Opener: Atomic & Ionic Radius

1. Which has a larger atomic radius? Justify your response. $_{11}Na$ or $_{15}P$

Na is larger, due to *less protons in Na, with valence electrons in the same (3rd) energy level, Na has a lower ENC,* thus less force to pull the e− cloud in.
For P, the *more + protons result in greater attraction for the valence electrons (higher ENC)* increasing the attractice force skootching the electron cloud in and thus **making P smaller**.

$$F_{attraction} = \frac{\uparrow Q^{+}Q^{-}}{d^{2}}$$

2. Which has a larger atomic radius? Justify your response. $_{9}F$ or $_{35}Br$

Br is larger since *Br is in the same family (in the periodic table) yet has more occupied energy levels*, thus the distance between the nucleus and Br's valence electrons is larger.

3. Of the following two particles, which is larger? or same size? Justify your response. $_{38}Sr$ or $_{38}Sr^{2+}$

Sr is larger. When *Sr loses it's valence electrons in the 5th energy level*, the resulting cation, Sr^{2+} has valence electrons only out to the 4th EL, and is thus smaller in size.

4. Of the following two particles, which is larger? or same size? Justify your response. $_{18}Ar$ or $_{16}S^{2-}$

S^{2-} is larger. When S *acquires two extra valence electrons, the resulting negative (anion) ion S^{2-}, has the same number of electrons (isoelectronic) as Ar, yet S^{2-} has fewer protons than Ar,* thus the electron cloud of the anion will not be held as tightly and thus will have a larger radius.

Opener: Electron Configuration Review and Atomic & Ionic Radius

1. Which has a larger atomic radius? Justify your response. $_{11}Na$ or $_{15}P$

2. Which has a larger atomic radius? Justify your response. $_{9}F$ or $_{35}Br$

3. Of the following two particles, which is larger? or same size? Justify your response. $_{38}Sr$ or $_{38}Sr^{2+}$

4. Of the following two particles, which is larger? or same size? Justify your response. $_{18}Ar$ or $_{16}S^{2-}$

Opener: Atomic & Ionic Radius

Looking only at your periodic table. Answer the following questions.

1. The atoms of which element have a larger or smaller radius? $_{31}$**Ga** **or** $_{34}$**Se** Justify your response.

Se is smaller, due to *more protons in Se, with valence electrons in the same (4th) energy level, Se has a higher ENC,* thus more force to pull the e− cloud in.

2. The atoms of which element have a higher ionization energy? $_{9}$**F** **or** $_{35}$**Br** Justify your response.

Br's IE is smaller since *Br is in the same family as F (in the periodic table) yet has more occupied energy levels*, thus the *distance between the nucleus and Br's valence electrons is larger,* making the force holding the valence electrons of Br less.

3. Which ion is smallest, larger, or same size? $_{20}$**Ca^{2+}** , or $_{16}$**S^{2-}** Justify your response.

Ca^{2+} is smaller. When *Ca^{2+} and S^{2-} both have 18 electrons, but Ca^{2+} has 20 protons, while S^{2-} has only 16 protons,* and the greater nuclear force pulls the valence electrons of Ca^{2+} in closer making Ca^{2+} smaller.

4. Identify a cation and anion that are isoelectronic with Kr

As^{3-},Se^{2-} , Br^{-} , are anions isoelectronic to Kr Rb^{+}, Sr^{2+}, Y^{3+} , are cations isoelectronic to Kr

Opener: Atomic & Ionic Radius

Looking only at your periodic table. Answer the following questions.

1. The atoms of which element have a larger radius? $_{31}$**Ga** **or** $_{34}$**Se** Justify your response.

2. The atoms of which element have a higher ionization energy? $_{9}$**F** **or** $_{35}$**Br** Justify your response.

3. Which ion is smallest? or same size? $_{20}$**Ca^{2+}** , or $_{16}$**S^{2-}** Justify your response.

4. Identify a cation and anion that are isoelectronic with Kr

Opener: Getting us all on the same page

Provide help, or get help as the case may be.

