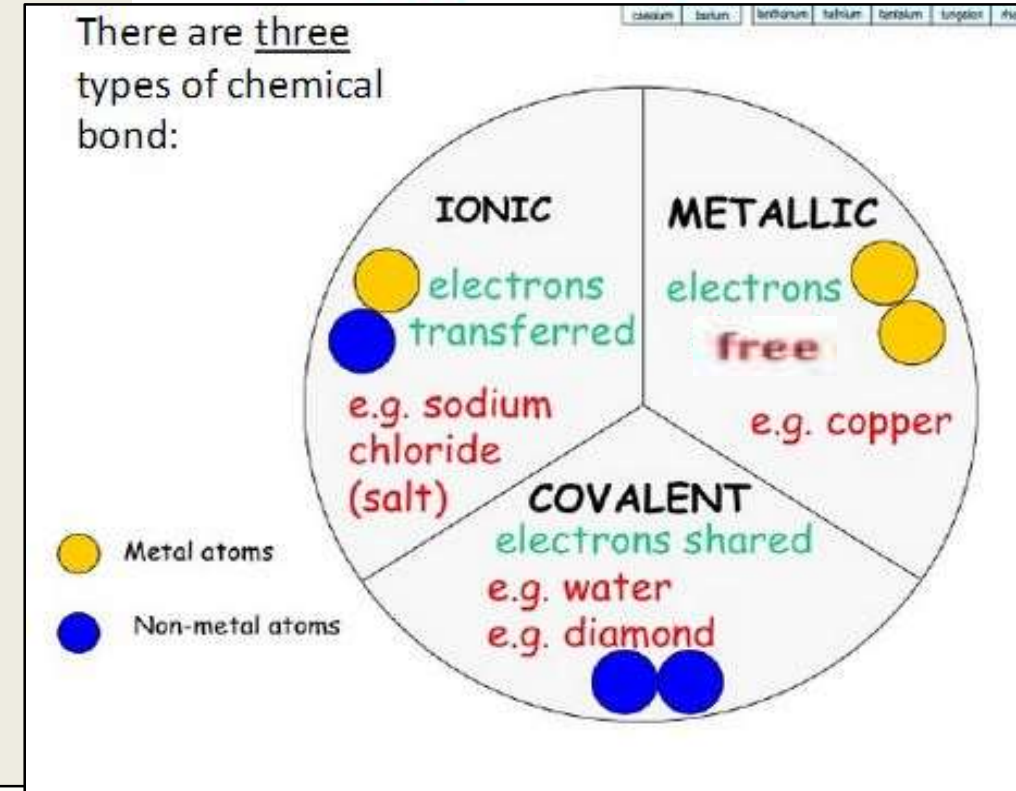
Ionic VS Covalent VS Metallic Bonds – Jot This Down!

- Atoms bonded together into Molecules can be “Ionic” or “Covalent” or “Metallic” in nature depending on what happens to their outer aka “Valence” Electrons!
 - Atoms that TRANSFER Electrons undergo Ionic Bonding!
 - Ex: A METAL bonding with a NONMETAL such as NaCl!
 - Atoms that SHARE Electrons undergo Covalent Bonding!
 - Ex: Two NONMETALS bonding together to make such as CO₂!
 - Atoms with FREE Electrons that exist as an “Electron sea” undergo Metallic Bonding!
 - Ex: Two METALS bonding together, like a bunch of LEAD (Pb) Atoms in an old pencil!



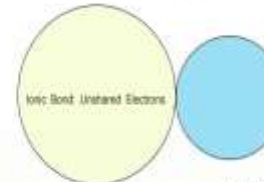
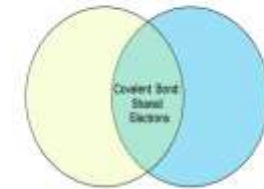
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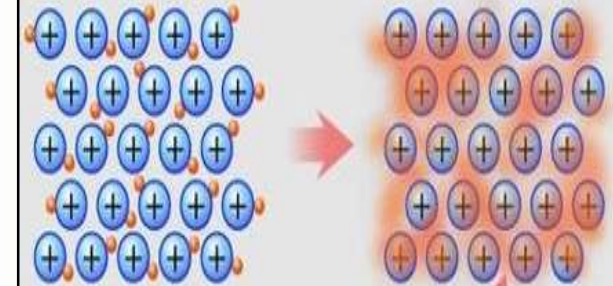
Covalent vs. Ionic Bonds in Chemistry

Yes... It Really Is This Simple.



