Directions: Answer the following questions.

**Standard 1: The periodic table is systematically arranged into columns and rows of elements that have particular characteristics in common.**

1. What property is the periodic table arranged by? What are the rows and columns of the periodic table called?

Increasing atomic number/number of protons; rows = periods; columns = groups/families

1. How many valence electrons does P have?

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1. What causes the elements in the same group to have the same properties?

Same valence electrons

1. Which of the following would have the most similar properties: Ni, Zn, Hg, and Ga? Explain why.

Zn and Hg because they have the same valence electrons

1. What are the names, locations, and properties for each of the five main element groups (ex: halogens)?

Alkali: group 1; soft, silver, good conductors, reactive

Alkaline: group 2; same as alkali but harder and less reactive\

Transition metals: d-block and f-block; same properties as metals

Halogens: group 17; nonmetals, come in all 3 states, reactive

Noble gases: group 18; inert/nonreactive, gasses, nonmetals

**Standard 2: The periodic table is sectioned into 3 types of elements: metals, nonmetals and metalloids**

1. What are three types of elements? How can you tell what type an element is based off the periodic table? What properties does each type have?

Metals: left of staircase; good conductors, lustrous, malleable, ductile, form cations, most react with acid

Nonmetals: right of the staircase; opposite of metals, most are gases but some are solid, form anions

Metalloids: touching staircase; mixture of metal and nonmetal properties

1. An element has the following properties: dull, brittle and a poor conductor of electricity. Would it be a metal, nonmetal, or metalloid?

Nonmetal

1. Identify the type of element for each of the following: W, Si, and N

Metal: W; Metalloid: Si; Nonmetal: N

**Standard 3: The elements on the periodic table are arranged so that certain properties increase or decrease as you go across or down the periodic table.**

1. Describe all three periodic trends as they go across and down the periodic table.

Atomic radius: dec across and inc down

Ionization energy: inc across and dec down

Electronegativity: inc across and dec down

1. Oxygen has a high electronegativity and ionization energy. What does that mean in terms of atomic structure, attractions, and electrons?

Oxygen has a small atomic radius so that means it has strong attractions to its own electrons and to new ones

1. Which of the following elements would have the largest atomic radius Ag, Hg, Be, and P.

Hg

1. Which of the following elements would have the lowest ionization energy Y, Ba, Co, or S?

Ba

1. Which of the following elements would have the highest electronegativity Mn, C, Al, Se, F?

F

1. ***Explain why (do not simply state the trend)*** the trend works the way it does for each of the following:
   1. Se has a larger ionization energy than Po

Se has a smaller radius which makes it the e- harder to remove because of the stronger attraction

1. Br has a smaller radius than Sc

Br has a stronger attraction between the nucleus and the e- because of the increase number of protons

1. As has a smaller electronegativity than N

As has a larger radius which weakens attraction and makes it harder to attract electrons

**Standard 4: Ion formation is a result of an atom gaining or losing valence electrons.**

1. Define ion, cation, and anion.

Ion: atom with a charge; cation: positive ion; anion: negative ion

1. What is the octet rule? Explain how metals and nonmetals fulfill the octet rule.

Atoms gain, lose, or share electrons to become like a noble gas

Metals lose electrons to have an empty valence shell

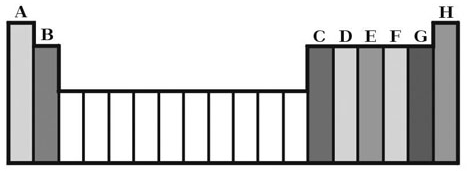
Nonmetals gain electrons to have a full valence shell

1. How would Ba fulfill the octet rule? How would it be different for O?

Ba would lose 2 e- to get an empty valence shell; O would gain two instead to get to a full valence shell

1. Label the charges for each column on the following periodic table:

1+ 2+ 3+ 4+/4- 3- 2- 1- 0



1. Draw Lewis Dot Symbol for the following:
   1. F F
   2. Ca Ca