

Protists

Wherever you find water, you will probably find one-celled organisms called protists. Although protists are unicellular, they each perform the same life functions as multicellular plants and animals. Protists use food to produce energy, exchange gases, get rid of wastes, respond to their environment, and reproduce. Some protists are motile. In this investigation, you will compare the structure, behavior, and methods of movement of representatives of three different protist phyla.

PRELAB

1. Read the instructions for the investigation and answer Prelab questions 1 through 6 on the Lab Report.
2. Label the structures in the diagrams of *Euglena*, *Amoeba*, and *Paramecium* on the Lab Report.

INVESTIGATION PROCEDURE

PART A: *Euglena*

1. Place a drop of *euglena* culture on a clean glass slide using the medicine dropper in the culture jar. Cover the drop with a coverslip.
2. Using the low-power objective of your microscope, locate some *euglena*. Move the slide so one *euglena* is in the center of the field. Switch to the high-power objective.
3. Observe the *euglena* for several minutes. Study its structure and note its color and shape. Watch how the *euglena* moves. Answer Investigation questions 1 through 5 of Part A on the Lab Report.
4. Draw a *euglena* as seen under high power. Label the end of the *euglena* that moves first with the word *front*.
5. Clean the slide and coverslip.

PART B: *Amoeba*

1. Take a drop from the bottom of the culture jar using the medicine dropper provided. Do not stir the culture. Using the low-power objective, scan the slide until you locate an *amoeba*.
2. Observe the *amoeba* under low power. Compare the structure of the live *amoeba* to the one you labeled in the Prelab section of the Lab Report.
3. Switch to the high-power objective and study how the *amoeba* moves. Answer Investigation questions 1 through 5 of Part B on the Lab Report.
4. Put the low-power objective back in position. Move the slide so that the *amoeba* is in the center of the field. Leave the slide on the stage for five minutes. After this time, observe the *amoeba*, noting its shape and location. Answer Investigation questions 6 and 7 of Part B on the Lab Report.
5. Clean the slide and coverslip.

OBJECTIVES

- ▢ Label the internal and external structures of *Euglena*, *Amoeba*, and *Paramecium*.
- ▢ Describe how each of the three representative protists obtain food.
- ▢ Describe the method of movement of each protist.
- ▢ Compare the structure and behavior of the three protists.
- ▢ Identify each of the protists as an autotroph or a heterotroph.

MATERIALS

cultures of *Amoeba*, *Paramecium*, and *Euglena*
methylcellulose solution
yeast-Congo red preparation
light microscope
microscope slide
coverslip
2 toothpicks

PART C: Paramecium

1. Place a drop of methylcellulose solution on a clean glass slide. Add a drop of paramecium culture and mix it with the methylcellulose using a toothpick. Cover with a coverslip.
2. Using the low-power objective, scan the slide until you find a paramecium. Observe its structure, size, shape, and method of movement. Answer Investigation questions 1 and 2 of Part C on the Lab Report.
3. Draw a paramecium as seen under high power in item 3 of Part C on the Lab Report. Label the end of the paramecium that moves first with the word *front*.
4. Prepare another slide of methylcellulose and paramecium culture. Dip the end of a toothpick into the yeast-Congo red preparation supplied by your teacher and then dip that same end into the drop on your microscope slide. Cover with a coverslip.
5. With the low-power objective, examine this slide under your microscope. Locate and observe a paramecium feeding on the yeast cells. Answer Investigation question 4 of Part C on the Lab Report.
6. Clean your slide and coverslip. Complete the *Protist Comparison* chart on the Lab Report.
7. Before leaving the laboratory, wash your hands thoroughly with soap and water.

INDEPENDENT INVESTIGATIONS



CAUTION: Learn about the appropriate safety measures needed for your independent work. Make a list of these procedures. Discuss this list with your teacher before beginning your investigation. Never work without teacher supervision.