1. Explain what this reaction is representing: $Mg + Energy \rightarrow Mg^{+} + 1e^{-}$

   This is an equation that represents the ionization of a magnesium atom.

2. Define Ionization Energy.

   The amount of energy needed to remove one valence electron.

3. What is the general trend for ionization energy as you proceed down the periodic table within a family? Explain why.

Down a family IE gets smaller since *each lower atom has one more occupied energy level*, thus the *distance between the nucleus and the valence electrons will get larger,* thus the force holding the valence electrons of atoms lower in the family less.

4. What is the general trend for ionization energy as you proceed across (L→R) the periodic table in a period? Explain why.

In a period across the chart IE get greater since all the valence e− are in the same energy level *but there are more protons making the ENC greater,* thus the force holding the valence electrons of atoms across in the period will be more.

5. Scientists learned lots about an atom by measuring first ionization energy, that they decided to measure the amount of energy required to remove a second electron, and a third electron, and so on. Explain what stands out about the data in the chart below, and what information is this data telling us about the electronic arrangement in these atoms?

	Successive Ionization Energy Values			
element	first	second	third	fourth
Mg	737	1,447	**7,738**	10,546
Al	576	1,814	2,750	**11,578**

The very large increase for Mg's 3rd IE indicates that after the 2 valence electrons have been removed, the removal of the third electron which is in the 2nd energy level which is much closer to the protons and with a greater ENC (10+ compared to 2+)

The very large increase for Al's 4th IE indicates that after the 3 valence electrons have been removed, the removal of the fourth electron which is in the 2nd energy level which is much closer to the protons and with a greater ENC (11+ compared to 3+)

6. Why would you expect to see a a very large increase for the second ionization energy of sodium? Explain why.

Na has only one valence electron thus after that 1 valence electron has been removed, the removal of the second electron which *is in the 2nd energy level feeling a greater ENC (9+ compared to 1+) and is much closer to the protons* and thus feeling a greater force of attraction.

7. For carbon, which ionization energy would you expect to exhibit a very large increase from the previous ionization energy?

C's 5th IE would be a very large increase because *after the 4 valence electrons have been removed, the removal of the fifth electron which is in the 1st energy level feeling a greater ENC (9+ compared to 1+) and is much closer to the protons* thus feeling a greater force of attraction.

Opener: Forming an ionic compound with gallium and sulfur

1. How many valence electrons in gallium? how many valence electrons in sulfur?

2. How many electrons will be ideally *lost* *gained* by gallium?
   (circle one)
   How many electrons will be ideally *lost* *gained* by sulfur?
   (circle one)

3. What ion (charge and magnitude) will be formed by gallium?
   What ion (charge and magnitude) will be formed by sulfur?

4. When these two elements combine to form an ionic compound, how many atoms (turned into ions) of each will need to "come to the party" so that each element satisfies their electron transfer needs/ abilities?

5. Write the chemical formula for gallium sulfide.

Opener: Forming an ionic compound with gallium and sulfur

1. How many valence electrons in gallium? how many valence electrons in sulfur?
   Gallium 3 valence e− , sulfur 6 valence e−
2. How many electrons will be ideally *lost* *gained* by gallium? 3 e− lost
   (circle one)
   How many electrons will be ideally *lost* *gained* by sulfur? 2 e− gained
   (circle one)
3. What ion (charge and magnitude) will be formed by gallium? gallium 3+
   What ion (charge and magnitude) will be formed by sulfur? sulfur 2−
4. When these two elements combine to form an ionic compound, how many atoms (turned into ions) of each will need to "come to the party" so that each element satisfies their electron transfer needs/ abilities?
   two Ga and three sulfur
5. Write the chemical formula for gallium sulfide Ga_2S_3

Opener: Nomenclature of Binary Ionic Compounds

- Name the following compounds:

1. BaO

2. K_3As

3. Sr_3P_2

- Write formulas for the following compounds:

4. cesium fluoride

5. calcium bromide

6. aluminum sulfide

Opener: Nomenclature of Binary Ionic Compounds

- Name the following compounds:

