

**Reading the River, 2003
A Unit on Water Quality**

**7th Grade
Science**

**Karyl White
Rowan County Middle School
Rowan County**

A World in a Drop of Water

GRADE LEVEL: 7th

OBJECTIVES:

In this activity, students should be able to:

1. perform water quality tests on samples and interpret the results
2. identify and classify freshwater organisms in a drop of water
3. assess the environmental quality of a water sample based on the presence of certain organisms
4. become aware of water quality and the environmental issues concerning water that is vital to our world

PROGRAM OF STUDIES

Scientific Inquiry

Use appropriate equipment, techniques, technology, and math in scientific investigations.

Communicate results of scientific findings.

Conceptual Understandings

Investigate factors that affect the number and diversity of organisms in an ecosystem.

Distinguish between physical and chemical properties and changes.

Plan, demonstrate, relate, and analyze the qualitative tests used in water testing.

Applications/Connections

Students will become aware of water quality and their roles and responsibilities in environmental issues.

Recognize how science can be used to understand problems in the environment.

Core Content

SC-M-3.5.2 Populations of organisms can be categorized by the function they serve in an ecosystem. All populations living together

and the physical factors with which they interact compose an ecosystem.

SC-M-3.5.4 The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g. quantity of light and water, range of temperatures, soil composition). Given adequate biotic and abiotic resources and no diseases or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate; limit the growth of populations in specific niches in the ecosystem.

Materials

- Samples of Freshwater
- Water Testing Kits and/or Equipment to test Water Temperature, pH Level, and Dissolved Oxygen
- Microscopes
- Microscope Slides
- Cover Slips
- Eyedroppers
- Paper Towels
- Small Glass Bowls
- Freshwater Organisms Identification Chart/Key

Activity Procedures (Groups of Two)

1. Materials and worksheets will be distributed to the students.
2. Each group of students will test three (3) freshwater samples (tap water, lake water, and pond water) for water temperature, pH level, and dissolved oxygen.
3. Students will record their results and will turn in a data table that contains the entire class data on it.
4. Students will use a microscope to examine a drop of tap water, a drop of lake water, and a drop of pond water.
5. Each group of students will prepare three microscope slides using water from 3 beakers in the lab labeled tap water, lake water, and pond water.
6. Students will obtain their samples in eyedroppers, using a different eyedropper for each sample.
7. Students will note eyepiece and objective lens magnification and calculate total magnification. This is the eyepiece

- magnification times the magnification of the objective lens (both should be marked right on the lenses).
8. Students will view their slide under the low power objective and focus on the pond water. Some organisms will be moving while others will remain in one place.
 9. Students will switch their microscopes to high power and draw within circles what they see, label, and write a brief description on the worksheet titled "Water Sample Survey." Ideas for descriptions include size, shape, movement, unique features, or interesting information.

Definition/Explanation of Concept or Skill

Students need to understand that there is a miniature cosmos in a single drop of water. A diverse range of living forms, both animal and plant, compete for energy supplies, food, space, and other resources. The best way to begin understanding these organisms is to examine them in different environments using microscopes. Students need to learn more about how water quality (temperature, pH level, dissolved oxygen, etc.) affects the life cycles of these organisms. With all life there is a continual struggle and competition for survival. This lab activity gives the students the skills necessary to go out into a real field-testing site and perform tests accurately and determine if a sample is healthy.

Assessment

1. Students will complete data chart on water quality.
2. Students will draw and label organism observed under the microscope.
3. Students will use the key to identify and group organism(s) found in the water samples.
4. Students will explain the correlation between water quality data and the organisms found in the water samples.

References

Life in a Drop of Water <http://www.iit.edu/~smile/chbi0300.htm>
Textbook: Prentice Hall – Science Explorer (pages 80A-94A)
Kids in the Creek
<http://www.bpa.gov/corporate/kr/ed/kidsinthecreek/curriculum.htm>

Lesson Context

Day 1 Students will take the water temperature, measure the amount of dissolved oxygen in the water, and calculate the pH level of each water sample and record their results in a data table. The students will turn in a data table that contains the entire class data on it.

