

**WORKSHOP 6:**  
**Stoichiometry**

Name: \_\_\_\_\_  
Section \_\_\_\_\_

*Review the Stoichiometry Path(s) presented in your textbook. The starred \* problems 2d and 4b are “limiting reactant” problems.*

1. Phosphorous pentachloride reacts with water to produce phosphoric acid and hydrogen chloride
  - a. Write the balanced equation for this reaction.
  
  
  
  
  
  
  
  
  
  
  - b. How many moles of phosphorous pentachloride will react with 7.36 g of water?
  
  
  
  
  
  
  
  
  
  
  - c. How many grams of water will be required to produce 4.62 g of hydrogen chloride?
  
  
  
  
  
  
  
  
  
  
  - d. If the reaction uses up 8.33 g of phosphorous pentachloride, how many grams of hydrogen chloride will be formed?
  
2. Hydrochloric acid reacts with oxygen gas to produce water and chlorine gas
  - a. Write a balanced equation for the reaction.
  
  
  
  
  
  
  
  
  
  
  - b. How many kilograms of hydrochloric acid are required to react with 15.4 kg of oxygen gas?
  
  
  
  
  
  
  
  
  
  
  - c. How many liters of chlorine gas at STP will be produced from the reaction of 41.56 g of hydrochloric acid?

d. If 5.00 L of oxygen gas is added to 10.0 L of hydrochloric acid at STP, how many grams of water would be formed? Identify the limiting reactant.

3. Pentane ( $C_5H_{12}$ ) reacts with oxygen gas to form carbon dioxide gas and liquid water.

a. Write the balanced equation for this reaction.

b. How many grams of water will be produced when  $3.35 \times 10^4$  mg of pentane reacts with excess oxygen?

c. What volume of carbon dioxide, measured at STP, would result from the reaction of 9.786 kg of oxygen with excess pentane?

4. Aqueous solutions of lead (II) nitrate and aluminum chromate are mixed together

a. Predict the products, write the balanced equation.

b. How much solid precipitate will be produced from the reaction of 4.512 kg of lead (II) nitrate with 5.000 kg of aluminum chromate? What is the limiting reactant?