Real Max @DecodeScience.com

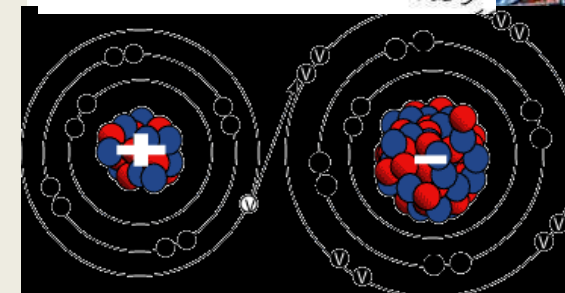
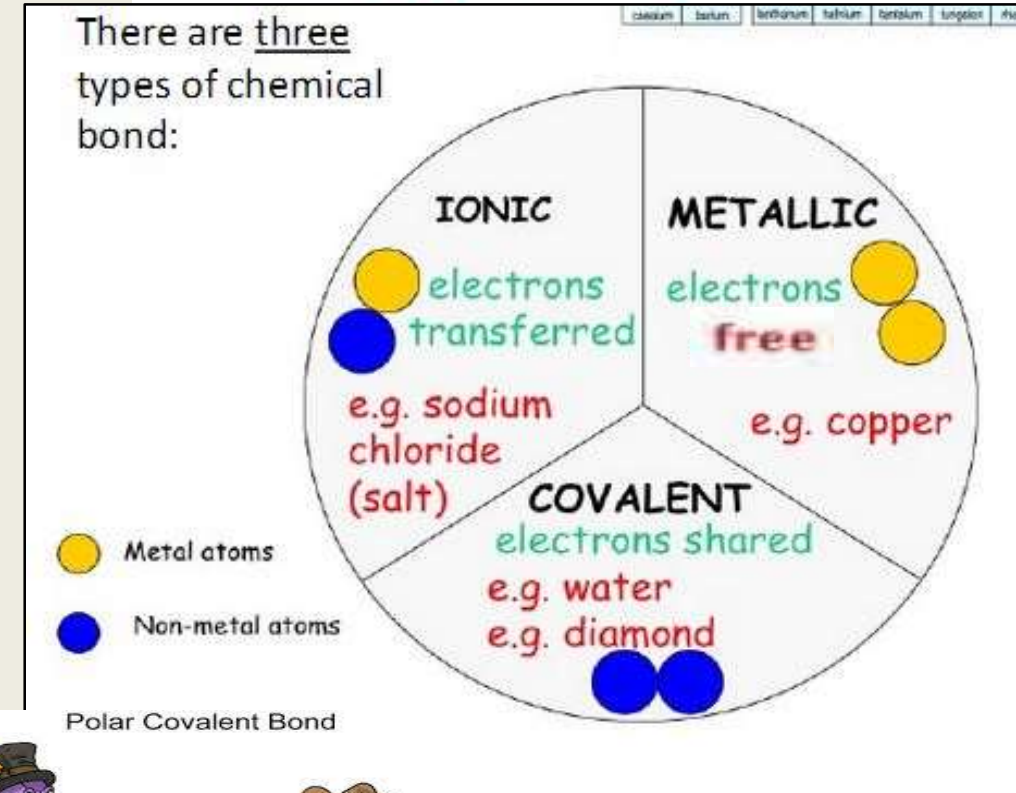
Metallic Bonding



Swarm of delocalised electrons

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Ionic Bond Naming Rules – Jot This Down!

- To name most “Ionic Compounds”, swap out the current ending syllable in the 2nd Element’s name for “-ide” and then just put it after the first Element’s name!

– Ex: For NaCl, turn “Chlorine” into “Chloride” and then add it to “Sodium” to make “Sodium Chloride”!

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Ionic Bond = Metal + Nonmetal

Ionic Bonding

- Electrons are **transferred**

The diagram illustrates the process of ionic bonding. On the left, a Sodium atom (Na) with one valence electron and a Chlorine atom (Cl) with seven valence electrons are shown. A dashed arrow indicates the transfer of one electron from the sodium atom to the chlorine atom. On the right, the resulting Sodium ion (Na⁺) and Chloride ion (Cl⁻) are shown. The Sodium ion has lost its valence electron, and the Chloride ion has gained it. The two ions are shown together, representing the formation of Sodium chloride (NaCl).