Advanced preparation:

1. Discuss with students the instructions for conducting each test.
2. Discuss with students the reasons for the results they obtained.
3. Discuss with students the contents of their data tables.

Day 2 Students will compare the data obtained as a class. The students will then interpret this data to assess the water quality of each sample.

Day 3 Students will view tap water, lake water, and pond water using a microscope. Students will record their observations and draw diagrams of any discovered organisms, at least three organisms from each sample. The students will also classify each organism using a taxonomy chart/key.

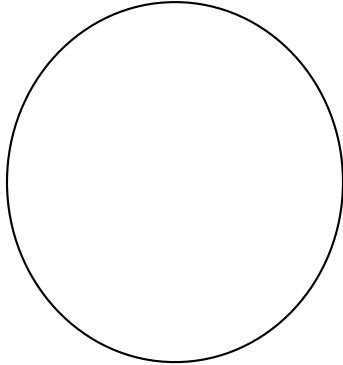
Day 4 Students will participate in a class discussion of the results of the previous day's activity. Students will compile results from the water quality data and the data obtained from the lab activity to explain the relationship to a healthy water system.

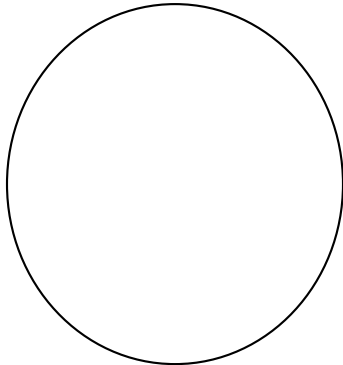
Day 5 Students will be assessed by their lab results and a written examination. Lab results will be assessed for proper completion. The written examination will contain completion and discussion items to evaluate if the students understood the lab procedures and if they can apply the results of the lab and the implications of this information to a real life situation.

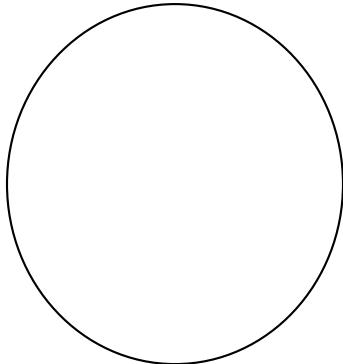
Water Sample Survey

Name _____ Date _____ Class _____

Investigate samples of water to find 3 different organisms. For each organism, identify by common (or scientific) name, provide a sketch, and write a brief description. Ideas for descriptions include size, shape, movement, unique features, or interesting information.

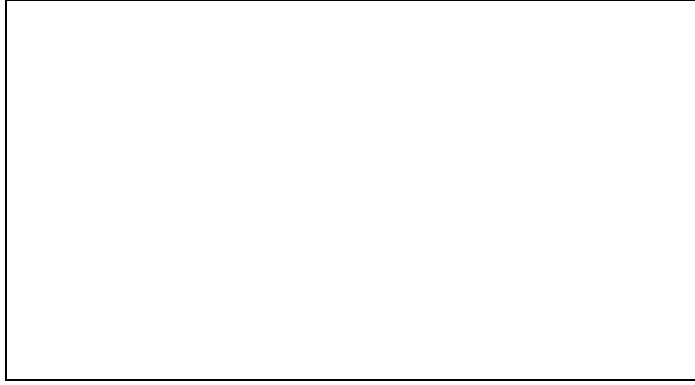
| | |
|---|----------------------------------|
|  | Name _____ Description: _____ |
|---|----------------------------------|

| | |
|---|----------------------------------|
|  | Name _____ Description: _____ |
|---|----------------------------------|

| | |
|---|----------------------------------|
|  | Name _____ Description: _____ |
|---|----------------------------------|

Calculate the total magnification for low power and high power objectives.

2. Draw a picture of a creature, other than a frog or fish or the animals in the boxes above, that you think you might find in your local pond water. If you know the name of your creature, write it below the drawing.



3. Do you think that students all over the United States and in different countries around the world will find many of the same animals in their freshwater? Give three reasons for your answer.

4. Was there anything that surprised you about this lab activity? List two new discoveries.

5. Where could you get more information about water quality in the state of Kentucky? List three sources.