

# Lab: Statue of Liberty Corrosion



## Pre-Lab:



1.) a.) Read the first paragraph on p. 636 of the text.

b.) Which type of element is susceptible to corrosion?

(1) metals                      (2) metalloids                      (3) non-  
metals                      (4) noble gases

c.) What naturally-occurring element causes corrosion?

\_\_\_\_\_

d.) When a metal corrodes, is it getting reduced or oxidized? \_\_\_\_\_

e.) The original meaning of the word *oxidation* is “to react with oxygen (air).” Explain why this makes sense when discussing corrosion.

\_\_\_\_\_  
\_\_\_\_\_

f.) What two substances are able to increase the rate of corrosion? \_\_\_\_\_ & \_\_\_\_\_

2.) A third substance that can accelerate the rate of corrosion is acid, either as solutions with a low pH or as acid fumes.

a.) Read p. R27 (this is in the blue-edged page at the back of the textbook).

b.) The pH of “normal” rainfall is \_\_\_\_\_. It is acidic because of \_\_\_\_\_ dissolved in the rain water.

c.) Acid rain is caused by the burning of coal. This releases oxides of the elements \_\_\_\_\_ and \_\_\_\_\_ into the air, which dissolve in water to form two acids: \_\_\_\_\_ and \_\_\_\_\_. These \_\_\_\_\_ acids are much stronger than carbonic acid, which is naturally found in rainwater. As a \_\_\_\_\_ result, these acids lower the pH of rain to be even more acidic.

d.) Using the map in the text, what is the pH of rainwater in the Rochester area? \_\_\_\_\_

3.) Corrosion can be prevented! Read p. 637. Summarize the two different ways corrosion can be prevented. Write a small paragraph using complete sentences.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

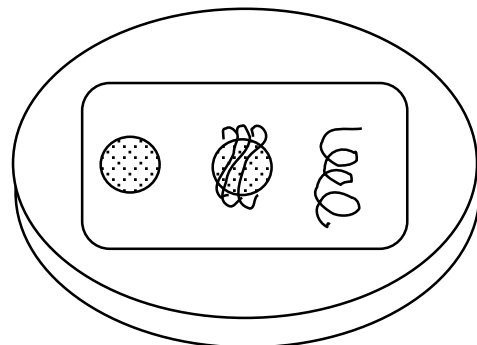
**Purpose:** To determine what corrosion is, what causes it, & how chemistry can be used to prevent it.

**Safety:** Wear safety glasses

**Materials:** a Petri dish, paper towel, steel wool, clear plastic wrap, 2 pennies, NaCl (table salt), vinegar, iron wire (from a "twist tie")

**Procedure:**

- 1.) Fold the paper towel and place it in the bottom of the Petri dish. Moisten the paper towel with tap water. (Don't soak it!)
- 2.) Sprinkle a small amount of NaCl (table salt) on the paper towel. (This will simulate the moist salt environment of New York's harbor.) Add a "dash" of vinegar. (This will simulate the acid rain.)
- 3.) Clean the edges of the pennies with steel wool. Scrape the paper or plastic from the "twist-tie" if used and clean the iron wire that is left behind with the steel wool.
- 4.) Wrap 1 piece of wire around 1 penny. Wind the other wire into a coil.
- 5.) Place the 1) wrapped penny, 2) the coil, and 3) the bare penny in the bowl on the paper towel. Don't let any of the three items touch! (see the diagram below)
- 6.) Cover the bowl with clear plastic wrap and place in the storage area to react until tomorrow.
- 7.) Make observations each day for 3 days.



**Data:**

Make observations using either words or pictures (use color if you decide to use pictures!).

	Observations		
	Day 1 – Date: _____	Day 2 – Date: _____	Day 3 – Date: _____
Bare Penny			
Wrapped Penny			
Coil			