STOICHIOMETRY PRACTICE   Key (sort of ☺)

1. How many moles are in each of the substances listed below?

    a. 2.41×10^{24} molecules of NaCl

        2.41×10^{24} molecules x $\dfrac{\text{moles}}{\text{molecules}}$

    b. 9.03×10^{24} atoms of Hg

        9.03×10^{24} atoms x $\dfrac{\text{moles}}{\text{atoms}}$

2. How many atoms or molecules are in each of the substances below:

    a. 3.6 moles NO_2

        3.6 moles x $\dfrac{\text{molecules}}{\text{moles}}$

    b. 1.4 moles Br

        1.4 moles x $\dfrac{\text{atoms}}{\text{moles}}$

3. Calculate the Molar Mass and the mass in grams of a **0.25 mol** sample of each of the following compounds:

    a. Sucrose ($C_{12}H_{22}O_{11}$)

        Molar Mass _____

        Mass of 0.25 mol in Grams:

            0.25 mol x $\dfrac{g}{mol}$

    b. Potassium permanganate ($KMnO_4$)

        Molar Mass _____

        Mass of 0.25 mol in Grams:

            0.25 mol x $\dfrac{g}{mol}$

    c. Ammonium hydroxide (NH_4OH)

        Molar Mass _____

        Mass of 0.25 mol in Grams:

            0.25 mol x $\dfrac{g}{mol}$

4. How many moles are in each of the following?

    a. 15.5 g SiO_2

        15.5g x $\dfrac{mol}{g}$

    b. 79.3g Cl_2

        79.3 gx $\dfrac{mol}{g}$

    c. 0.8 g Ca

        0.8g x $\dfrac{mol}{g}$

5. How many moles of CO are in a sample that weighs 79 grams?

        79g x $\dfrac{mol}{g}$

    a. How many **molecules** of CO would that sample have?

        ____ mol x $\dfrac{\text{molecules}}{mol}$

6. If I had 350g of silver, how many moles of silver make up that sample?

$$350 \, g \times \frac{moles}{g}$$

7. How many molecules of salt (NaCl) are in a single serving sample (one serving is 0.4g)?

$$0.4 \, g \, NaCl \times \frac{mol}{g} \times \frac{molecules}{mol}$$

8. How many molecules of aspirin are you consuming if you take one recommended dose?
   (The formula for aspirin is $C_9H_8O_4$ and one adult dose is 0.325g)?

$$0.325 \, g \times \frac{mol}{g} \times \frac{molecules}{mol}$$

9. Ammonia is produced by the reaction of hydrogen and nitrogen:

   a. Balance the equation: _____ N_2 + _3_ H_2 → _2_ NH_3
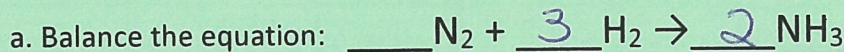
   b. Calculate the molar mass of N_2 _____ H_2 _____ NH_3 _____

   c. How many moles of H_2 are needed to react with 2.0 moles of N_2?

 $$2 \, moles \, N_2 \times \frac{mol \, H_2}{mol \, N_2}$$

   d. How many moles of NH_3 are produced when 8.4 moles of H_2 react?

   $$8.4 \, mol \, H_2 \times \frac{mol \, NH_3}{mol \, H_2}$$

   e. If I start with 6.2 grams of hydrogen gas (H_2), how many grams of ammonia (NH_3) can I produce?

   $$6.2 \, g \, H_2 \times \frac{mol \, H_2}{g \, H_2} \times \frac{mol \, NH_3}{mol \, H_2} \times \frac{g \, NH_3}{mol \, NH_3}$$

10. In an acetylene torch, acetylene gas (C_2H_2) burns in oxygen to produce carbon dioxide and water:
    a. Balance the equation: _2_ C_2H_2 + _5_ O_2 → _4_ CO_2 + _2_ H_2O
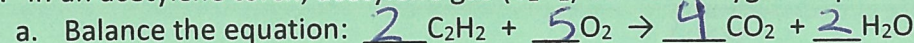
    b. Calculate the molar mass of C_2H_2 _____ O_2 _____ CO_2 _____ H_2O _____

    c. How many moles of O_2 are needed to react with 7 moles of C_2H_2?

    $$7 \, mol \, C_2H_2 \times \frac{mol \, O_2}{mol \, C_2H_2}$$

    d. How many grams of CO_2 are produced when 3.5 moles of C_2H_2 react?

    $$3.5 \, mol \, C_2H_2 \times \frac{mol \, CO_2}{mol \, C_2H_2} \times \frac{g \, CO_2}{mol \, CO_2}$$

    e. If I start with 100 g. of Oxygen gas (O_2), how many grams of H_2O will be produced?

    $$100 \, g \, O_2 \times \frac{mol \, O_2}{g \, O_2} \times \frac{mol \, H_2O}{mol \, O_2} \times \frac{g \, H_2O}{mol \, H_2O}$$

Percent Composition
11. Calculate the percent composition of each element in NaOH: %Na _____   %O _____   %H _____

$$\frac{mass \, of \, each}{Total} \times 100$$

12. Calculate the percent composition of FeO when 14 g of Iron combine completely with 4 g of Oxygen.
    %Fe_____   %O_____ $\frac{mass \, of \, each}{Total} \times 100$

For more practice, do problems 1-7 on pp 76-77 in your book or try www.ck12.org/section/stoichiometry