(2/1/16) Lesson 1 on pg. 351 (#4 and 5)

4. Answer parts a. and b. for the equation: $NaOCL(aq) + NH_3\ (aq) \rightarrow NaOH(aq) + NH_2Cl(g)$
   a. A solution of sodium hypochlorite (bleach) reacts with a solution of ammonia to produce a solution of sodium hydroxide and bubbles of chloramine gas [get the name from the problem].
   b. b. Expect to see gas bubbles produced and a clear colorless solution of sodium hydroxide.

5. $HgCl_2(s) + C_{10}H_{16}N_2O_4(aq) \rightarrow HgC_{10}H_{12}N_2O_4\ (aq) + 4\ HCl(aq)$
   a. Solid mercury chloride reacts with a solution of EDTA to produce an aqueous solution hydrochloric acid and a compound containing mercury.
   b. The solid will disappear and a solution of two compounds will remain.

(2/3/16) Lesson 3 on p. 360 (#4 and 6)

4. Matching:
1 and E- methanol reacts with oxygen to produce toxic formaldehyde (CH_3O)
2 and C. Chloramine gas is added to water supply to kill bacteria
3 and D Octane (oct- means 8) burns in cars to produce CO2 gas and water
4 and A sulfuric acid dissolved in raindrops reacts with calcium carbonate in shells
5 and F liquid mercury…
6 and G unsaturated fatty acids react with hydrogen gas to form saturated fatty acids
7 and B. solid calcium oxide is added to lakes to counteract acid rain

5. Label each reaction in #4 as physical or chemical change
   1) Chemical
   2) Physical
   3) Chemical
   4) Chemical
   5) Physical
   6) Chemical
   7) Chemical

(2/5/16) Lesson 2 p. 356 (#4 and 5)

4. Write a chemical equation for each reaction description:
   a. Solid magnesium reacts with a solution of hydrochloric acid to produce hydrogen gas and a solution of magnesium chloride
   b. A solution of hydrogen peroxide decomposes into water and oxygen gas
   c. A solution of sodium chloride reacts with a solution of lead (II) nitrate to produce a solution of sodium nitrate and the precipitate lead (II) chloride.

5. What do you expect to observe in each reaction?
   a. bubbles of the gas chloramine (NH_2Cl) coming from a solution of sodium hydroxide and water.
   b. bubbles of the gas hydrazine coming from a solution of sodium chloride and water.

(2/9/16) Lesson 5 p. 368 (#3 and 4)

3. Answers may vary but should include the following information and reasons.

a. If I have 6 bananas to use up I can triple the recipe (6/2 per recipe) and make three loaves

b. A balanced chemical equation is like recipe to make the products. The coefficients give the ratio of reactants to products and can be doubled or tripled just like in a recipe.

4. Balance these equations:

a. $2K(s) + I_2(s) \longrightarrow 2KI(s)$

b. $Mg(s) + Br_2(s) \longrightarrow MgBr_2(s)$

c. $KBr(aq) + AgNO_3(aq) \longrightarrow KNO_3(aq) + AgBr(s)$

d. $2KClO_3(s) \longrightarrow 2KCl(s) + 3O_2(g)$

e. $2C_2H_6(g) + 7O_2(g) \longrightarrow 4CO_2(g) + 6H_2O(l)$

f. $4Al(s) + 3O_2(g) \longrightarrow 2Al_2O_3(s)$

g. $P_4(s) + 6H_2(g) \longrightarrow 4PH_3(g)$

(2/16/16) Lesson 6 p. 372 (#3 and 5)

3. a. double exchange reaction

$NaOH(aq) + HNO_3(aq) \longrightarrow NaNO_3(aq) + H_2O(l)$

b. combination reaction

$C_2H_4(g) + Cl_2(g) \longrightarrow C_2H_4Cl_2(g)$

c. single exchange reaction

$Cl_2(g) + MgBr_2(s) \longrightarrow Br_2(s) + MgCl_2(s)$

5. $SO_3(g) + H_2O(l) \longrightarrow H_2SO_4(aq)$

Because sulfur trioxide, SO_3, is a gas, it could enter the body through the nose and mouth and travel to the lungs. Sulfuric acid is an aqueous liquid that could enter the body by ingestion or through the skin.

(2/16/16) Lesson 4 p. 364 (#3 and 5)

3. a. No matter was lost or gained during the reaction. You could prove this by measuring the mass of sulfur trioxide and water that reacted and the mass of sulfuric acid solution that was produced. These masses will be the same.

b. The right side of the equation shows a total of one atom of sulfur, two atoms of hydrogen, and four atoms of oxygen. Because the same atoms are present in the reactants and the products, this provides evidence for the law of conservation of mass.

