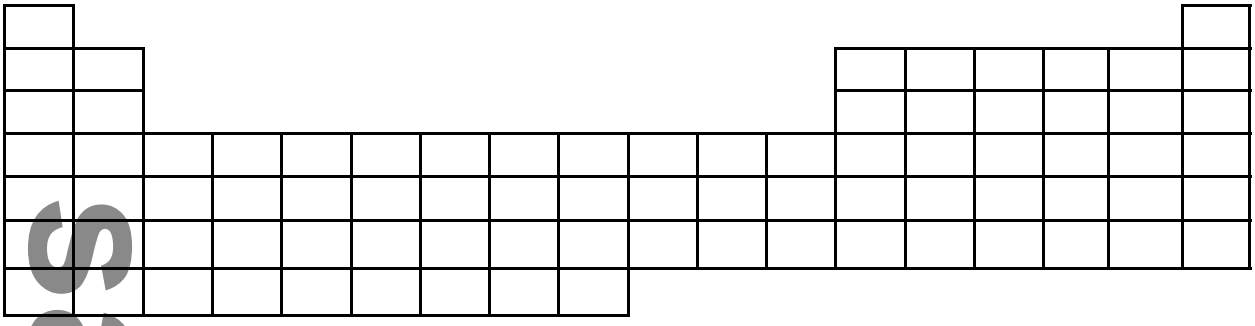
REVIEW: TRENDS IN THE PERIODIC TABLE

Atomic Radius:



1. Label the above table using arrows to represent the trend in atomic radius across a period and down a group.
2. In general, atomic radii _____ as atomic number increases within a given period. This is due to:

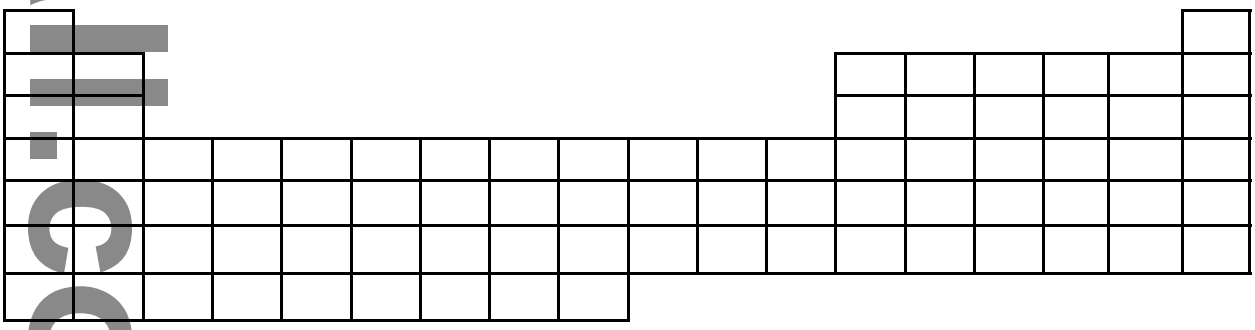
3. In general, atomic radii _____ , going down a group or a family.

4. Underline the atom which has the **largest** has the atomic radius:
   (i) O, F (ii) S, Cl (iii) Ca, Sr (iv) K or Rb (v) Se, As

5. Underline the atom which has the **smallest** has the atomic radius:
   (i) Na, Cl (ii) Fe, F (iii) Co, I (iv) Ba, Sr (v) S, Sb

6. The elements of Group IA have the _____ atomic radii.

Ionization Energy



1. Label the above table using arrows to represent the trend in ionization energy across a period and down a group.

2. The ionization energies of the elements _____ as you go from left to the right across a period of the periodic table, and _____ as you go from the bottom to the top of a group in the periodic table.

3. Underline the element with the **largest** first ionization energy:
   (i) C, P (ii) Br, O (iii) K, Rb (iv) Br, Ca (v) Rb, Sr

4. Underline the element with the **smallest** first ionization energy:
   (i) B, N (ii) Rb, Sr (iii) Ga, Se (iv) Sc, Sr (v) P, Se

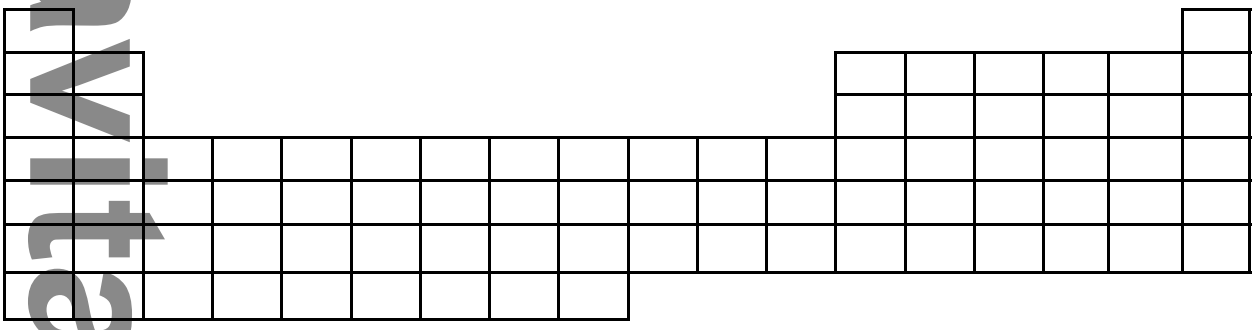
5. The Group IA metals, (aka: the _____ _____), have a _____ atomic radius, and a _____ ionization energy.

