Periodic Table Trends Activity **Name:** _____

Why?

The Periodic Table is one of the greatest inventions in the history of man. It allows scientists to predict physical and chemical properties of the elements. Dimitri Mendeleev (a Russian scientist) and Robert Mosley (a British chemist) put together this table in the late 1800's based on properties of the elements known at the time. The trends in these properties as you go across periods and down groups is the subject of this Chem Crunch.

Success Criteria:

- Understand the meaning of:
  - atomic radius
  - electronegativity
  - ionization energy
- Recognize trends in atomic radius, electronegativity, and ionization energy as you go across periods and down groups.

Prerequisites:

1. What happens to the number of valence electrons *as you go down a group* on the periodic table?

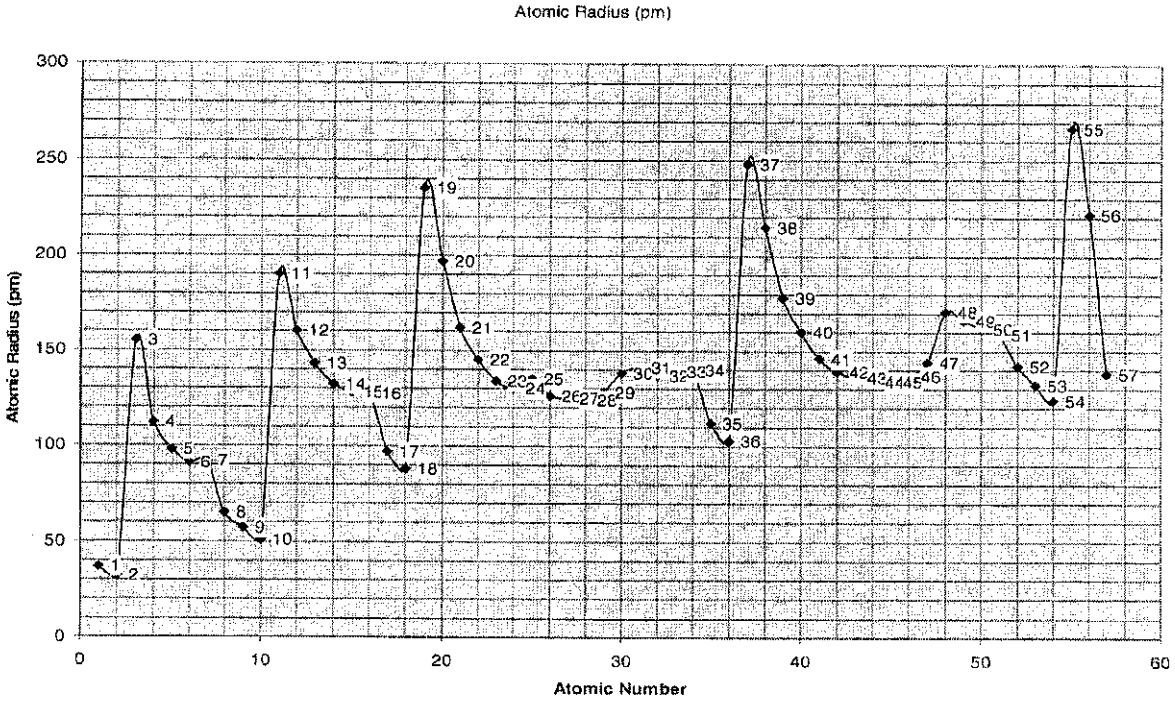
2. What happens to the number of valence electrons *as you go from left to right across a period* on the periodic table?

3. What happens to the number of energy levels as you go down a group on the periodic table?

4. What happens to the number of energy levels as you go from left to right across a period?

MODEL 1: Trends in Atomic Radius

Atomic radius is defined as the distance



1. Define atomic radius. Draw a picture to represent the meaning of atomic radius.

2. On the graph, use different colors to highlight/label each Period (for Periods 1-5).

3. Look at the elements on the graph that make up Period 3. What do you notice about atomic radius as you move from left to right across the period? Explain why this trend occurs.

4. Notice that atomic numbers 2, 10, 18, 36, and 54 are all noble gases. What happens to this specific group of elements as you proceed from top to bottom of the group?