1. BaO

barium oxide

2. K_3As

potassium arsenide

3. Sr_3P_2

strontium phosphide

- Write formulas for the following compounds:

4. cesium fluoride

CsF

5. calcium bromide

$CaBr_2$

6. aluminum sulfide

Al_2S_3

Opener: Nomenclature of Binary Ionic Compounds

- *Name the following compounds:*

1. indium phosphide

2. cobalt(III) sulfide

3. silver nitride

- *Write formulas for the following compounds:*

4. Au_3N_2

5. $AlBr_3$

6. SnO_2

w/ some Roman #'s

Opener: Nomenclature of Binary Ionic Compounds

- *Name the following compounds:*

1. indium phosphide

InP

2. cobalt(III) sulfide

Co_2S_3

3. silver nitride

Ag_3N

- *Write formulas for the following compounds:*

4. Au_3N_2

gold(II) nitride

5. $AlBr_3$

aluminum bromide

6. SnO_2

tin(IV) oxide

Opener: **Nomenclature of Binary Ionic Compounds with Roman #**

- *Write formulas for the following compounds:*
  1. manganese(II) chloride
  2. antimony(V) sulfide
  3. lead(IV) sulfide
- *Name the following compounds:*
  4. Ni_3N_2
  5. Au_2O
  6. CrP_2

ALL w/ Roman #'s

Opener: **Nomenclature of Binary Ionic Compounds with Roman #**

- *Write formulas for the following compounds:*
  1. manganese(II) chloride
  2. antimony(V) sulfide
  3. lead(IV) sulfide
- *Name the following compounds:*
  4. Ni_3N_2
  5. Au_2O
  6. CrP_2

1. $MnCl_2$
2. Sb_2S_5
3. PbS_2

4. nickel(II) nitride
5. gold(I) oxide
6. chromium(VI) phosphide

Opener: Nomenclature of Ionic Compounds with Polyatomic Ions

✓ *Write formulas for the following compounds:*

1. cobalt(II) nitrite

2. ammonium oxalate

3. gallium hydroxide

✓ *Name the following compounds:*

4. $NiCO_3$

5. $CuMnO_4$

6. Ag_3PO_3

Opener: Nomenclature of Ionic Compounds with Polyatomic Ions

✓ *Write formulas for the following compounds:*

1. cobalt(II) nitrite

2. ammonium oxalate

3. gallium hydroxide

✓ *Name the following compounds:*

4. $NiCO_3$

5. $CuMnO_4$

6. Ag_3PO_3

$Co(NO_2)_2$

$(NH_4)_2C_2O_4$

$Ga(OH)_3$

nickel(II) carbonate

copper(I) permanganate

silver phosphite

Opener: Nomenclature of Binary Molecular Compounds

- *Write formulas for the following compounds:*

1. phosphorous trichloride

2. silicon dioxide

3. sulfur hexafluoride

- *Name the following compounds:*

4. CF_4

5. N_2O

6. CS_2

Opener: Nomenclature of Binary Molecular Compounds

- *Write formulas for the following compounds:*

1. phosphorous trichloride

PCl_3

2. silicon dioxide

SiO_2

3. sulfur hexafluoride

SF_6

- *Name the following compounds:*

4. CF_4

carbon tetrafluoride

5. N_2O

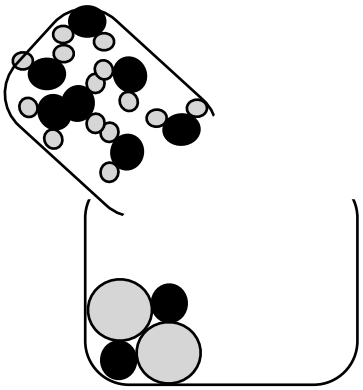
dinitrogen monoxide

6. CS_2

carbon disulfide

Opener: Dissolving salt

- A model of sodium iodide is in the bottom of a beaker as shown, and you pour in water as diagrammed in the beaker above. Sketch what the beaker would look like after the system was poured together and stirred up. Label as best you can.



