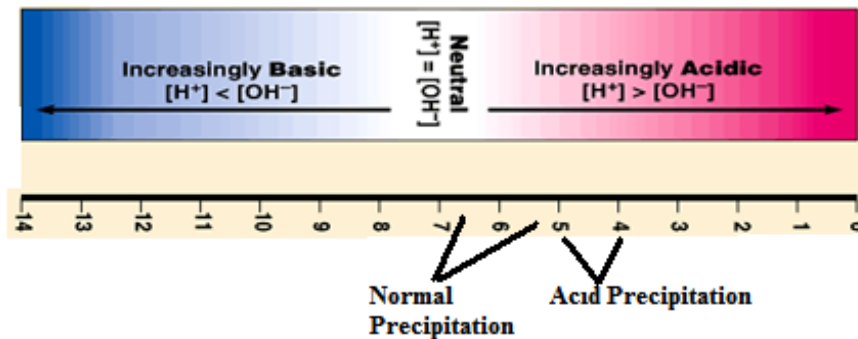


Assessing Water Quality Virtual Lab #6

Background Information: Acid precipitation (aka acid rain) results from the release of pollutants into the atmosphere. The pollutants come from the combustion of fossil fuels, the acids released from combustion exhaust will then combine with water vapor in the atmosphere and produce acid precipitation such as rain or snow. The carbonic acid (CO_2) represents the acid precipitation

Indicator species are organisms that can alert scientists to pH changed in aquatic ecosystems, if their population numbers change drastically and quickly, this can signal to the scientist that there are abiotic factors of the lake that are effecting the biotic organisms of the lake. The pH of normal, healthy aquatic ecosystems range from a pH of 7.5 to 6.2



Purpose: To study the quality of water through indicator species population numbers

Procedure: On the screen you will see 3 aquatic organisms in the aquarium. The pH indicator on the aquarium shows the current pH level. The computer program will randomly choose 3 different aquatic organisms at a time and compare their population numbers under different pH conditions. There are 10 different aquatic organisms and you have to track all of them.

Computer Instructions:

1. Click the reset button until you get the combination of aquatic organisms that you want to track.
2. Click the Population bar Graph on the computer to see the population data for the 3 species at the current pH level of the aquarium ...pH is at 7
3. Record this information on your data table
4. Click the pipette to dispense (put in) 3 drops of carbonic acid (this represents the formation of acid precipitation) into the aquarium. Notice the pH will drop
5. Click the Population Bar Graph to view the data on your new populations. Add 3 drops of carbonic acid and record your data. Continue tracking the 2 new populations until you have recorded their data for 2.8 pH **OR** until all 3 species have a population of 0.
6. Repeat this process until you have recorded the data for all 10 organisms in the aquarium
7. Graph your data and answer the lab questions

