

### First-Year Chemistry Review (Part #1)

Write the long form electron configurations for each of the following neutral elements:

N _____	Na _____
Co _____	Sn _____
K _____	Ar _____
Ca _____	Si _____

What are valence electrons?

How many valence electrons are present in each of the following neutral atoms?

I _____	Al _____	S _____	Ba _____	Si _____
K _____	Ar _____	Li _____	Cl _____	Mg _____

What is the octet rule?

Predict the most stable ionic charge for each of the following. Be sure to indicate a “+” or “-” sign.

F _____	Na _____	Ca _____	S _____	O _____	Ne _____
Sr _____	B _____	Ar _____	K _____	Al _____	Br _____

Name the following chemical compounds.

Ca(NO <sub>3</sub> ) <sub>2</sub> _____	LiNO <sub>2</sub> _____
HF _____	NaCl _____
Na <sub>2</sub> CO <sub>3</sub> _____	K <sub>2</sub> O _____
AlCl <sub>3</sub> _____	LiClO <sub>4</sub> _____
KNO <sub>3</sub> _____	BaSO <sub>4</sub> _____
NH <sub>4</sub> OH _____	NaClO _____

Write the proper formula for each of the following compounds.

hydrogen bromide \_\_\_\_\_

ammonium carbonate \_\_\_\_\_

calcium nitrate \_\_\_\_\_

calcium cyanide \_\_\_\_\_

sodium sulfite \_\_\_\_\_

ammonium phosphate \_\_\_\_\_

magnesium oxide \_\_\_\_\_

aluminum chlorite \_\_\_\_\_

aluminum hydroxide \_\_\_\_\_

potassium sulfide \_\_\_\_\_

barium sulfate \_\_\_\_\_

lithium carbonate \_\_\_\_\_

ammonium fluoride \_\_\_\_\_

strontium sulfite \_\_\_\_\_

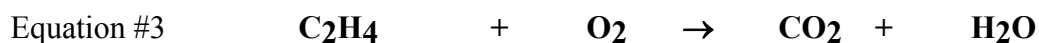
- (a) Balance each of the following equations by supplying any necessary coefficients.
- (b) Draw the "visual" representation by showing each individual atom in the balanced chemical equation. Here is an example of what I mean by showing each atom.



"Visual"

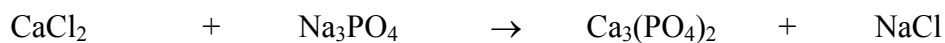
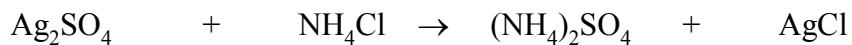


"Visual"



"Visual"

Balance each of the following by providing coefficients. No visual pictures are needed.



Molar Relationships in Balanced Chemical Equations

Ref: Olmsted, J. J. *Chem. Educ.* **1999**, 76, 52-53.

Balance each chemical equation and then fill in the blanks with the correct number of molecules.



\_\_\_\_\_ 40 billion O<sub>2</sub> \_\_\_\_\_

0.8 moles Na \_\_\_\_\_

\_\_\_\_\_ 3 moles O<sub>2</sub> \_\_\_\_\_

\_\_\_\_\_ \_\_\_\_\_ 0.042 moles Na<sub>2</sub>O



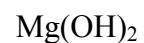
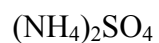
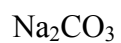
\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ 624 trillion H<sub>2</sub>O

1.2 moles CH<sub>4</sub> \_\_\_\_\_ \_\_\_\_\_

\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ 0.84 moles H<sub>2</sub>O

Formula Weight, Molar Mass, Molecular Weight

Calculate the formula weight for each of the following chemical formulas. Round your atomic weights to the second decimal place.



Percent Composition

Calculate the elemental percent composition for each of the following chemical compounds. Round your percentages to the nearest whole number.

