1. Limiting reagents
2. Balancing chemical equations
3. Percent composition
4. Empirical formula

1. Consider the balanced equation for the following reaction:
   \[ 3\text{H}_2\text{O}(l) + \text{Mg}_3\text{N}_2(aq) \rightarrow 3\text{MgO}(s) + 2\text{NH}_3(g) \]

   If 6.44 moles of \( \text{H}_2\text{O} \) reacts with 4.75 moles of \( \text{Mg}_3\text{N}_2 \), which species is the limiting reagent in the reaction?

2. Balance and use this equation to answer the following questions

   \[ \_ \text{KClO}_3(s) \rightarrow \_ \text{KCl}(s) + \_ \text{O}_2(g) \]

   1. How many moles of \( \text{O}_2 \) will be formed from 1.65 moles of \( \text{KClO}_3 \)?

   2. How many moles of \( \text{KClO}_3 \) are needed to make 3.50 moles of \( \text{KCl} \)?
3. Calculate the percent composition by mass of the following compounds that are important starting materials for synthetic polymers:

   a. $\text{C}_3\text{H}_4\text{O}_2$

   b. $\text{C}_4\text{H}_6\text{O}_2$

   c. $\text{C}_3\text{H}_3\text{N}$

4. A compound that contains only carbon, hydrogen, and oxygen is 48.64% C and 8.16% H by mass. What is the empirical formula of this substance?

5. A compound contains 47.08% carbon, 6.59% hydrogen, and 46.33% chlorine by mass; the molar mass of the compound is 153 g/mol. What are the empirical and molecular formulas of the compound?

6. (EOC 3.81) The following compounds have been detected in space. Which of them contains the greatest percentage of carbon by mass?

   - Naphthalene, $\text{C}_{10}\text{H}_8$
   - Chrysene, $\text{C}_{18}\text{H}_{12}$
   - Pentacene, $\text{C}_{22}\text{H}_{14}$
   - Pyrene, $\text{C}_{16}\text{H}_{10}$

If extra time:
1. \[ C_7H_{16} + O_2 \rightarrow CO_2 + H_2O \]

2. \[ H_2SiCl_2 + H_2O \rightarrow H_8Si_4O_4 + HCl \]

3. \[ HSiCl_3 + H_2O \rightarrow H_{10}Si_{10}O_{15} + HCl \]