

Periodic Trends

- 1) Ionization energy increases / decreases (circle one) as you go across a period and increases / decreases (circle one) as you go down a family. Explain why this happens.

As you move across a period, the size of the atom decreases. Since ionization energy is the amount of energy it takes to remove one electron, as you go across the period, it takes more energy to remove one. The reverse is true for families. Since the size of atoms increases in families, the amount of energy decreases to remove one electron.

- 2) Positive ions are larger / smaller than the parent atom, whereas negative ions are larger / smaller than the parent atom. Explain why this happens.

Positive ions are smaller than neutral atoms because they lost an electron.  
Negative ions are larger than neutral atoms because they gain an electron.

and so... ?

- 3) Atom size increases / decreases (circle one) as you go across a period and increases / decreases (circle one) as you go down a family. Explain why this happens.

As you go across a period, atom size increases because protons, neutrons, and electrons added. The same occurs as you go down a family

- 4) All elements in a family / period have the same outer electron configuration. All halogens lose / gain <sup>1</sup> \_\_\_\_\_ (insert number) electron(s) so that the balance shell is completed \_\_\_\_\_.

- 5) Which periodic trend do you feel was most important in development of your periodic table? Justify your position.

Name : \_\_\_\_\_

- 6) If you could start over, would you chose a different way to set up your periodic table, and why?

I would not choose a different way.

- 7) Circle the following element that would have the smallest radius: K, Ra, Kr, Mn

The element with the smallest radius would then also have a high / low ionization energy because \_\_\_\_\_

Because it is furthest to the right and higher than the rest of the elements

- 8) Name the group of elements in the periodic table that has the following outer electron configuration:

$s^2$  alkaline earth metals

$s^2p^5$  \_\_\_\_\_

Any d orbital \_\_\_\_\_



- 9) The first 3 ionization energies of an element are as follows (kJ/mol):  $IE_1 = 403$ ,  $IE_2 = 2632$ ,  $IE_3 = 3859$ . What is the charge on the most common ion of this element?

\_\_\_\_\_ How many valence electrons does this element have? \_\_\_\_\_ Which of the following 3 elements could this unknown be? Ga, Rb or Ba

- 10) Circle the larger of the following sets of atoms or atoms/ions.

Na /  $Na^{+1}$

Na / P

Na / Ga

$K^{+1}$  / Ga<sup>+3</sup>

F / F

F<sup>-1</sup> / Ne

- 11) Which element of the following (Na, Si, Cl, Cs) has:

the highest 1<sup>st</sup> ionization energy? \_\_\_\_\_

the lowest 1<sup>st</sup> ionization energy? \_\_\_\_\_

the smallest atomic radius? Cl

the largest atomic radius? \_\_\_\_\_

- 12) Circle the more electronegative element in each pair:

Calcium / gallium

lithium / oxygen

chlorine / sulfur

bromine / Arsenic