Na Sodium atom Cl Chlorine atom Na⁺ Sodium ion (a cation) Cl⁻ Chloride ion (an anion)

Sodium chloride (NaCl)

Simple Ionic Compounds

- Let's look at this example: **KBr**
- Name the metal (cation) first
 - Potassium
- Name the non-metal (anion) next, end it with -ide
 - Bromine becomes bromide
- Put together: **Potassium bromide**

NaF
Sodium Fluoride

Ca₃P₂
Calcium Phosphide

MgO
Magnesium Oxide

K₂S
Potassium Sulfide

Al₂O₃
Aluminum Oxide

Metal - Red

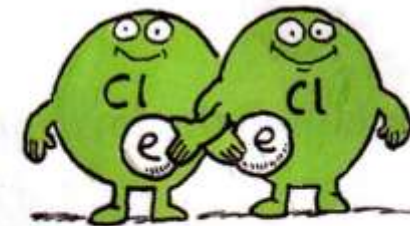
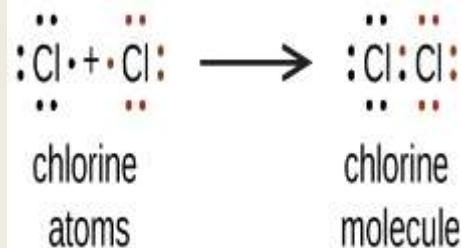
Nonmetal - Blue

Covalent Bond Naming Rules – Jot This Down!

- To name many “Covalent Compounds”, we still swap out the current ending syllable in the 2nd Element’s name for “-ide” and then put it after the first Element’s name!
- However, we must ALSO add “Number Prefixes” such as mono-, di-, tri-, tetra-, penta-, and hexa- to the beginning of each Element’s name!
 - Ex: For N_2O_3 , turn “Oxygen” into “Trioxide” and then add it to “Dinitrogen” to make “Dinitrogen Trioxide”!
 - NOTE:** We NEVER add the mono- prefix to the first Element! Ex: CO is Carbon Monoxide, NOT Monocarbon Monoxide!

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Covalent Bond = Nonmetal + Nonmetal
 Covalent Bond = |
 Metallic Bond



Chlorine atoms share a pair of electrons in a covalent bond

Naming Covalent Compounds

• Steps

- Write the name of the **first element**.
- Add a prefix according to the subscript.
 - EXCEPT: if the subscript is 1, don’t add a prefix
- Write the name of the **second element** (change the ending to -ide)
- Add a prefix according to the subscript.

number of atoms	prefix	example
1	mono	NO nitrogen monoxide
2	di	NO ₂ nitrogen dioxide
3	tri	N ₂ O ₃ dinitrogen trioxide
4	tetra	N ₂ O ₄ dinitrogen tetroxide
5	penta	N ₂ O ₅ dinitrogen pentoxide
6	hexa	SF ₆ sulphur hexa fluoride
7	hepta	IF ₇ iodine hepta fluoride
8	octa	P ₄ O ₈ tetra phosphur decoxide
9	nona	P ₄ S ₉ tetra phusphur nona sulphide
10	deca	AS ₄ O ₁₀ tetra arsinic decoxide

TUESDAY, FEBRUARY 26th

DO NOW

- In your notebooks, to be checked, solve this problem...
There are 1000 milligrams in 1 gram and 1000 grams in 1 kilogram. These are units of Mass!

Know:

$$1000mg = 1g \quad 1000g = 1kg$$

Asked: How many kilograms are in 8 million milligrams?

TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!
 - Today's **QP** = LIST and SKETCH 5 different ways to BOND things together and then REDEFINE the terms "Ionic Bonds", "Covalent Bond", and "Metallic Bond"!
2. Open books, **WORK** on today's **AO**!
3. ***HW** = Read & Complete Pg. 196-197!

TODAY'S ACADEMIC OBJECTIVE

Today you will **POWER UP** your Scientific Minds by **IONIZING** some Atoms into **CRYSTALS**!

WEDNESDAY, FEBRUARY 27th

DO NOW

Know: The distance between bonded Atoms depends on the force of attraction between them.

Asked: Which instrument would work **best** to measure the force between Atoms?

A: A spring scale

B: Measuring tape

C: A laser that can bounce off one of the Atoms and measure how much it moves

TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!

▪ Today's **QP** = METALS and NONMETALS make IONIC Bonds!
Using your PTables, LIST which of the following Compounds are IONIC then COUNT the # of Atoms in each one; CaCl₂, CH₄, Al₂O₃, CaO, SF₆!

2. Open books, **WORK** on today's **AO**!

3. ***HW** = Study For Vocal Quiz!

TODAY'S ACADEMIC OBJECTIVE

Today you will **POWER UP** your Scientific Minds by **IONIZING** some Chemicals into **CRYSTALS**!

THURSDAY, FEBRUARY 28th

DO NOW

Know: Chemical Reactions often result in the release or absorption of heat.

Asked: What process would most likely absorb heat?

A: A Candle Burning

B: A Microphone Exploding

C: A Cake Baking

TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!

- Today's **QP** = LIST the NAME, CHEMICAL SYMBOL, AND the GROUP Number for each of the 12 Chemical Elements on today's VOCAL QUIZ!

