

1. Sodium chloride reacts with ammonia gas, carbon dioxide and water to make sodium hydrogen carbonate and ammonium chloride. If 5.8 grams of sodium chloride are reacted with excess of all other reactants and 4.4 grams of sodium hydrogen carbonate is made, what is the percent yield?
2. Combustion analysis
  - a. Convert grams of  $\text{CO}_2$  to moles of  $\text{CO}_2 = \text{moles C}$
  - b. Convert grams of  $\text{H}_2\text{O}$  to moles of  $\text{H}_2\text{O}$  then multiply by 2 = moles H
  - c. Divide all terms by smallest number of moles to get empirical formula

Combustion of 0.671 grams of limonene yielded 2.168 grams of carbon dioxide and 0.71 grams of water. What is the empirical formula of limonene?

3. If the molar mass of limonene is 136.24, what is the molecular formula? Use the empirical formula from question 2.
4. Combustion of 0.0341 grams of a compound from coral yielded 0.1101 grams of carbon dioxide and 0.036 grams of water. What is the empirical formula of this compound?
5. Vanillin contains carbon, hydrogen and oxygen. Combustion of 30.4 mg of vanillin yielded 70.4 mg of carbon dioxide and 14.4 mg of water. What is the empirical formula of vanillin?
6. How many moles of oxygen are required to react with 4 moles of ammonia?  
 $2\text{NH}_3 + 2\text{O}_2 \rightarrow \text{N}_2\text{O} + 3\text{H}_2\text{O}$
7. Balance the following reaction. How many moles of oxygen are needed to react with one mole of  $\text{B}_2\text{H}_6$ ?

