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| *Mole to mole Stoichiometry*  CλeMis+ry: http://genest.weebly.com  Stop in for help every day at lunch and Tues &Thurs after school! |  | Name\_\_\_\_\_\_\_\_\_\_\_\_\_  Period\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**For each of the problems below:**a. Write the balanced chemical equation.  
b. show a *before – change – after* table

**c.** Do the math by

* Identifying what is given (with units) and what you want to find (with units) and
* Using coefficients from balanced equation to determine mole ratio.

1. Hydrogen sulfide gas, which smells like rotten eggs, burns in air to produce sulfur dioxide and water. How many moles of oxygen gas would be needed to completely burn 8 moles of hydrogen sulfide?  
  
**a.** Equation: \_\_\_ H2S(g) + \_\_\_ O2 (g) → \_\_\_ SO2(g) + \_\_\_ H2O(g)

**b.**   
**B**efore \_\_\_ \_\_\_ \_\_\_ \_\_\_  
  
**C**hange \_\_\_ \_\_\_ \_\_\_ \_\_\_

**A**fter \_\_\_ \_\_\_ \_\_\_ \_\_\_

**c.**

2. Propane, C3H8, burns in air to form carbon dioxide and water. If 12 moles of carbon dioxide are formed, how many moles of propane were burned?  
  
**a.** Equation:

**b.**   
**B**efore \_\_\_ \_\_\_ \_\_\_ \_\_\_  
  
**C**hange \_\_\_ \_\_\_ \_\_\_ \_\_\_

**A**fter \_\_\_ \_\_\_ \_\_\_ \_\_\_

**c.**

3. Ammonia, NH3, for fertilizer is made by causing hydrogen and nitrogen to react at high temperature and pressure. How many moles of ammonia can be made from 0.15 moles of nitrogen gas?  
  
**a.** Equation:

**b.**   
**B**efore \_\_\_ \_\_\_ \_\_\_ \_\_\_  
  
**C**hange \_\_\_ \_\_\_ \_\_\_ \_\_\_

**A**fter \_\_\_ \_\_\_ \_\_\_ \_\_\_

**c.**

4. The poison gas phosgene, COCl2, reacts with water in the lungs to form hydrochloric acid and carbon dioxide. How many moles of hydrochloric acid would be formed by 0.835 moles of phosgene?  
**a.** Equation:

**b.**   
**B**efore \_\_\_ \_\_\_ \_\_\_ \_\_\_  
  
**C**hange \_\_\_ \_\_\_ \_\_\_ \_\_\_

**A**fter \_\_\_ \_\_\_ \_\_\_ \_\_\_

**c.**

5. Iron metal and oxygen combine to form the magnetic oxide of iron, Fe3O4.

How many moles of iron can be converted to magnetite by 8.80 moles of pure oxygen?

(Do A, B, and C steps):

Also, how many moles of iron oxide would be produced?

6. The recipe for Coca-Cola Classic is a closely guarded secret. Researchers outside the company believe the flavoring mixture, known as “7X”, contains oils of orange, lemon, nutmeg, cinnamon, and coriander. The original mixture also contained caffeine, vanilla, caramel, lime juice, sugar or artificial sweetener, and citric acid.

Over the years, the recipe has changed. For example, the original recipe contained citric acid but this was combined with phosphoric acid to cut production costs. Corn syrup replaced sugar for the same reason.

C8H10N4O2 + 4 H3PO4 + 6 CO2 + other ingredients 🡪 C6H5CO2K + other products

caffeine phosphoric acid potassium benzoate

To produce 1000 cans of Coca-Cola Classic, 40g (0.21 moles) of caffeine are reacted with phosphoric acid and other ingredients. How many moles of phosphoric acid are required?

How many moles of carbon dioxide are required?

(Please do all three steps A, B, C)

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| \\mmsdfs01\userdata$\b730886\My Documents\My Pictures\LifeCam Files\2015-03-11 10-42-01.336.jpg | A solution was mixed up that contained 149 grams of sodium chloride (table salt) per 1700 mL of aqueous solution. |

7. If a chemist took 4 squirts of this substance using a pipette that holds 1.6 mL and then she evaporated it in a crucible, how many grams of salt should she expect to obtain?

If she actually obtains 0.40 grams, did she obtain too little or too much?

Tell one SPECIFIC thing (not ‘human error’) that could cause her result to be like this.

8. If a chemist took 3 squirts of this substance using a pipette that holds 2.1 mL and then he evaporated it in a crucible, how many grams of salt should he expect to obtain?

If he actually obtains 0.60 grams, did he obtain too little or too much?

Tell one SPECIFIC thing (not ‘human error’) that could cause her result to be like this.