

## **MICRO MONSTERS! EXPLORING MICROSCOPIC LIFE FORMS OF THE POND**

**Lesson by:** Elaine Deichmeister

**Grade Level:** Fifth

### **Focus:**

This lesson will address the types of microorganisms found in a pond environment, as well as their adaptations, feeding mechanisms, and role within the pond food web.

### **Objectives:**

1. Students will be able to correctly operate a microscope and make a wet mount slide.
2. Students will observe and identify microorganisms from the pond environment.
3. Students will be able to explain the role of specific microorganisms within the larger food web of the pond.
4. Students will be able to research the microorganisms they observed, and identify adaptations which help them survive and feed in the pond environment.

### **Standards:**

#### **SCI 5.1.4 2010**

Give examples of technology, such as telescopes, microscopes, and cameras, that enable scientists and others to observe things that are too small or too far away to be seen without them and to study the motion of objects that are moving very rapidly or are hardly moving.

#### **SCI 5.2.4 2010**

Observe and describe that some living things consist of a single cell that needs food, water, air, a way to dispose of waste, and an environment in which to live.

#### **SCI 5.4.4 2010**

Explain that in any particular environment, some kinds of plants and animals survive well, some do not survive as well, and some cannot survive at all.

#### **SCI 5.4.7 2010**

Explain that living things, such as plants and animals, differ in their characteristics, and that sometimes these differences can give members of these groups (plants and animals) an advantage in surviving and reproducing.

### **Materials:**

1. Microscopes
2. Microscope slides
3. Cover slips
4. Eye droppers or pipettes
5. Cups
6. Drawing pencils
7. "Monocular Microscope" handout
8. "Pond Life Identification Chart" handout
9. "Micro-Monsters" worksheet
10. Quieting solution/proto-slow solution (optional, see notes in procedure)

11. Methylene blue staining solution (optional, see notes in procedure)
12. Paper towels or toilet paper (optional, see notes in procedure)

**Procedure (1 hour total):**

1. Review the parts of the microscope with the students using the “Monocular Microscope” handout.
2. Distribute cups and allow students to collect a sample of water from the pond.
3. Have students prepare their own “wet mount” slides. To prepare a wet mount slide, use the dropper to place a drop of pond water in the center of the slide. Note: To enhance visibility, you may want to use “quieting solution” which slows microorganisms so that they may be more easily observed. If using quieting solution, add a drop of this solution to the drop of pond water at this point.
4. *Very gently* place the cover slip over the water sample on the slide.  
Note: At this point, you may want to add staining solution to enhance the visibility of microorganisms. To add staining solution, place one drop of Methylene Blue stain on one edge of the cover slip, and the flat edge of a piece of paper towel on the other edge of the cover slip. The paper towel will draw the water out from under the cover slip, and the cohesion of the water will draw the stain under the cover slip. Be sure to wipe any excess staining solution from the slide, so it does not stain the microscope lens.
5. Have students set up and plug in the microscopes using the following instructions.  
Note: Microscopes should always be carried with two hands. Instruct students to place one hand under the base, and use the other to grasp the arm.
6. Plug in microscope and turn on light switch
7. Place the microscope slide on the stage and fasten it with the stage clips.
8. Turn the objective lenses so that the lowest power setting (red) is clicked into position.
9. Use the coarse focus knob to raise the stage as close as possible to the objective lens, *without touching the slide*. Then lower the stage until the sample comes into focus.
10. Look through the eyepiece and adjust the amount of light for greatest clarity.
11. Use the fine focus knob to make final adjustments.  
Note: You should always use the lowest possible objective lens to view your specimen. If you need to increase magnification power, you should be able to change to the next objective lenses with only slight focusing adjustment. Use the fine focus knob for this. If you cannot focus on your specimen, repeat steps 7 through 11 with the higher power objective lens in place. Never allow the lens to touch the slide!
12. Instruct students to begin observing microorganisms in their sample. During this time, they should fill out the drawing and naming portion of the “Micro-Monsters” packet as thoroughly as they can. This includes drawing detailed sketches of the organisms they see, and attempting to identify them using the “Pond Life Identification Sheet.”
13. Tell students they will research and answer the additional questions back at school.

**Evaluation:**

1. The worksheets will be collected to check for comprehension.
2. Further evaluation can be used using some suggestions from the Classroom Extension.

