

Unit 4 Test Periodic Trends

Name: _____ **30 total points**
Block: _____ Date: _____

Atomic Forces

1. In your own words, explain how the electron-electron repulsive forces change as the atomic number increases.

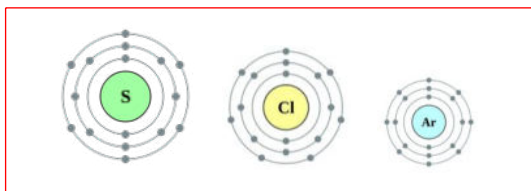
Like charges repel. So as the atomic number increases and more electrons are added, the electron-electron repulsive forces spread out the electron orbital.

2. In your own words, explain how the nuclear force changes as the number of protons and electrons increases.

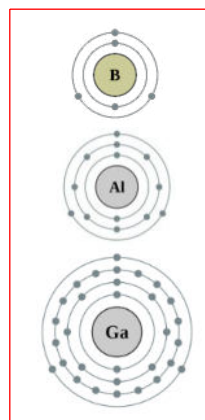
The nuclear force causes the protons to attract the electrons. The greater the number of protons and electrons the greater the inward pull on the atom, causing it to be smaller.

Atomic Radius

1. Draw Bohr models of each atom to show the relative periodic table location and atomic radius trend for S, Cl, and Ar.

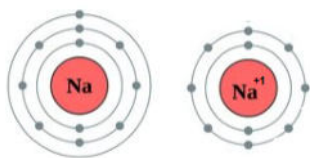


2. Draw Bohr models of each atom to show the relative periodic table location and atomic radius trend for B, Al, Ga.



Ionic Radius

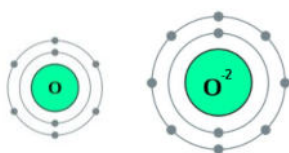
1. Draw Bohr models to show the ionic radius trend for N and N^{3-} . Explain how the atom is different than the ion.



The cation is smaller because it lost 1 electron.

The cation has 2 orbitals, while the atom has 3.

2. Draw Bohr models to show the ionic radius trend for O and O^{2-} . Explain how the atom is different than the ion.



The anion is larger because it has 2 more electrons.

Both atom and ion have 2 orbitals.

Ionization Energy

1. Write the full electron configuration for the alkali metal with the highest ionization energy.

Lithium is $1s^2 2s^1$

2. Write the abbreviated electron configuration for the noble gas with the lowest ionization energy.

Radon is $[\text{Xe}] 6s^2 4f^{14} 5d^{10} 6p^6$

Metallic Properties

1. Explain what it means to be malleable. Give an example of an element that **is** and that **is not** malleable.

Malleable means the ability to be hammered into a different shape. Metals are malleable; nonmetals are not. [Actual answers will vary]

2. Explain what it means to be ductile. Give an example of an element that **is** and that **is not** ductile.

Ductile means the ability to be stretched into a wire. Metals are ductile; nonmetals are not. [Actual answers will vary]

Electronegativity

1. Explain which element on the periodic table has the highest electronegativity and why.

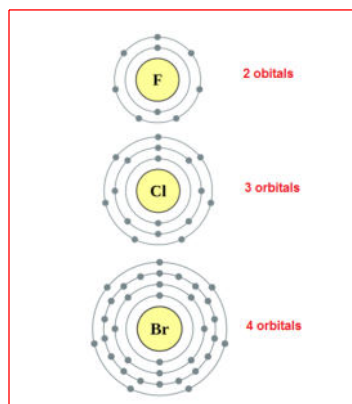
Fluorine has the highest electronegativity because it has the least amount of shielding, a large nuclear force, and it only needs one more electron to complete its valence orbital.

2. Explain which group on the periodic table has the lowest electronegativity and why.

Noble gases have the lowest electronegativity because their valence orbitals are already full.

Shielding

1. Draw Bohr models of each atom to show the relative periodic table location and shielding trend for F, Cl, and Br. *Indicate the number of orbitals for each atom.*



2. Draw Bohr models of each atom to show the relative periodic table location and shielding trend for Na, Mg, and Al. *Indicate the number of orbitals for each atom.*