Name _____

Period _____

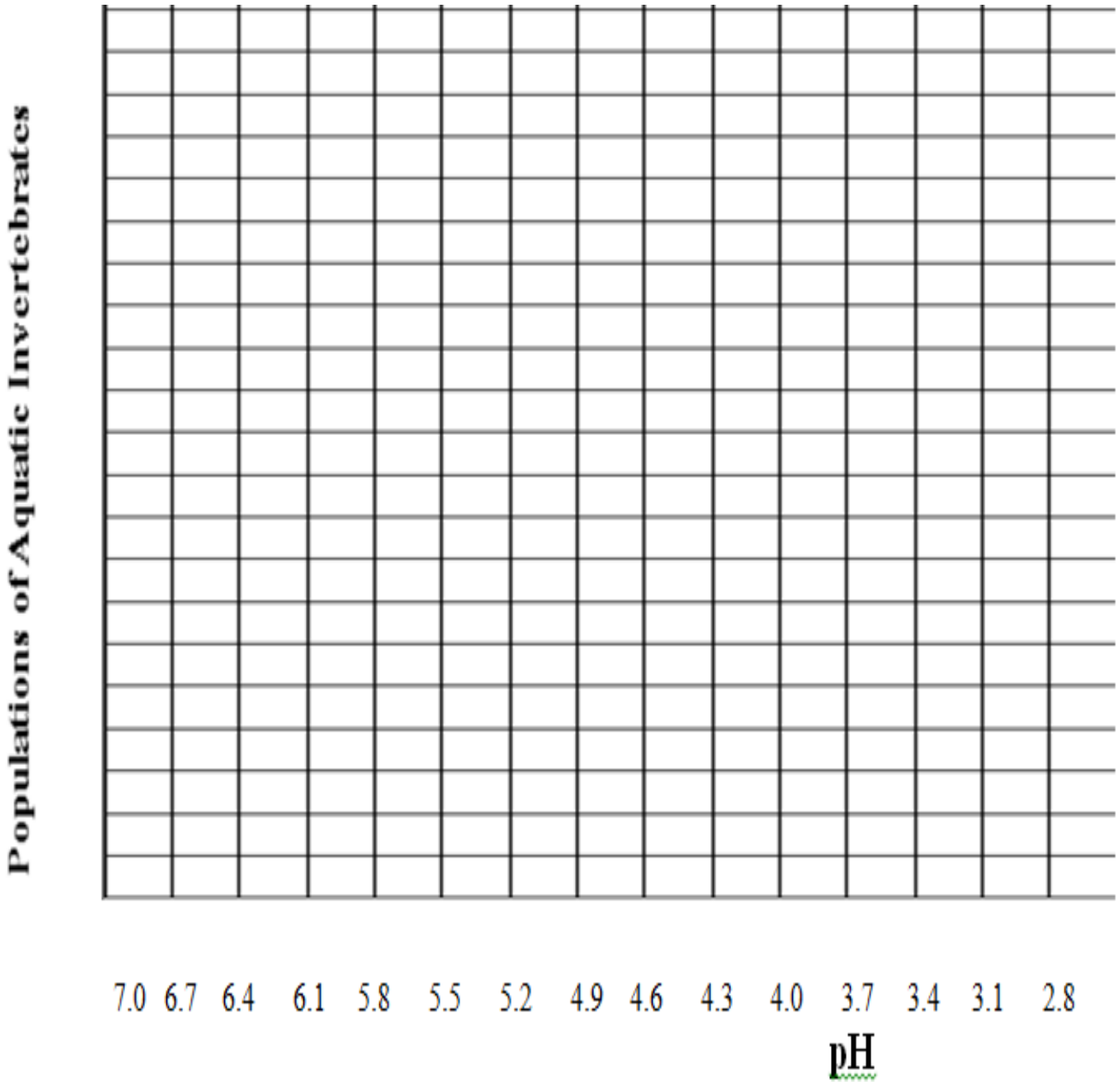
Aquatic Populations to Sample

1. Aquatic earthworms
2. Snails
3. Tubifex worms
4. Clams
5. Leeches
5. Sideswimmers
6. Dragonfly nymphs
7. Crayfish
8. Fairy shrimp
9. Stonefly nymphs

Questions to Answer

1. What does the term aquatic mean?
2. As the pH of the aquarium becomes more acidic, what happens to the Biodiversity of your tank?
3. What might the lack of Biodiversity do to an actual lake such as Butler Lake?
4. Of your 5 species,
 - A. Which species was the most tolerant of the pH change?
 - B. Which species was the least tolerant of the pH change?
 - C. Which might be called an indicator species?
5. What are the causes of acid precipitation?
6. How might acid precipitation be controlled or remedied? Give 2 answers
7. Amphibia such as frogs are often indicator species for both potential water and air pollution problems. Frog populations have decreased drastically in the past 20 years. What does this indicate about water quality and air quality in the past 2 decades?

How the Change in pH Effects Population Size of Aquatic Species



Key for Line Graph

- | | |
|-----------------------|---------------------|
| 1. Aquatic earthworms | 6. Sideswimmers |
| 2. Snails | 7. Dragonfly nymphs |
| 3. Tubifex worms | 8. Crayfish |
| 4. Clams | 9. Fairy shrimp |
| 5. Leeches | 10. Stonefly nymphs |