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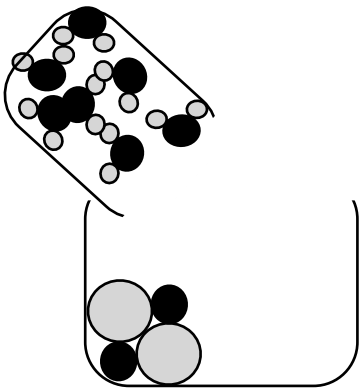
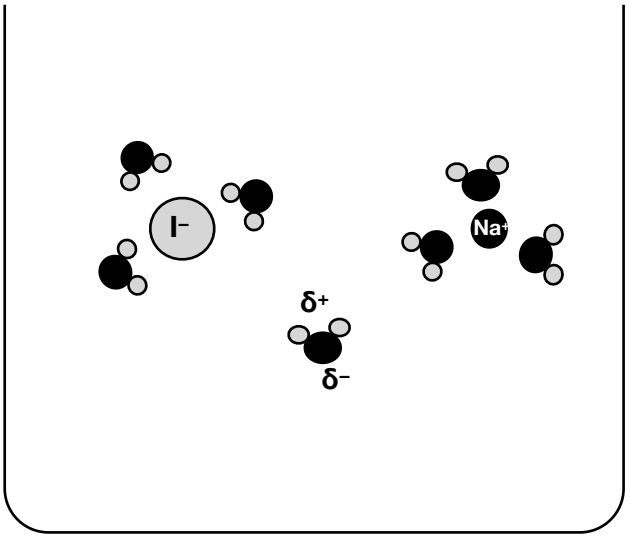
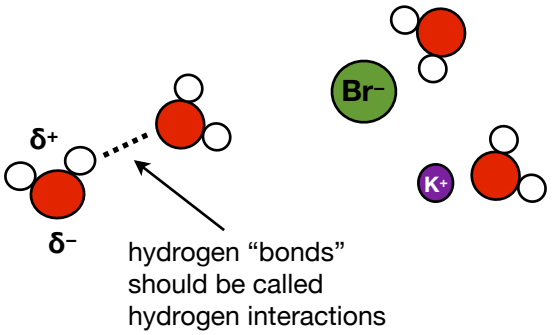




Opener: **Dissolving salt interacting with water.**

1. Which is bigger K^+ or Br^- ? Thus which color is which ion?
2. Note which end of water is sticky to which ion.
3. Note what parts of water are sticky to each other.



Opener: **Dissolving salt interacting with water.**

1. Which is bigger K^+ or Br^- ? Thus which color is which ion?
2. Note which end of water is sticky to which ion.
3. Note what parts of water are sticky to each other.

Opener: Nomenclature Acids

- *Name the following acids:*

1. H_2SO_4

2. H_2S

3. H_2SO_3

- *Write formulas for the following acids:*

4. carbonic acid

5. nitrous acid

6. acetic acid

Opener: Nomenclature Acids

- *Name the following acids:*

1. H_2SO_4 sulfuric acid

2. H_2S hydrosulfuric acid

3. H_2SO_3 sulfurous acid

- *Write formulas for the following acids:*

4. carbonic acid H_2CO_3

5. nitrous acid HNO_2

6. acetic acid $HC_2H_3O_2$ aka CH_3COOH

Door Opener: Nomenclature (No acids) All Mixed Together

- *Name the following substance:*

1. Cu_2SO_3 copper(I) sulfite
2. H_2S hydrosulfuric acid
3. N_2O_4 dinitrogen tetraoxide
4. $NiCl_3$ nickell(II) chloride

- *Write formulas for the following substances:*

5. copper(I) nitrite $CuNO_3$
6. diphosphorous pentaoxide P_2O_5
7. tin(IV) sulfide SnS_2
8. silver nitrate $AgNO_3$

Door Opener: Nomenclature (No acids) All Mixed Together

- *Name the following substance:*

1. Cu_2SO_3
2. H_2S
3. N_2O_4
4. $NiCl_3$

- *Write formulas for the following substances:*

5. copper(I) nitrite
6. diphosphorous pentaoxide
7. tin(IV) sulfide
8. silver nitrate