

ACTIVITY: Periodic Trends – WEBQUEST!

This activity will provide an opportunity to examine the periodic table more closely. Use the interactive periodic table (see link below) to explore trends of atomic radius, ionization energy, and electronegativity across a period and down a group on the periodic table.

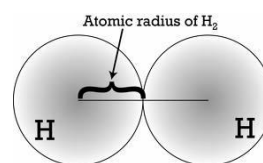


Go to <http://www.ptable.com/> and click on the properties tab near the upper left of the screen.

Part 1 – Atomic Radius:

(click on radius / calculated radius in the options in the middle of the screen)

1) Define **atomic radius**: (look up in your notes or text or online!)



2) Examine the trend in atomic radius **from left to right across a period** by clicking on all the elements in the **2nd period**. List their atomic radii below (pm = picometer or 1×10^{-12} m).

Li _____, Be _____, B _____, C _____, N _____, O _____, F _____, Ne _____

3) What is the trend in atomic radius from left to right across a period?

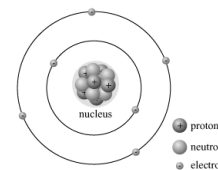
4) **Rationalize / explain** this trend with respect to the nuclear attraction to the electron cloud. (look up in your notes or text or online if you need to!)

5) Examine the trend in atomic radius **from top to bottom down a group** by clicking on all the elements in the **1st group**. List their atomic radii below (pm = picometer or 1×10^{-12} m).

Li _____, Na _____, K _____, Rb _____, Cs _____, Fr _____

6) What is the trend in atomic radius from top to bottom down a group?

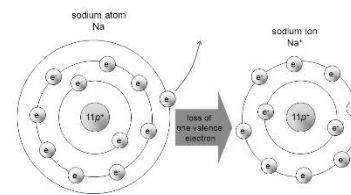
7) **Rationalize / explain** this trend with respect to the nuclear attraction to the electron cloud. (look up in your notes or text or online if you need to!)



8) **Without** looking at their atomic radii on the periodic table, try to organize the following elements **in order of increasing atomic radius** (Ge, He, Sr, O, Ba). **then check your answer using the ptable!*

Part 2 – Ionization Energy: (click on ionization in the options in the middle of the screen)

Formation of Cation



1) Define **ionization energy**: (look up in your notes or text or online!)

2) Examine the trend in ionization energy **from left to right across a period** by clicking on all the elements in the **2nd period**. List their 1st ionization energy below (kJ/mol is a unit of energy).

Li _____, **Be** _____, **B**, _____, **C** _____, **N** _____, **O** _____, **F** _____, **Ne** _____

3) What is the trend in 1st ionization energy from left to right across a period?

4) **Rationalize / explain** this trend with respect to the nuclear attraction to the electron cloud. (look up in your notes or text or online if you need to!)

5) Examine the trend in atomic radius **from top to bottom down a group** by clicking on all the elements in the **1st group**. List their 1st ionization energy below (kJ/mol is a unit of energy).

Li _____, **Na** _____, **K**, _____, **Rb** _____, **Cs** _____, **Fr** _____

6) What is the trend in 1st ionization energy from top to bottom down a group?

7) **Rationalize / explain** this trend with respect to the nuclear attraction to the electron cloud. (look up in your notes or text or online if you need to!)

8) **Without** looking at their 1st ionization on the periodic table, try to organize the following elements in **order of decreasing 1st ionization energy** (Cs, F, Se, P, Ga). **then check your answer using the ptable!*

9) **Click on Calcium**. Use the sliding bar at the upper right corner of the periodic table to examine the 1st, 2nd, and 3rd ionization energies of calcium. Rationalize / explain the large jump in ionization energy from the 2nd to the 3rd ionization energy.

Part 3 – Electronegativity: (click on electronegativity in the options in the middle of the screen)

1) Define **electronegativity**: (look up in your notes or text or online!)

2) examine the trend in electronegativity **from left to right across a period** by clicking on all the elements in the **2nd period**. List their electronegativity below (this quantity is a relative scale without a unit).

Li _____, Be _____, B _____, C _____, N _____, O _____, F _____, Ne _____

3) What is the trend in electronegativity from left to right across a period?

4) **Rationalize / explain** this trend with respect to the nuclear attraction to the electron cloud. (look up in your notes or text or online if you need to!)

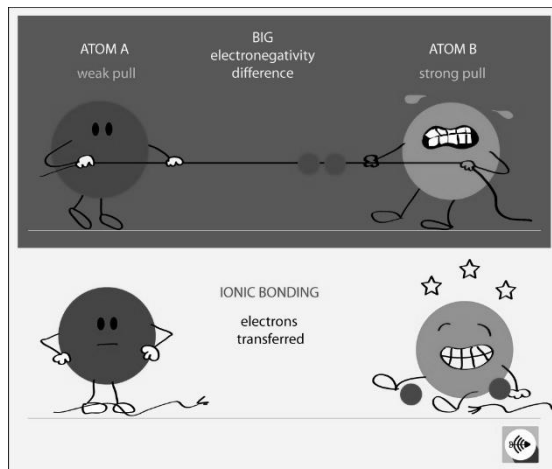
5) Examine the trend in electronegativity **from top to bottom down** a group by clicking on all the elements in the **1st group**. List their electronegativity values below (this quantity is a relative scale without a unit).

Li _____, Na _____, K _____, Rb _____, Cs _____, Fr _____

6) What is the trend in electronegativity from top to bottom down a group?

7) **Rationalize / explain** this trend with respect to the nuclear attraction to the electron cloud. (look up in your notes or text or online if you need to!)

8) **Without** looking at their electronegativity on the periodic table, try to organize the following elements **in order of increasing electronegativity**: Ca, Li, C, As F. **then check your answer using the ptable!*



9) Provide an argument detailing why **noble gases** typically do **NOT** have electronegativity values.