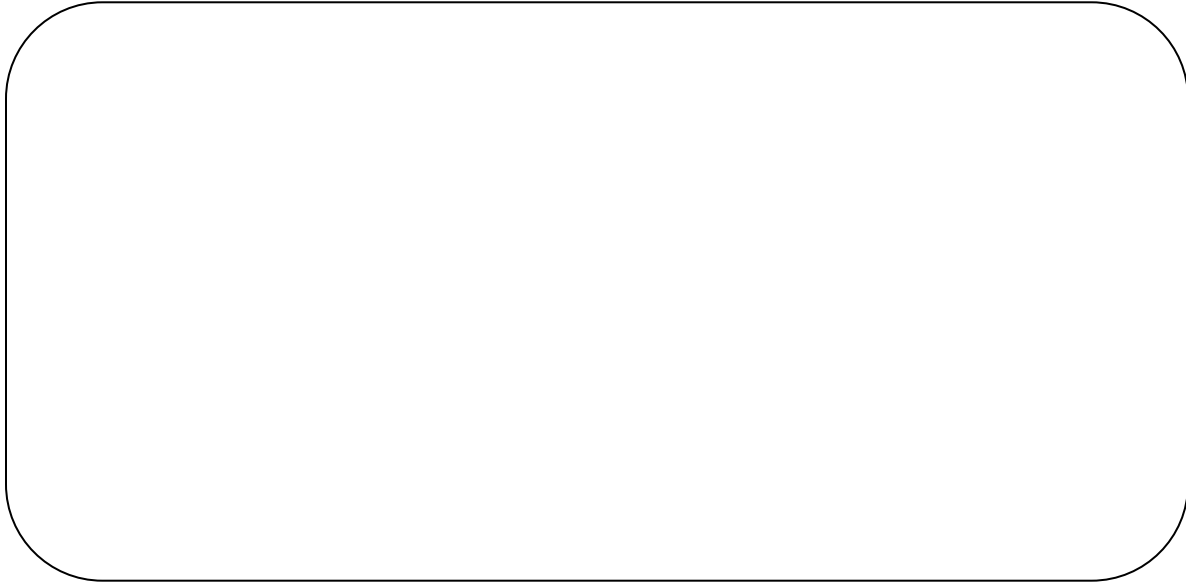
**Classroom Extension:**

Here are some ideas for how to extend and reinforce this activity once you and your students return to school.

1. Put the students in groups and have them draw a pond food web using their microorganisms.
2. Put the students into groups and have each group act out a microorganism. The rest of the class should guess what they are.
3. Have each student choose one of the single celled organisms to make into a poster. Students should draw the microorganism and label its cell parts.

# Micro-Monsters! Exploring Microscopic Life in a Pond

Organism 1: Draw what you see in the space below!



I'm a \_\_\_\_\_!

What do you think it is? Use the pond identification chart to label your organism.

Research Questions:

1. What do I eat? What eats me? \_\_\_\_\_  
\_\_\_\_\_
2. Am I a producer, a consumer, or a decomposer? How do you know?  
\_\_\_\_\_  
\_\_\_\_\_
3. How do I move?  
\_\_\_\_\_  
\_\_\_\_\_
4. What adaptations help me survive in the pond? \_\_\_\_\_  
\_\_\_\_\_

Organism 2: Draw what you see in the space below!



I'm a \_\_\_\_\_!

What do you think it is? Use the pond identification chart to label your organism.

Research Questions:

1. What do I eat? What eats me? \_\_\_\_\_

\_\_\_\_\_

2. Am I a producer, a consumer, or a decomposer? How do you know?

\_\_\_\_\_

\_\_\_\_\_

3. How do I move?

\_\_\_\_\_

\_\_\_\_\_

What adaptations help me survive in the pond? \_\_\_\_\_

\_\_\_\_\_

### Pond Life Identification Chart






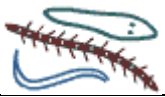




Group	Image	Characteristics
Bacteria		single celled, dots or strands, just visible with strongest magnification, cyanobacteria are larger
Protozoa		single celled, with tiny hairs or pseudopodia
Algae		single celled, mostly green, sometimes yellow-brown
Rotifers		wheel-like, hairy appendages, transparent, free swimming or attached 0.2 - 1 mm
Gastrotichs		two tails, hairy, round mouth opening 0.1 - 0.5 mm
Worms		long thin body, many non related forms
Bryozoa		plant-like or jelly-like colony, crown of tentacles individuals: 0.25 - 5 mm
Hydra		green brown or colourless, body and tentacles contract and stretch extended: 20 mm
Water Bears		8 stumpy legs, slow moving <1 mm
Arthropods		jointed limbs; many groups e.g. crustaceans ('water fleas'), mites

Chart adapted from Micscape Magazine, November 2000, at  
<http://www.microscopy-uk.org.uk/index.html>?<http://www.microscopy-uk.org.uk/ponddip/index.html>

## Parts of a Monocular Microscope

$O_c$ -Ocular lens(10x)  
 $O_t$ -Ocular tube  
 $O_b$ -Objective lenses  
     Red-4x  
     Yellow-10x  
     Blue-40x  
 S-Stage w/clips  
 D-Diaphragm  
 $F_c$ -Coarse focus  
 $F_f$ -Fine focus  
 L-Understage light  
 $S_w$ -Light switch(off/on)  
 P-Power cord

1. Rotate ocular lens to position pointer in field of view.
2. Ocular tube swivels 360 degrees.
3. Diaphragm wheel rotates larger openings (1-5).
4. Stage moves vertically to focus.
5. Objective turret positions lenses.
6. Ocular power times objective power = magnification.  
(10x4=40)  
Use lowest possible to ID object.