1. Obtain the name of a biological supply house from your teacher and order some mixed cultures of protists, containing flagellates, sarcodines, and ciliates. Observe and draw all the different kinds of protists that you find in each culture. Use reference books to try and identify each protist.
2. Obtain prepared slides of paramecium conjugation from a biological supply house. Observe and draw the stages of conjugation in the order in which they occur. Find out what conditions are required for paramecia to reproduce by this method.
3. Obtain a sample of pond water to find out what kind of protists it contains. If pond water is not available, take some water from the filter of a freshwater aquarium that has been operating for at least a couple of months. Be sure your sample includes water from both the bottom and the surface of the pond. Prepare slides from your pond water sample and observe them under the microscope using both low- and high-power objectives. Draw any organisms you see. Using reference books, try to identify as many organisms as you can. NOTE: Protists will not be the only organisms you will see. You will also find bacteria, algae, larval stages of insects, and invertebrates.
4. What happens to euglena if they are deprived of sunlight? Design and perform a controlled experiment to help you answer this question. Begin by forming a hypothesis. Use your results to develop a conclusion that confirms or disproves your hypothesis.

Protists

NAME _____

CLASS _____ DATE _____

PRELAB QUESTIONS

1. What is a protist? _____

2. Define autotroph. _____

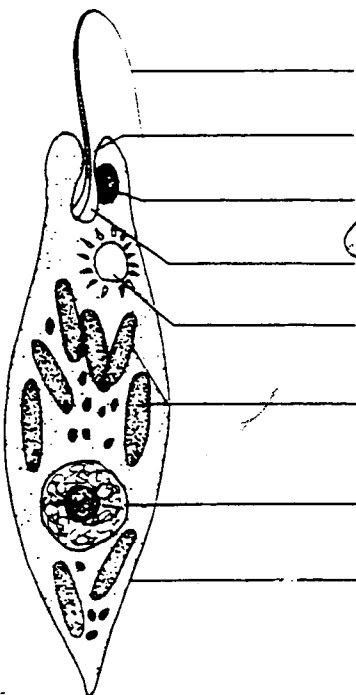
3. Define heterotroph. _____

4. Why is the low-power objective used to scan a slide rather than the high-power objective? _____

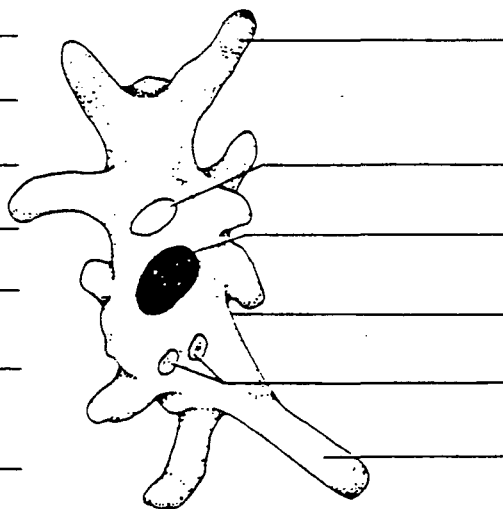
5. Methylcellulose is a viscous, or thick, liquid. What do you think is the function of the methylcellulose solution used in the Investigation Procedure? _____

6. The methylcellulose solution is only used with the paramecium. From this information, what can you infer about the amoeba and the euglena? _____

