**Purpose:** To give you practice with questions that use the stoichiometry road-map.

This homework set is due **Mon, 3/24**. Work must be shown for each problem, including units and significant figures to receive full credit.

**Task:** Complete questions 5, 7 and 17 from chapter 10 of your online textbook and the Day 4 synthesis question below.

**Resource information:**

Note: These arrows represent conversion factors

***The stoichiometry road map***

Grams Moles Particles

Avogadro’s number (6.02x1023 particles /mol)

Molar mass (g/mol)

***Important words to define AND know:***

 Write a definition and the possible ways these words can be used as conversion factors

*Ex. “Speed” is the rate at which an object moves over a distance.*

 *Possible conversion factors:* $\frac{x miles}{1 hour} and \frac{1 hour}{x miles}$ *if we’re talking about travelling by car.*

* Molar mass: The mass (in grams) of 1 mole’s worth of representative particles of a particular substance. The conversion factors for this include: $\frac{X g substance}{1 mole substance} and \frac{1 mole substance}{X g substance}$. Molar mass can be calculated using the number of particles of each element present and the molar mass of each element present (found on the periodic table).
* Avogadro’s number: The number of particles (e.g. atoms, molecules, formula units) present in 1 mole of a particular substance. The conversion factors for this include: $\frac{6.02 x 10^{23}paricles }{1 mole substance} and \frac{1 mole substance}{6.02 x 10^{23}paricles }$.

**Homework problems:**

5. How many *molecules* are in 1.14 moles of sulfur trioxide?

Chemical formula: SO3

$$1.14 mol SO\_{3}×\frac{6.02 x 10^{23} molecules SO\_{3}}{1 mol SO\_{3}}=6.86x 10^{23} molecules SO\_{3}$$

Note: One of your classmates pointed out that the question originally read, “How many atoms are in 1.14 moles of sulfur trioxide?” and thus we should get a different answer than what I have written above. If you find the answer to this, turn in your work on test day for an extra point on your test!

7. Find the molar mass of PCl3.

Chemical name: Phosphorus trichloride

$$1 mol PCl\_{3}=1 mol P+3 mol Cl$$

$$Molar mass of PCl\_{3}=\left(1 mol P×\frac{30.974 g P}{1 mol P}\right)+\left(3 mol Cl×\frac{35.453 g Cl}{1 mol Cl}\right)=137.33\frac{g}{mol} PCl\_{3}$$

17. Calculate the mass, in grams, of 2.50 mol of iron (II) hydroxide.

$$2.50 mol Fe(OH)\_{2}×\frac{89.86 g Fe(OH)\_{2}}{1 mol SO\_{3}}=225 g Fe(OH)\_{2} (3 sig figs) $$

DAY 4 SYNTHESIS QUESTION:

If you have 34 g ammonium sulfate, how many formula units of ammonium sulfate do you have?

Chemical formula: (NH4)2SO4

$$34g \left(NH\_{4}\right)\_{2}SO\_{4}×\frac{1 mol \left(NH\_{4}\right)\_{2}SO\_{4}}{132.14 g \left(NH\_{4}\right)\_{2}SO\_{4}}×\frac{6.02 x 10^{23} formula units \left(NH\_{4}\right)\_{2}SO\_{4}}{1 mol \left(NH\_{4}\right)\_{2}SO\_{4}}$$

$$=1.55× 10^{23} formula units \left(NH\_{4}\right)\_{2}SO\_{4}$$