5. When water evaporates, the molecules of water do not change, but their arrangement with respect to one another changes. The density changes, but the mass and weight do not change. Even though the vapor may drift out of the glass, the total mass of the water molecules alone is still the same.

(2/18/16) Lesson 8 p. 383 (#5,6,7, and 9)

5. 740 marbles will have a greater mass than 740 plastic beads because the mass of a single marble is greater than the mass of a single bead.

6. $\text{Mass of bag} = 50 \text{ lb} \cdot \frac{1 \text{ kg}}{2.2 \text{ lb}} = 22.7 \text{ kg}$

$$\#\text{ of beans} = 22.7 \text{ kg} \cdot \frac{1000 \text{ g}}{1 \text{ kg}} \cdot \frac{1 \text{ bean}}{0.074 \text{ g}}$$

$$= 307{,}000 \text{ beans}$$

7. The total mass of jelly beans is 500 g. Two thirds of the jelly beans will be red and one third of the jelly beans will be yellow. The mass of the red jelly beans is two thirds of 500 g, or 333 g.

9. The mass of one gold atom is 197.0 amu.

One amu is 0.000000000000000000000000166

$$197.0 \cdot 0.000000000000000000000000166 \text{ g}$$
$$= 0.000000000000000000000327 \text{ g}$$

(2/22/16) Lesson 9 p 387 (#4,5,6)

4. The molar masses are determined by looking up the average atomic mass on the periodic table in amu and writing the same number in grams.

a. N 14.01 g
b. Ne 20.18 g
c. Cl is 35.45 g
d. Cu is 64.55 g

5. Which has more mass?

a. 1 mol of hydrogen = 1.008 g

1 mol of carbon = 12.01 g

1 mol of carbon has more mass.

b. 1 mol of aluminum = 26.98 g

1 mol of iron = 55.85 g

1 mol of iron has more mass.

c. 1 mol of copper = 63.55 g

1 mol of gold = 197.0 g

1 mol of gold has more mass.

d. 5 mol of carbon = 5 • 12.01 g = 60.05 g

1 mol of gold = 197.0 g

1 mol of gold has more mass.

6. The sample with the higher number of atoms is the same as the sample with the higher number of moles. To find the number of moles, divide the mass of the sample by the molar mass.

a. hydrogen: $\frac{12 \text{ g}}{1.008 \text{ g/mol}} = 12 \text{ mol}$

carbon: $\frac{12 \text{ g}}{12.01 \text{ g/mol}} = 1.0 \text{ mol}$

The sample with 12 g of hydrogen has a higher number of atoms.

b. aluminum: $\frac{27 \text{ g}}{26.98 \text{ g/mol}} = 1.0 \text{ mol}$

iron: $\frac{27 \text{ g}}{55.85 \text{ g/mol}} = 0.48 \text{ mol}$

The sample with 27 g of aluminum has a higher number of atoms.

(2/24/16) Lesson 10 p 391 (#3,5,7)

3. • 1 mol Ne = 20.18 g

Ne(*g*): 20.2 g/mol

• 1 mol Ca = 40.08 g

Ca(*s*): 40.1 g/mol

• 1 mol CO_2 = 12.01 g + 2(16.00 g)
= 44.0 g

CO_2(*g*): 44.0 g/mol

• 1 mol $CaCO_3$ = 40.08 g + 12.01 g + 3(16.00 g)
= 100.1 g

$CaCO_3$(*s*): 100.1 g/mol

• 1 mol CH_4O = 12.01 g + 4(1.008 g) + 16.00 g
= 32.0 g

CH_4O(*l*): 32.0 g/mol

• 1 mol C_2H_6O
= 2(12.01 g) + 6(1.008 g) + 16.00 g
= 46.1 g

C_2H_6O(*l*): 46.1 g/mol

• 1 mol Fe_2O_3 = 2(55.85 g) + 3(16.00 g)
= 159.7 g

Fe_2O_3(*s*): 159.7 g/mol

5. **a.** 1 mol Ca = 40.08 g

1 mol $CaCl_2$ = 40.08 g + 2(35.45 g)
= 111.0 g

$$\text{moles of Ca} = \frac{10.0\text{ g}}{40.08\text{ g/mol}}$$
$$= 0.249\text{ mol}$$

$$\text{moles of } CaCl_2 = \frac{10.0\text{ g}}{111.0\text{ g/mol}}$$
$$= 0.0902\text{ mol}$$

10.0 g of calcium has more moles of metal atoms.

b. 1 mol NaCl = 22.99 g + 35.45 g
= 58.4 g

1 mol NaF = 22.99 g + 19.00 g
= 42.0 g

$$\text{moles of NaCl} = \frac{5.0\text{ g}}{58.4\text{ g/mol}}$$
$$= 0.085\text{ mol}$$

$$\text{moles of NaF} = \frac{5.0\text{ g}}{42.0\text{ g/mol}}$$
$$= 0.12\text{ mol}$$

5.0 g of sodium fluoriude has more moles of metal atoms.

c. 1 mol FeO = 55.85 g + 16.00 g
= 71.9 g

1 mol FeS = 55.85 g + 32.07 g
= 87.9 g

$$\text{moles of FeO} = \frac{2.0\text{ g}}{71.9\text{ g/mol}}$$
$$= 0.028\text{ mol}$$

$$\text{moles of FeS} = \frac{2.0\text{ g}}{87.9\text{ g/mol}}$$
$$= 0.023\text{ mol}$$

2.0 g of iron oxide has more moles of metal atoms.