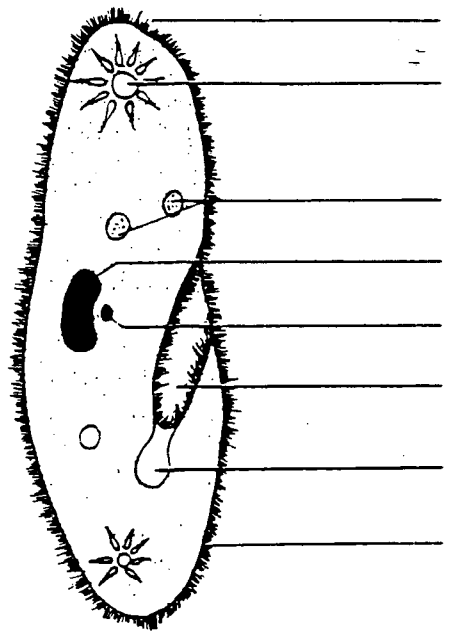
7. Euglena



8. Amoeba



9. Paramecium



INVESTIGATION

OBSERVATIONS AND DATA

PART A: Euglena

1. Describe the general shape of the euglena. _____

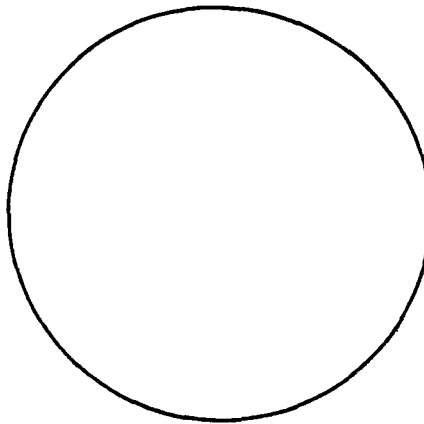
2. Describe the color of the euglena. Explain why it has this color. _____

3. How does the euglena obtain its food? _____

4. What is the function of the eyespot in the euglena? _____

5. The euglena can move by two methods. Describe each method of movement. _____

6. Euglena under High Power



_____ X

PART B: Amoeba

1. Describe the amoeba's shape and color. _____

2. How does the amoeba take in food? _____

3. How does the amoeba move? _____

4. Based on your observations, describe how pseudopods are formed. _____

5. Is there a particular side of the amoeba that is always the front of the organism? Explain. _____

6. After five minutes, is the amoeba still in the field? Is it still the same shape? _____

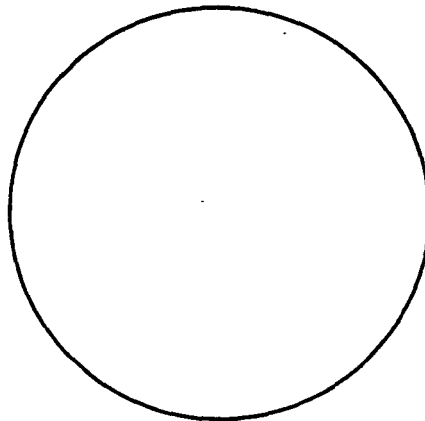
7. Why do you think the amoeba responded the way it did? _____

PART C: Paramecium

1. Describe the shape and color of the paramecium. _____

2. Explain how the paramecium moves. _____

3. Paramecium under High Power



_____ X

4. Describe how the paramecium takes in food. _____

5. Protist Comparison Chart

Protist	Phylum	Autotroph	Shape	Relative Size	Method of Movement	Method of Food-Getting
		Heterotroph				
Euglena						
Amoeba						
Paramecium						

ANALYSIS AND CONCLUSIONS

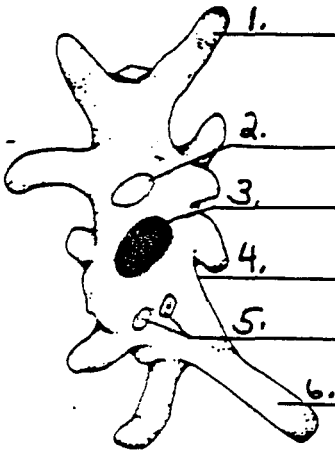
1. Which of the three protists are autotrophs? Which are heterotrophs? Explain your answers. _____

2. Of the three protists, the only one with a sensory structure is euglena. Why is this structure so important to this protist? _____

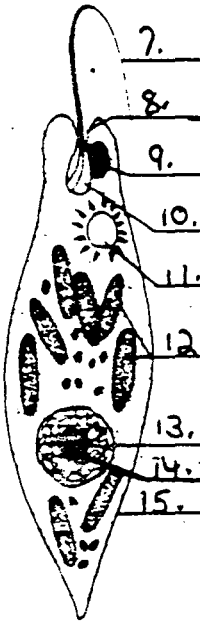
STRUCTURE

FUNCTION

Amoeba



Euglena



Paramecium

