IN CLASS NOTES:

ELEMENT GROUPS

Starting from the Right….The NON-METALS

Group 18: The NOBLE GASES

This is the only group that has only gases.
Non-reactive elements. Rarely combined with other elements.

1. Have a _____FULL_____ valence shell of electrons.
2. All have __8__ electrons except He with only ___2____ electrons.
3. Krypton and Xenon can react with __Fluorine___ & ____Oxygen_____
4. Elements in this group are always found by themselves; they are __monatomic___
5. Examples __Helium, Neon, Argon_____

Group 17: The Halogens

This is the only group that has all three phases of matter at room temperature and/or STP.

7 valence electrons; Tends to gain one electron to form _-1__ ions.

Very reactive elements. Never found uncombined in nature; always in compounds. Elements can be obtained by *electrolysis* (decomposition of the compound)

1. Gas._Fluorine & Chlorine___ Liquid___Bromine_ Solid __Iodine__
2. Elements in this group are always found in pairs; they are called _diatomic___
3. Examples ___fluorine, chlorine, bromine, iodine_____
4. Most reactive non-metal: ___fluorine_____

Group 16

1. Which element is diatomic? _____Oxygen_____
2. Describe the test for oxygen? Embers will burst into flame in presence of pure O_2
3. What are the allotropes of oxygen?_molecular oxygen (O_2) and ozone (O_3) _____
4. Describe the appearance of the two allotropes of sulfur: (1) brittle, dull, yellow; (2) darker, rubbery, slightly shiny___
5. Examples___Oxygen, Sulfur, Tellurium, Selenium

LESSON 2: Categories (Groups) of Elements

Group 15

1. Which element is diatomic? _____Nitrogen_____
2. What makes nitrogen very stable? ___A triple bond in N_2 molecule (BARF – forming bonds releases energy; lower energy is more stable._____
3. What is an allotrope?_An element bonded to itself with a different structure, hence different properties
4. Which element in group 15 forms allotropes?____Phosphorus_____
5. Examples___Nitrogen, Phosphorus, Arsenic, Bismuth_____

Staircase elements: The METALLOIDS

Elements touching staircase have properties of both metals and nonmetals except for Al and At. They are called __METALLOIDS_____.

Examples: __Boron, Germanium, Silicon, Arsenic, Antimony, Tellurium

Groups 14-17

As you go down each of these groups from top to bottom, the elements change from ___Non-Metals_____ to __Metalloids_____ to ____Metals_____.

TO THE LEFT: THE METALS

Groups 3-11: The _____Transition Metals_____

1. Least reactive metals
2. Color or Salt ___colored (green, teal, orange, etc)_____
3. Color of Solution _____also colored _____
4. Examples: ___Iron, copper, silver, gold, cobalt, nickel_____

Key property for transition metals is color. Electron shells are not filled in order. More than one oxidation state.

LESSON 2: Categories (Groups) of Elements

Group 2: The Alkaline Earth Metals

2 valence electrons. Tends to lose the two electrons to form +2 ions.

Very reactive elements. Never found uncombined in nature, always in compounds. Can be obtained by electrolysis.

1. Color or Salt White
2. Color of Solution Clear
3. Observations
   a. Calcium metal in water Bubbles; white precipitate; heat released
   b. Burning of magnesium once ignited, exceedingly bright flame (too bright to look at for long!) white ash
4. Examples: Calcium, Magnesium, Strontium, Barium

Group 1: The Alkali Metals

1 Valence electron. Tends to lose the one electron to form +1 ions.

Very reactive elements. Never found uncombined in nature, always in compounds. Can be obtained by electrolysis.

1. Color or Salt White
2. Color of Solution Clear
3. Observations
   a. Sodium metal in water "Sizzled" and spun around; eventual orange flame; sparks flying at end
   b. Potassium metal in water Immediate purple flame; burned out very quickly
   c. Which is more reactive? Potassium
   d. How element is stored in mineral oil (to protect from reacting with air around it)
4. Which are more reactive, group 1 or group 2? Group 1
5. Examples: Lithium, Sodium, Potassium, Cesium
6. Most reactive metal: Francium or Cesium

Hydrogen:

Not in a group

A non-metal; diatomic element.

Gas phase at STP.

Describe the test for Hydrogen a lit splint will explode or "pop"