7. 1 mol Fe_2O_3 = 2(55.85 g) + 3(16.00 g)
= 159.7 g

5 mol Fe_2O_3 = 5(159.7 g)
= 798.5 g

(2/26/16) Lesson 11 p 394 (#1, 3,5,6)

1. To convert between moles of a substance and grams of the substance, use the formula:
mass(g) = molar mass(g/mol) • moles

3. Every molecule of C_2H_6O has 6 H atoms.
2.0 mol C_2H_6O = 6(2.0 mol) = 12.0 mol H.

5. 1 mol BaO = 137 g + 16.0 g
= 153 g
1 mol BaO_2 = 137 g + 32.0 g
= 169 g
Each sample has 1 mol of molecules. The first sample also has 1 mol of oxygen atoms. However, the second sample has 2 mol of oxygen atoms because each molecule contains two oxygen atoms. So the sample of 169 g of BaO_2 has more moles of oxygen atoms.

6. • In order of increasing mass: Fe_2O_3, $SiCl_4$, PbO
1 mol $SiCl_4$ = 28.09 g + 4(35.45 g)
= 170.1 g
2 mol $SiCl_4$ = 2 mol(170.1 g/mol)
= 340.2 g
• 1 mol PbO = 207.2 g + 16.00 g
= 223.2 g
2 mol PbO = 2 mol(223.2 g/mol)
= 446.4 g
• 1 mol Fe_2O_3 = 2(55.85 g) + 3(16.00 g)
= 159.7 g
2 mol Fe_2O_3 = 2 mol(159.7 g/mol)
= 319.4 g

(3/7/16) Lesson 14 p 409 (#2, 3, 8)

2. Determine the number of moles of solute in a solution by multiplying the concentration by the volume.

3. Drawings should show the least amount of particles in the 0.10 M drawing, 2.5 times as many particles in the 0.25 M drawing, and 5 times as many particles in the 0.50 M drawing.

8. a. Moles of NaCl = 0.10 M(50 L)
= 5.0 mol
b. Moles of $C_6H_{12}O_6$ = 3.0 M(0.25 L)
= 0.75 mol
c. 35 mL = 0.035 L
Moles of HCl = 12.0 M(0.035 L)
= 0.42 mol
d. 300 mL = 0.30 L
Moles of NaOH = 0.025 M(0.30 L)
= 0.0075 mol

(3/7/16) Lesson 15 p 412 (#1) p. 413 (# 4)

1. Possible answer: To prepare a 0.25 M solution of sucrose, you would calculate the mass of 0.25 mol of sucrose, then measure the amount of sucrose and dissolve it in enough water to make 1 L of solution. Since the amount of solution is unspecified, different amounts can be suggested as long as the mass of the sucrose in grams divided by the volume of the solution in liters is equal to 0.25 M.

4.

Molarity	Volume	Number	Molar mass	Mass of solute
0.50 M	2.0 L	1.0 mol	180 g/mol	180 g
0.40 M	250 mL	0.10 mol	180 g/mol	18 g
0.10 M	300 mL	0.03 mol	180 g/mol	5.4 g
0.01 M	100 mL	0.001 mol	180 g/mol	0.180 g

(3/9/16) Lesson 17 p 425 (#1, 2, 3)

1. Possible answer: Acids have a sour taste and they can burn the skin in concentrated form. Bases have a bitter taste and a slippery feel. Bases can also cause skin burns in concentrated form. Most acidic and basic solutions are colorless and odorless.

2. Possible answer: The pH scale is a numeric scale used to classify acids and bases. Substances with a pH below 7 are acids, and the lower the number, the stronger the acid. Substances with a pH above 7 are bases, and the higher the number, the stronger the base.

3. A substance with a neutral pH is neither acidic nor basic.

(3/9/16) Lesson 18 p 430 (#1)

1. According to the Arrhenius theory, an acid is a molecule that dissociates to form hydrogen ions in solution and a base is a substance that dissociates to form hydroxide ions in solution.

(3/14/16) Lesson 21 p 443 (#2)

2. A neutralization reaction is the combination of an acid and a base to form a salt and water.