2. Open books, **WORK** on today's **AO!**

3. ***HW** = Read & Complete Pg. 198-199!

TODAY'S ACADEMIC OBJECTIVE

Today you will **EMPLOY** your knowledge of Chemical Element Symbols in order to **DEMOLISH** today's Vocal Quiz!

FRIDAY, MARCH 1st

DO NOW

Know: Chemical Reactions often result in the release or absorption of heat.

Asked: What two reactants would most likely produce and release heat?

A: Oxygen and Carbon (Wood)

B: Fireworks and H₂O (Water)

C: Water and Salt (NaCl)

TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!

- Today's **QP** = COVALENT Bonds are between a NONMETAL and another NONMETAL! Using your PTables, LIST which of the following Compounds are COVALENT then COUNT the # of Atoms in each one; P₂O₅, B₂Br₆, TiCl₄, CO, & Ca(OH)₂!

2. Open books, **WORK** on today's **AO**!

3. ***HW** = Read & Do Pg. 200-201!

TODAY'S ACADEMIC OBJECTIVE

Today you will **HEAT UP** your Scientific Minds by **REVIEWING** the Indicators of a Chemical **REACTION**!

THE SGS - STUDY GUIDE SLIDE – CHEMICAL BONDS QUIZ

- **Students must KNOW:**
 1. What happens when substances undergo Chemical Reactions, what can cause these Reactions, and WHY do certain Elements prefer to react with each other?
 2. What is a Valence Electron? How many Valence Electrons does an Atom need to be “happy”?
 3. How and Why do Atoms become Ions?
 4. What kinds of Elements form Covalent Bonds & which form Ionic Bonds?
 5. How are Chemical Formulas & Reactions written, what are the parts of each, and why/how must Reactions be Balanced?
- **Students must be able to DO:**
 1. Differentiate between the “Bohr Model”, “Electron Cloud”, and “Space-Filling” Models for drawing Atoms
 2. Draw Bohr Models & Lewis Dot Diagrams for Elements in Periods 1-4.
 3. Compare & Contrast Molecules and Compounds.
 4. Predict the number of Valence Electrons, Reactivity, and Properties of an Element based off of its Family/Group Name on the Periodic Table.
 5. Compare & Contrast Ionic, Covalent, and Metallic Bonding/Compounds and the Properties of Each.



THE SGS - STUDY GUIDE SLIDE - CHEMICAL BONDS QUIZ

Students must KNOW:

1. Atoms are rearranged, since bonds are just broken and reformed. Heat, collisions, concentration, and “catalysts” can cause reactions. Endothermic Reactions take in heat, Exothermic ones release it. Elements prefer to react with an Element that will give them 8 Valence Electrons.
2. The outermost Electrons. Atoms need 8 Valence Electrons to be happy aka have a full outermost energy level.
3. By losing or gaining Electrons. Atoms do this to become more stable aka to get 8 Valence Electrons. Neutral Atoms have equal numbers of Protons and Electrons. Ions bonded together make “Ionic Compounds”.
4. Nonmetal + Nonmetal = Covalent. Metal + Nonmetal = Ionic
5. Formulas show a ratio of Atoms. Formulas can have Subscripts (little # after a symbol), Coefficients (big # before a symbol), and Parentheses. Reactions are written to show “Reactant” chemicals on the left turning into “Products” on the right. Reactions are written as Equations, they use Math Symbols, but the “Yield” Arrow (\rightarrow) instead of the = sign. Reactions must be balanced due to the Law of Conservation of Energy, and to balance them just add Coefficients before each Atom/Molecule.

Students must be able to DO:

1. Bohr shows the Valence Electrons and can help predict how Atoms bond, the Electron Cloud is the most accurate representation of an Atom, and the Space-Filling is good for showing food molecules.
2. See your Jot-Down Notes on drawing Bohr and Lewis Diagrams. Note that both are good for predicting how Atoms will bond.
3. Molecule = Two or more Atoms. Compound = Two or more DIFFERENT Atoms. All Compounds are Molecules, but not vice versa.
4. Group Number can tell you the number of Valence Electrons. Groups 1-2 have 1-2 Valence Electrons, while 13-18 have the Group Number minus 10. Elements will react to get 8 valence Electrons, and whether or not an Element tends to react depends on its number of Valence Electrons (its easier to react if an Element only needs to gain or lose 1 Valence Electrons. Ex: Alkali Metals in Group 1 are very reactive, Noble gases in Group 18 are not).
5. Ionic tend to conduct electricity when dissolved in water. Covalent involve the sharing of Electrons. Metallic are good conductors since the Electrons can move around freely.

