

# Microscopic Life in Water

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Grade Levels: 4<sup>th</sup>-6<sup>th</sup>

Length of Lesson Sequence: 1 hour

## Brief Description:

Examination of water under a microscope uncovers a whole new world that is invisible to the standard human eye. In this activity, students examine the microscopic life in water from multiple sources to find out if there is life in them and if it is different between sources. Students draw pictures of what they see in microscopes and draw conclusions about what they found. Experts suggest that this activity is one of the best at stimulating a child's interest in exploring the natural world.

## Content Statements/Standards Covered:

I.1.e2 (C 2) - Develop solutions to unfamiliar problems through reasoning, observation, and/or experimentation.

II.1.e4 (R 4) - Develop an awareness of and sensitivity to the natural world.

III.5.e4 (LEC 5) - Describe positive and negative effects of humans on the environment.

I.1.e6 (C 6)- Construct charts and graphs and prepare summaries of observations.

## Objectives of Lesson:

At the conclusion of the lesson, students will be able to:

- ◆ Identify microscopic organisms that are found in water
- ◆ Differentiate between organisms found in different water sources (lakes, ponds, rivers, drinking, fish tank, etc..)

## Materials and Resources

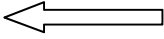
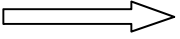
- 1-5 microscopes capable of magnifying to 100x (400x is preferable).
- Glass microscope slides (with wells for placing water preferable)
- Water from at least 5 different sources
- Identification book for microscopic organisms found in water
- 1-5 datasheets (same # as microscopes; Sample in Appendix)

## Strategy

- Inductive or field inquiry: techniques-observations-patterns-explanations (TOPE)

## Observations, patterns, and explanations

In the chart below, describe the connected observations, patterns, and explanations or models that you will use for your session.

Observations or experiences (examples, phenomena, data)	Patterns (laws, generalizations, graphs, tables, categories)	Explanations (models, theories)
Students examine water from different sources under a microscope to look for microscopic life forms	Students find different types and amounts of organisms depending on the water source	Microscopic life in water, including plankton and protozoans can be found in water from many places. Conclusions can be made regarding why they are found in certain places and not others.
 Application: Model-based Reasoning		
Inquiry: Finding and Explaining Patterns in Experience 		

### Introduction/Anticipatory Set

- At least one day prior to the lesson, ask students to collect 0.25 liters of surface water from around their home (if possible) in a container. Make sure this container is labeled with the site, date and students name.
- Have the students bring in the water to class for examination the following day.
  - The teacher can also collect water from different sources for use. To effectively conduct the lesson, at least 5 different water sources should be examined.
- On the day of the lesson prior to the activity, the teacher should set up the microscopes in open areas and make and label slides for each of the sources of water.
  - For each microscope, place one random slide under the lens and focus on any microscopic organisms found in the water. Make sure all microscopes are at the same magnification level to control for organism size differences. 100x might be a good magnification, but this is variable depending on the situation.

### Activities of the Session

- Provide the students with a brief overview of how the microscopes work, but there is no need to provide too much detail. Just make sure they can be broken easily and need to be handled with care.
- Arrange the students into groups based on how many microscopes are available and send each group to a microscope.
- Each group should create a space on their data sheet to make a drawing for each water source that is available.
- Have all individuals in each group look through the first microscope at any organisms that are there and make a drawing of them on the datasheet, with a correct label for the specific water source. They should draw structures they see regardless of whether it is living or non-living. If swimming organisms are encountered, draw them as if they were still.
  - Make available an identification book for the students to look for the organisms that they are finding on the slides they are looking at.
- When all groups have their first drawing, have the groups rotate to the next microscope to examine the water and make drawings of the next slide.
- After each group has made it to all microscopes, the teacher should assist in placing new slides from different water sources under the lens of each microscope.
- Students should examine and draw pictures for the second slide at each microscope.

- This can continue until each group has had a chance to examine the life and draw pictures from all of the water sources

## Conclusion

- As a class, use the reference materials available to identify the different organisms that were found in the different water sources. They might include zooplankton, phytoplankton, protozoans, etc.... Bacteria will not be visible.
- Draw conclusions about what types of organisms were found in the different water sources.
- As a class, create a Science Experiment Report in the form of a chart (Appendix) to explain what happened during the experiment.

## Assessment

Have the students answer the following question:

Compare and contrast the types of microscopic organisms found in pond water, stream water and drinking water.

## Extensions (Optional)

- Students may try to increase the magnification of the microscopes to look for smaller organisms.
- Water from additional sources can be examined for life, including water from snow.
- Students can track the changes in microscopic life in water over time. For example, the plankton communities in a lake change through time.

## Post-lesson Comments and Reflection

12.11.06

When we performed this lesson, we only had one microscope available. Therefore, the teachers used the microscope to focus on the organisms in each water source and the students proceeded to form a line and look through the microscope one by one at the different water sources. However, it worked out very well as the students were amazed by the protozoans and phytoplankton that were observed.

We anticipate performing this same activity again in the spring to find out if we can find any more organisms in the same or other water sources.

# Microscopic Life in Water Datasheet

- Make a drawing of what you see through the microscope for each of the water sources.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Water Source: \_\_\_\_\_

Water Source: \_\_\_\_\_

Water Source: \_\_\_\_\_

Water Source: \_\_\_\_\_

Water Source: \_\_\_\_\_

Water Source: \_\_\_\_\_

Water Source: \_\_\_\_\_

Water Source: \_\_\_\_\_

Water Source: \_\_\_\_\_

# Science Experiment Report

Experiment: \_\_\_\_\_ Scientists: \_\_\_\_\_ Date: \_\_\_\_\_

What was our Hypothesis?	What did we do? (Materials and Methods)	What did we learn? (Results)	What questions do we have?