

Lab - Periodic Trends

Purpose: To determine relationships between the way the periodic table is set up and the various properties of the elements.

Questions

Atomic Mass vs. Atomic Number

- 1) How does atomic mass vary with atomic number?
- 2) The data has been plotted with a best fit line, and the slope has been determined. What is the slope of the graph?
- 3) The slope of the line tell the relationship of the atomic number (# of protons) to the atomic mass (protons + neutrons). Using your calculated slope, how many neutrons are present for every proton?

Atomic Radius vs. Atomic Number

- 4) Using your notes and/or the Internet, describe the difference between a period and a group.
- 5) What elements have the largest atomic radius in each period of the periodic table?
- 6) Which group of elements have the largest atomic radius?
- 7) What elements have the smallest atomic radius in each period of the periodic table?
- 8) Which group of elements have the smallest atomic radius?
- 9) What happens to the radius of the atom as you move down a group? Explain this in terms of electron configurations and orbitals.

Ionization energy vs. Atomic Number

- 10) Use the Internet to define ionization energy.
- 11) What happens to ionization energy as you move left to right across a period?
- 12) What group of elements represent the peaks in ionization energy in each period? How do these peaks relate to atomic radius?
- 13) What happens to ionization energy as you move down a group?
- 14) Looking at the graph for the whole periodic table, between which elements are there dramatic drops in the ionization energy?
- 15) What change in orbital shape (from what orbital to what orbital) occurs at the dramatic drops in ionization energy?

Electronegativity vs. Atomic Number

16) Use the Internet to define electronegativity.

17) What happens to electronegativity as you move across a period? Down a group?

18) Which element group has the highest electronegativity? The lowest?

Melting Point vs. Atomic Number

19) What pattern exists in melting point as you move across a period? Is it the same for all periods?

20) What pattern exists in melting point as you move down a group? Is it the same for all groups?

21) Which group seems to have the highest melting points? The lowest melting points?

Boiling Point vs. Atomic Number

22) What pattern exists in boiling point as you move across a period? Is it the same for all periods?

23) What pattern exists in boiling point as you move down a group? Is it the same for all groups?

24) Which group seems to have the highest boiling points? The lowest boiling points?

Density vs. Atomic Number

25) What pattern exists in density as you move across a period? Is it the same for all periods?

26) What pattern exists in density point as you move down a group? Is it the same for all groups?

27) Which group seems to have the highest density? The lowest boiling density?