Chapter 13/14 Quiz Study Guide

1. Describe the following chemical equations in word. Be sure to include ALL information given in the equation. Use ONLY words (not chemical notation)
   a. $CaCl_2(s) \rightarrow CaCl_2(aq)$

   b. $Na(l) + Cl_2(g) \rightarrow NaCl(s)$

   c. $NaOH(aq) + HNO_3(aq) \rightarrow NaNO_3(aq) + H_2O(l)$

2. Interpret the following descriptions of chemical reactions into the appropriate chemical equation. Be sure to include ALL information that is needed in the equation. Make sure compounds are NEUTRAL, and the equations are balanced
   a. Chlorine gas is mixed with solid magnesium bromide, resulting in the production of solid bromine and solid magnesium chloride.

   b. Aqueous silver nitrate and aqueous sodium hydroxide are mixed to produce aqueous sodium nitrate and solid silver hydroxide.

   c. Solid copper sulfate is dissolved in water to produce aqueous copper sulfate.

3. How is NaCl(*aq*) different from NaCl(*l*)?

4. Consider reaction 1a. What part of this reaction is most like a physical change? What part is most like a chemical change?

5. Consider the reaction for forming a kidney stone.
   $Na_3PO_4(aq) + 3CaCl_2(aq) \rightarrow Ca_3(PO_4)_2(s) + 6NaCl(aq)$
   a. Which of the 4 types of reactions is this?

   b. Does it show a chemical or a physical change? Explain

   c. What is the chemical name of the solid that makes up a kidney stone?

6. Balance the following reactions:
   a. ____$N_2(g)$ + ____$H_2(g) \rightarrow$ ____$N_2H_4(g)$

N -	N -
H -	H -

   b. ____$KNO_3(s)$ + ____$K(s) \rightarrow$ ____$K_2O(s)$ + ____$N_2(g)$

K -	K -
N -	N -
O -	O -

c. ____$H_2SO_4(aq)$ + ____$NaCN(aq)$ → ____$HCN(g)$ + ____$Na_2SO_4(aq)$

H -

S -

O -

Na -

C -

N -

H -

S -

O -

Na -

C -

N -

d. ____$H_3PO_4(aq)$ + ____$Ca(OH)_2(aq)$ → ____$Ca_3(PO_4)_2(aq)$ + ____$H_2O(l)$

H -

P -

O -

Ca -

H -

P -

O -

Ca -

e. ____$H_2S(g)$ + ____$O_2(g)$ → ____$SO_2(g)$ + ____$H_2O(l)$

H -

S -

O -

H -

S -

O -

f. ____$H_2(g)$ + ____$O_2(g)$ → ____$H_2O(l)$

H -

O -

H -

O -

g. ____$C_3H_8(g)$ + ____$O_2(g)$ → ____$O_2(g)$ + ____$H_2O(l)$

C -

H -

O -

C -

H -

O -

7. The LD_{50} of several toxins is in the table below. For each row, determine the lethal dose for a 165 lb adult human, the molar mass of each toxin, and the moles in the lethal dose. WATCH YOUR UNITS

Toxin	**Formula**	**LD_{50} (mg/kg)**	**Lethal Dose (g)**	**Molar Mass (g/mol)**	**Moles in Lethal Dose (mol)**
gyromitrin	$C_4H_8N_2O$	200 mg/kg			
sodium chloride	NaCl	3000 mg/kg			
lead	Pb	450 mg/kg			
Vitamin D3	$C_{27}H_{44}O$	42 mg/kg			
glucose	$C_6H_{12}O_6$	30000 mg/kg			

a. Which of the 5 toxins is the most toxic? How did you determine this?

8. Why is it necessary to take a person's weight into account when a doctor prescribes medications?

9. Suppose you have 1 mol of $PbCl_2$.
   a. How many moles of lead do you have? Explain

   b. How many moles of chlorine do you have? Explain

10. List the following in order of INCREASING moles of METAL in each compound. Show your work.

5.0 g NaCl, 5.0 g AgCl, 5.0 g LiCl

11. Balance these equations:

a. ____$TiCl_4(s)$ + ____$Mg(s)$ → ____$Ti(s)$ + ____$MgCl_2(s)$

Ti -

Cl -

Mg -

Ti -

Cl -

Mg -

b. ____$H_2O(l)$ + ____$Mg(s)$ → ____$MgO(s)$ + ____$H_2(g)$

H -

O -

Mg -

H -

O -

Mg -

c. ____$Fe(s)$ + ____$CuSO_4(s)$ → ____$FeSO_4(s)$ + ____$Cu(s)$

Fe -

Cu -

S -

O -

Fe -

Cu -

S -

O -

d. ____$Li(s)$ + ____$H_2O(s)$ → ____$LiOH(aq)$ + ____$H_2(g)$

Li -

H -

O -

Li -

H -

O -

Topics Covered:

- Chemical equations
  - Subscripts - what do notations like *aq, s, l, and g* refer to?
  - reactants/products (know which vocab word refers to which side of a reaction)
  - Describing a chemical reaction in words
  - Writing a chemical reaction in proper notation, given a description of what changes.
- Physical v. chemical change
- Balancing Chemical Equations
  - Difference between a subscript and a coefficient
  - Using *inventories* to balance
- Types of Reactions
  - Combination
  - Decomposition
  - Single exchange
  - Double exchange
- LD_{50}
  - Comparing two toxins to describe which is less/more toxic
  - Figuring out lethal dose for humans of various weights
- Molar Mass, mole-mass conversions
  - Calculating molar mass
  - Converting moles of a substance to mass, and vice versa