Water Quality: An Important Issue

Background and Definitions

- Pollutants can enter water to change water quality through various routes.
- **Point source** pollutants come from known outlets (sewage pipe or effluent from industry)
- **Non point source** pollutants include run off from multiple places and the amounts that come from each area are not clear. For example: salt from roads, fertilizer from fields. Fertilizer contains nutrients such as nitrates and phosphates.

Nitrate-nitrogen*-Levels exceeding 50 mg/L (ppm) are considered unhealthy for lakes. It is recommended 0–1 ppm and 1–5 ppm for optimum growth in freshwater systems.*
Phosphorous *Discharge Standards: Total Phosphorous for discharge < 100 micrograms/L; Where stream enters lake < 50 micrograms/L; Discharge into a lake < 25 micrograms/L.*

Dissolved oxygen is the amount of gaseous oxygen (O_2) dissolved in an aqueous solution. Oxygen gets in the water by diffusion from the surrounding air, by aeration (rapid movement), and as a waste product of photosynthesis.
Dissolved oxygen *Recommended minimum levels for fresh water fish are as follows: warm water fish: 5.0 mg/L (ppm) and cold water fish: 6.0 mg/L (ppm).*

Temperature is another abiotic factor that affects ecosystems in many ways. *The higher the temperature of water, the lower the amount of dissolved oxygen water can hold. The opposite is also true: the lower the temperature, higher amounts of oxygen can be dissolved in the water.*

Biochemical/biological oxygen demand (BOD) is the amount of dissolved oxygen that must be present in water in order for microorganisms to decompose the organic matter in the water. It is used as a measure of the degree of pollution.

pH is a measure of how acidic or basic a substance is. The pH scale ranges from 0 to 14. A pH of 7 is neutral. A pH greater than 7 is basic. The pH scale is logarithmic and as a result, each whole pH value below 7 is ten times more acidic than the next higher value (For example, a pH of 4 is 10 times more acidic than 5, and 100 times more acidic than 6) and each whole pH value above 7 is ten times more basic than the next lower value. *Recommended values for pH in aquatic ecosystems range from 6-8.*

Activity

You have a water sample from a river or creek to test.

Test the characteristics of your sample.

Record your data in the table below.

Plot your data on your graph in the section that corresponds to your sample.

1. Measure turbidity, or clarity, of the water by seeing if you can read the print on this paper while looking through the sample. (Report as clear, blurry or opaque)
2. Use the pH strip to test the pH.
3. Use the dissolved oxygen test kit to test the level of dissolved oxygen
4. Use each specific test kit to measure nitrates and phosphates.

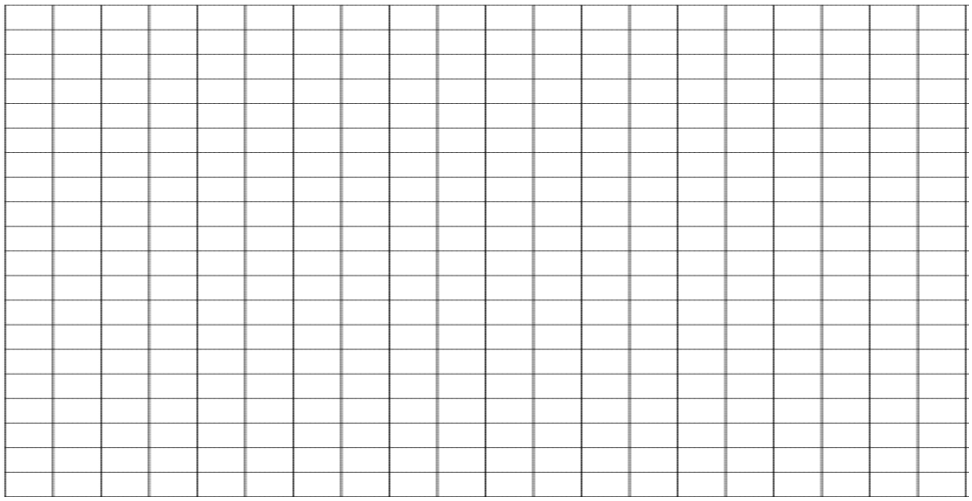
Water Quality and Human Impacts

Sample _____	Turbidity	pH	Dissolved O_2 (ppm)	Nitrate (ppm)	Phosphate (ppb)	Temp. (°C)

Water Quality Measurements

From Impact card

From collected data



Now get an impact card. This impact card has data that describes what you might find if you collect a sample from the water source in the zone you tested. Graph this data on the top half of the graph above the line.

Questions for discussion:

1. How does your data compare to the given data from the stream?

2. How does the class data compare to the oxygen sag curve on the accompanying handout?

3. How would this sag curve change in a lake or pond?

***This document may be reproduced for educational purposes, but it may not be reposted or distributed without crediting GrowNextGen and The Ohio Soybean Council and soybean checkoff.**