How Can Water Pollution Be Detected?
Go to: http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT03/CT03.html

Water pollution occurs when harmful waste products, chemicals, and other substances are introduced into a body of water. Most water pollution can be classified into four main types:

Thermal Pollution: is caused when factories and power plants release hot water, used to cool machines in their factories, intro surrounding water. This hot water causes a higher overall water temperature, which can lead to environmental imbalances.

Industrial or Chemical Pollution: is the discharge of toxic substances and other industrial byproducts into bodies of water

Domestic Pollution: is the flow of sewage, pesticides and other waste material from farms, roads, cities and towns into bodies of water

Soil Pollution: occurs when erosion causes soil to flow into a body of water

One of the most devastating effects of water pollution on ecosystems is a **reduction in the amount of dissolved oxygen (DO) in a body of water.** Fish and other aquatic creatures extract DO from water as they breathe. As pollution cause the amount of DO to decrease, aquatic animals must move to cleaner waters or die from suffocation. However, while many species die from lack of oxygen, there are fish, invertebrates, and microorganisms that thrive in polluted conditions.

In this virtual lab, you will measure DO levels and examine the species of aquatic life that inhabit different bodies of water.

Objectives:
1: Define four types of water pollution
2: Describe how pollution results in decreased dissolved oxygen (DO) levels, and explain the effect low DO levels can have on an ecosystem
3: Describe how other factors, like temperature, can affect DO levels
4: Describe what aquatic life are most and least suited to polluted environments

Procedure:
1: Select a river to test by *clicking 1, 2 or 3*

2: **Click the fish net** to catch a fish from the river

3: **Click the pail** to take a water sample from the river

4: **Click the thermometer** to take the temperature of the river

5: Look at the lab results to **identify the samples**

6: Click the fish, invertebrates, and microorganisms tabs for information about how each aquatic animal reacts to different levels of DO in the water and **enter the information in the Table.**

7: Click the Dissolved Oxygen tab for instructions how how to determine the Percent Saturation Value and **enter the result in the Table.**

8: Using the season selector, change the season. **Repeat steps 1-7 for each season.**

9: Click map to go to the map screen and select another site. **Repeat steps 1-8 for each site. (After completing the table- take a screen shot of your data table for your write-up)**

Journal Questions:

1: What are four types of water pollution? Define each.
-Thermal – When industry heats water as a coolant, causing DO to drop
-Industrial/Chemical – Toxic substance discharge and industry byproduct into bodies of water
-Domestic – Sewage, pesticides, and other waste from farms roads, cities, and towns into water
-Soil – Erosion of soil causes soil to flow into body of water

2: Which fish species are the least tolerant of water pollution? Which species are the most tolerant? How do you arrive at your conclusion?
- Gar are the most tolerant of water pollution due to their resourceful swim bladder. Trout may be less tolerant because of their preference to 40-45 degree clean water.

3: Which invertebrates are the least tolerant of water pollution? Which species are the most tolerant? How do you arrive at your conclusion?
-Mayfly nymphs are the least tolerant due to them being an indicator species for pollution. The Rat-tailed maggot may be the most tolerant due to its preference to polluted water and low DO.

4: What might a high level of bacteria indicate about DO levels? What is the relationship between bacteria and water pollution?
-A high level of bacteria may indicate that DO levels are low due to the use of oxygen in breaking down organic matter. Bacteria and water pollution both exist in harmony, since bacteria “clean up” pollution, but use up oxygen.

5: Based on the lab results, what conclusion can be drawn about each site? Which river was the most polluted? How did you arrive at your conclusion?
-Based on the results, site 1 can only sustain fish populations in the spring and winter. In site 2, fish can live during all seasons. In site 3, fish cannot live in the summer. Site 1 is the most polluted, since only 2 seasons can sustain fish and only carp, gar, and catfish swim in the river, and these species are the more tolerant species listed.