6. The Group VII A, (aka: the _____), have a relatively _____ atomic radius, and a _____ ionization energy.

7. For the Group IA elements, as the atomic number increases, the ionization energies _____, and the atomic radii _____.

8. For the halogens of the Group VIIA, as the atomic number increases, the ionization energies _____, and the atomic radii _____.

Electron Affinity



1. Label the above table using arrows to represent the trend in electron affinity across a period and down a group.

2. In general, as you go across a period from left to right in the periodic table the electron affinity _____, and as you go down a group of the periodic table, the electron affinity _____.

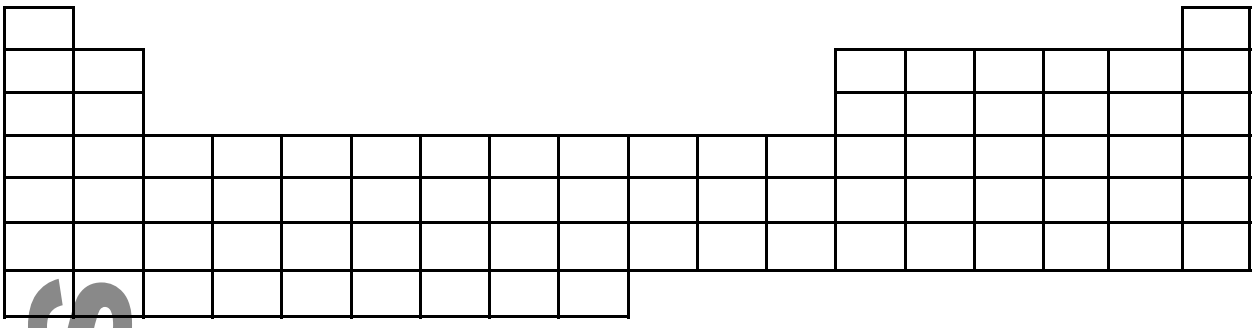
3. Underline the atom with the **largest** (most exothermic) electron affinity:
(i) S, Cl (ii) Cl, I (iii) P, Al (iv) B, Ga (v) S, Te

4. In general, as you go across a period from left to right in the periodic table, the atomic radius _____, the first ionization energy _____, and the electron affinity _____.

5. As atomic radii increase, the ionization energies _____, and the electron affinity _____.

6. Fluorine has the _____ electron affinity, whilst francium has the _____ electron affinity.

Electronegativity



1. Label the above table using arrows to represent the trend in electronegativity across a period and down a group.

2. In general, as you go across a period from left to right in the periodic table the electronegativity _____, and as you go down a group of the periodic table, the electronegativity _____.

3. Underline the atom with the **largest** electronegativity:
   (i) S, Cl (ii) Cl, I (iii) P, Al (iv) B, Ga (v) S, Te

4. In general, as you go across a period from left to right in the periodic table, the atomic radius _____, the first ionization energy _____, the electron affinity _____, and the electronegativity _____.

5. As atomic radii increase, the ionization energies _____, the electron affinity _____, and the electronegativity _____.

6. Fluorine has the _____ electronegativity, whilst, francium has the _____ electronegativity.

Ionic Radii

There are two types of ions:

(i) Cations: these are atoms that have lost one or more electrons and carry a _____ charge.

(ii) Anions: these are atoms that have gained one or more electrons and carry a _____ charge.

Cations are always _____ than their neutral atoms. Many cations have lost an entire shell of electrons and are only about half the size of the neutral atom.

Further decrease in ionic radius is due to the fact that cations have more protons in the nucleus than electrons.

Anions are always _____ than their neutral atoms, many are twice as big.
There is some repulsion from the added electron.

1. Underline the ion which is the largest:
   (i) Na, Na^{+1} (ii) Cl, Cl^{-1} (iii) O, O^{-1}, O^{-2} (iv) S, S^{-1}, S^{-2} (v) Al, Al^{+3}, Mg^{+2}
2. Elements, X, Y and Z are found in the same group of the periodic table, with X on top and Z on the bottom. Which element will have: (a) the largest atomic radius, (b) the largest ionization energy; (c) the highest electron affinity.