

**Worksheet 11-1**  
**Redox Reactions**

Name \_\_\_\_\_  
Period \_\_\_\_\_

1. What is a redox reaction?
2. Can oxidation occur without reduction? Explain.
3. Why would a nail corrode more quickly in saltwater than in distilled water?
4. a. What is the oxidation number of any atom in the elemental state? \_\_\_\_\_  
b. What is the oxidation number of any monatomic ion? \_\_\_\_\_  
c. What is the sum of the oxidation numbers in a neutral compound equal? \_\_\_\_\_  
d. What is the sum of the oxidation numbers in a polyatomic ion equal? \_\_\_\_\_
5. Determine the oxidation number of phosphorous in each substance.
  - a.  $P_4O_8$  \_\_\_\_\_
  - b. P \_\_\_\_\_
  - c.  $P_4O_6$  \_\_\_\_\_
  - d.  $H_3PO_4$  \_\_\_\_\_
  - e.  $PO_3^{3-}$  \_\_\_\_\_
  - f.  $PO_4^{3-}$  \_\_\_\_\_
6. Determine the oxidation numbers of each element in each of the following compounds.
  - a.  $S_2O_3$  \_\_\_\_\_
  - b.  $Cl_2$  \_\_\_\_\_
  - c.  $CO_3^{2-}$  \_\_\_\_\_
  - d.  $NO_3$  \_\_\_\_\_
  - e. KCl \_\_\_\_\_
  - f. He \_\_\_\_\_
  - g.  $NO_2$  \_\_\_\_\_
  - h.  $H_3N$  \_\_\_\_\_
7. If a substance is "reduced" does it gain or lose electrons? \_\_\_\_\_ If a substance is "oxidized" does it gain or lose electrons? \_\_\_\_\_
8. Distinguish between an oxidizing agent and a reducing agent.
9. Use the changes in oxidation numbers to identify which atom is oxidized and which is reduced. Then, determine which reactant is the oxidizing agent and which is the reducing agent. (Show your work.) You may need to use electronegativity values (p. 405) to determine which atom is gaining or losing electrons, especially for molecular compounds.
  - a.  $H_2 + Cl_2 \rightarrow 2 HCl$   
Oxidized \_\_\_\_\_ Reduced \_\_\_\_\_  
Oxidizing Agent \_\_\_\_\_ Reducing Agent \_\_\_\_\_