5. In terms of atomic structure, explain WHY the trend in atomic radius exists as you go down a group of elements.

State the trend: ATOMIC RADIUS _____ _____ as you go down a group
(increases or decreases)

and _____ as you go from left to right across a period.
(increases or decreases)

Label this trend on your personal Periodic Table

4. Which has higher electronegativity values, metals or nonmetals? Why?

5. Which element has the highest electronegativity of all? Explain why, in terms of atomic structure.

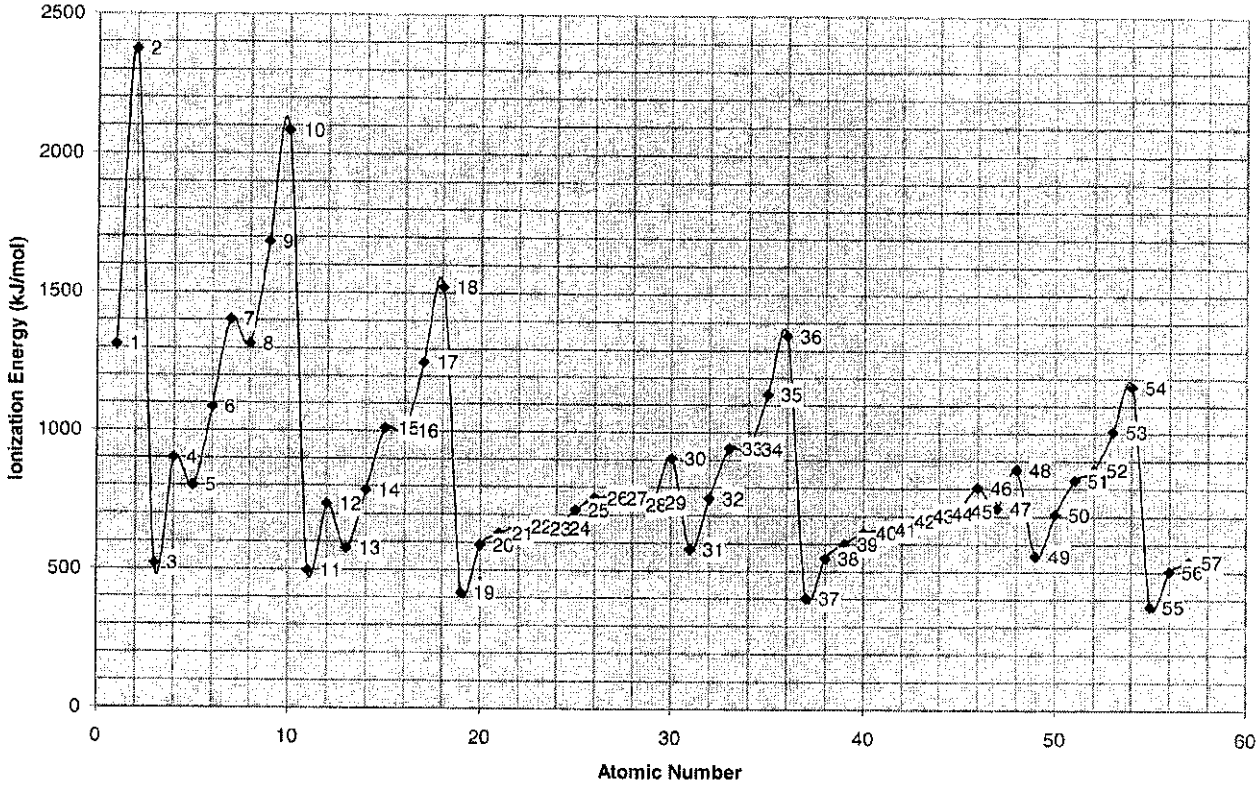
6. Based on the definition of electronegativity, why do the noble gases not have any electronegativity values?

State the trend: ELECTRONEGATIVITY ___ _____ as you go down a group and ___ _____ as you go from left to right across a period.
(increases or decreases) (increases or decreases)

Label this trend on your personal Periodic Table

MODEL 3: Trends in First Ionization Energy

Ionization energy is the energy required to remove an outer electron from an atom.



1. Define ionization energy.

2. Describe what happens (in general) to the first ionization energy values as you go from left to right across a period. Explain why this trend occurs.

3. Find the values for Group 1 in the graph above. What happens to these values as you go from the top to the bottom of the group? Explain why this trend occurs.

State the trend: IONIZATION ENERGY _____ as you go down a group and _____ as you go from left to right across a period.
(increases or decreases) (increases or decreases)

Label this trend on your personal Periodic Table