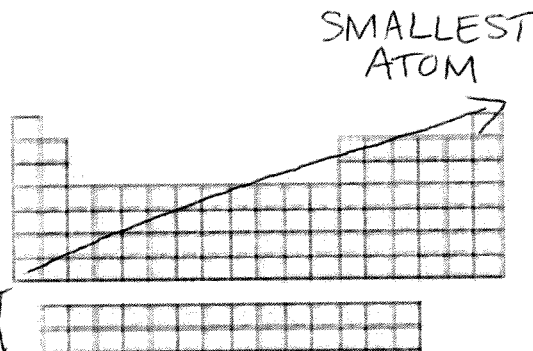


### Periodicity Homework

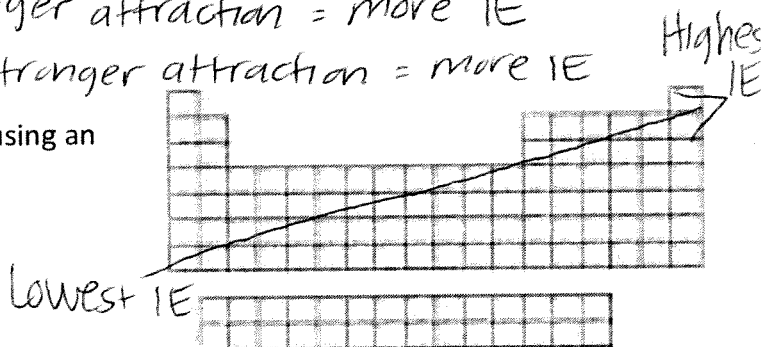
#### 1. ATOMIC/IONIC RADIUS REVIEW

- a. When families of the periodic table are examined, what trend is observed for atomic size?  
Atomic size increases down a group (family)
- b. Phosphorus is smaller than Aluminum even though Phosphorus has more valence electrons.  
Why? P has more protons than Al, thus a stronger attraction resulting in a smaller atom.
- c. Circle the atom or ion that has the **biggest radius** then explain **why**:
- F or **Br** more protons = stronger attraction = smaller atom
  - Mg** or S more E levels = weaker attraction = bigger atom
- d. Arrange the following atoms in order of increasing atomic size:
- Cl, Br, I Cl, Br, I
  - Ca, Ba, Ra Ca, Ba, Ra
  - S, P, Si S, P, Si
- e. Draw the trend of **increasing** atomic radius using an arrow(s) on the periodic table



#### 2. IONIZATION ENERGY REVIEW

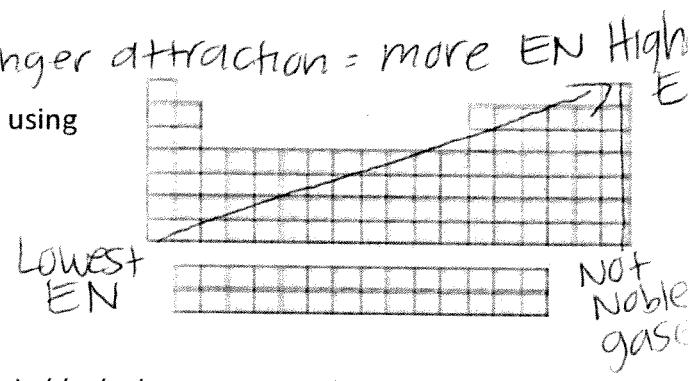
- a. What does ionization energy mean:  
E needed to remove an  $e^-$  from an atom
- a. Circle the atom that has the **highest ionization energy** then explain **why**:
- Li or **O** more  $p^+$  = stronger attraction = more IE
  - Mg** or Sr less E levels = stronger attraction = more IE
  - Ga or **Br** more  $p^+$  = stronger attraction = more IE
  - Ga or **B** less E levels = stronger attraction = more IE
- b. Draw the trend of **increasing ionization** using an arrow(s) on the periodic table



#### 3. ELECTRONEGATIVITY REVIEW

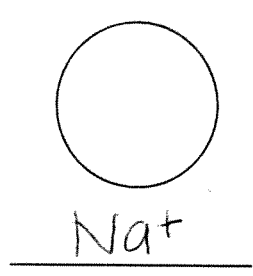
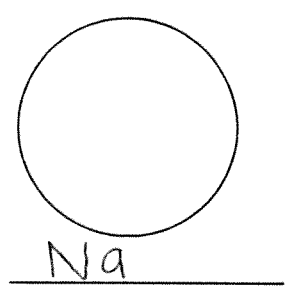
- c. What does electronegativity mean:  
Ability to attract another atom's  $e^-$  in a bond
- d. Circle the atom that has the **highest electronegativity** then explain **why**:
- Li or **O** more  $p^+$  = stronger attraction = more EN

- ii. (Mg) or Sr less E levels = stronger attraction = more EN
  - iii. Ga or (Br) more pt = stronger attraction = more EN
  - iv. Ga or (B) less E levels = stronger attraction = more EN
- e. Draw the trend of **increasing electronegativity** using an arrow(s) on the periodic table



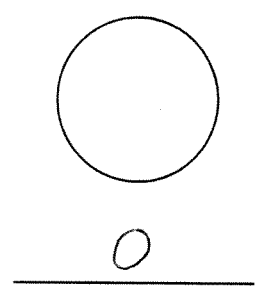
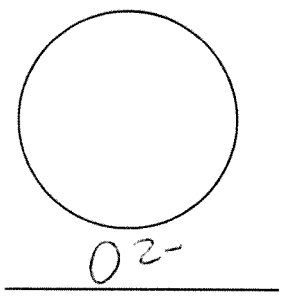
4. **ION SIZE CHANGE** (use your Trend: Ion Charge in the main block elements note sheet)

a. Label the atoms below as either Sodium or as Sodium Ion:



when atoms lose e<sup>-</sup>, they get smaller

b. Label the atoms below as either Oxygen or as Oxygen Ion:



when atoms gain e<sup>-</sup>, they get bigger

c. The ionic radius of Aluminum (Al<sup>3+</sup>) is 54 pm while the ionic radius of Sodium (Na<sup>+</sup>) is 102 pm. Explain why Aluminum ions have smaller radii than Sodium ions even though both ions have the same electron configuration.

Al<sup>3+</sup> has more protons than Na<sup>+</sup>, thus Al<sup>3+</sup> has more attractive force, which results in a smaller atom.

d. Arrange the following in order of increasing ionic size.

- I<sup>-</sup>, Br<sup>-</sup>, Cl<sup>-</sup>      Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>
- P<sup>3-</sup>, S<sup>2-</sup>, Cl<sup>-</sup>      Cl<sup>-</sup>, S<sup>2-</sup>, P<sup>3-</sup>
- Ba<sup>2+</sup>, Sr<sup>2+</sup>, Ca<sup>2+</sup>      Ca<sup>2+</sup>, Sr<sup>2+</sup>, Ba<sup>2+</sup>