

## Live Protists Lab

### Introduction:

Kingdom Protista includes algal protists, animal-like protists, & fungal protists. Protists are often thought of as simple organisms, but closer examination reveals that they possess a variety of specialized structures. They are eukaryotic, which means they have a nucleus enclosed in a membrane. Protists also possess other organelles that perform different functions. Though most protists are one-celled organisms, a few are multicellular. The organisms that make up protists are diverse, with the kingdom as a whole lacking unifying characteristics. Protozoans vary in size & shape & in specialized structures used for locomotion. The way a protozoan moves is a key factor in its classification. Protozoans also vary in structures used for nutrition. Some make their own food whereas others must take in nourishment from their nourishment. In this lab you will observe the shapes, sizes, movement, & feeding of various protozoans. Protozoans live in a variety of habitats. Many are found in freshwater ponds. In their watery world they compete with each other for available resources. Like multicellular organisms, protists have become specialized in order to compete successfully with their neighbors. Some protists are autotrophic & depend on light to enable them to carry out photosynthesis. Others are heterotrophs, depending on autotrophs for food. Some protists are predators & feed upon prey. Still others are cannibalistic, & feed on members of their own species.

### Objectives:

*Prepare slides of live protozoans for observation*

*Recognize & draw various protists while viewing them under the microscope*

*Identify & label the major organelles found in some common protists*

*Describe & record observations regarding the responses of some protists to light & food*

*Classify some protist organisms by their type of locomotion*

*Identify the structures of a paramecium used for locomotion & by which a paramecium ingests & digests food*

*Observe & describe how a paramecium responds to its environment*

### Materials:

Prepared slides of: Amoeba proteus, Paramecium, Euglena, Volvox, Stentor & Spirostomum

Live cultures of: Amoeba proteus, Paramecium, Euglena, Volvox, Stentor & Spirostomum

Labeled micropipettes for organism transfer.

microscope slides & cover slips – try depression slides?

grease pencils or markers

compound light microscope

cotton ball

flashlight

toothpick

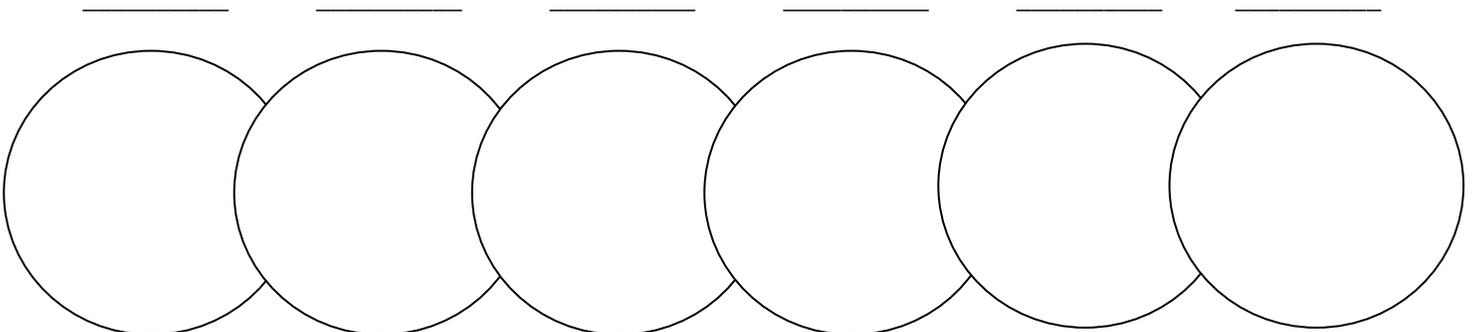
Index card

methyl cellulose or “Detain”

### **Before You Start: SAFETY WARNING!**

**In this lab, the organisms you will use are alive. Treat all solutions containing protozoans as if they were hazardous. Wash hands thoroughly when lab is complete. Dispose of all materials according to instructions.**

### **Pre-Lab – Practice looking at what you will see with prepared slides:**



### Part A: Amoeba proteus

Label a clean slide with the name "Ameba."

Pipette a drop of the Ameba culture onto the slide.

Observe the organism under low power & low light using the microscope. Move the slide back & forth to search for the organism. Amebas are somewhat transparent & very irregular in shape.

Then try high power.

→ALWAYS WATCH FROM THE SIDE WHEN SWITCHING FROM LOW TO HIGH POWER SO THAT THE OBJECTIVE DOES NOT COME IN CONTACT WITH THE SLIDE!

Observe the organisms closely for several minutes.

Locate the Ameba's two kinds of cytoplasm: **endoplasm**, a clear outer layer near the cell membrane; & **ectoplasm**, the granular interior cytoplasm that contains organelles.

Notice the movement of the Ameba's cytoplasm. Classified as a sarcodine, the Ameba moves with **pseudopodia** (false feet), or cell extensions.

Observe the organelles such as the **nucleus or nuclei** & the **contractile vacuole**.

\*Draw what you see in the space provided.

\*Label the parts of the organism described in bold that you observe using your "Popular Protists" diagrams or coloring pages as a guide.

Record your observations of the organism's shape, size & locomotion in the data table.

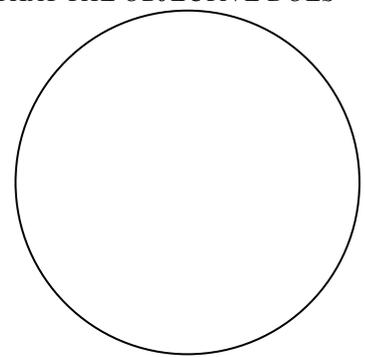
\*Shine a light on one side of the slide. Record any movement of the Ameba: \_\_\_\_\_

Carefully remove the coverslip from the slide & add a drop of Stentor culture. Mix the two cultures with a toothpick & replace the coverslip.

Observe the Ameba as it eats the Stentor. Notice the **food vacuole**, which is an organelle that digests food.

\*Does the Ameba retain a constant shape? Explain: \_\_\_\_\_

\*Describe what happens when the Ameba meets some food: \_\_\_\_\_



### Part B: Flagellates - Euglena

Label a clean regular slide with the name Euglena.

Prepare the slide of the Euglena as you did for the Ameba.

Observe the organism under low power using the microscope, then try high power.

Distinguish the anterior end from the posterior end of the organism.

Note the **chloroplasts**, which enable Euglena to make their own food

Locate the Euglena's outer covering, or **pellicle**. This pellicle allows the Euglena to change its shape & move. Notice the **two flagella**, or taillike structures. The longest flagellum helps the organism to move. Find the flask-shaped groove called the **reservoir** where the flagella are attached.

Find the **contractile vacuole**, which collects extra water & discharges it from the cell. Locate the **nucleus**.

Locate the **eyespot**, which is sensitive to light.

\*Draw what you see in the space provided.

\*Label the parts of the organism described in bold that you observe using your "Popular Protists" diagrams or coloring pages as a guide.

Record your observations of the organism's shape, size & locomotion in the data table.

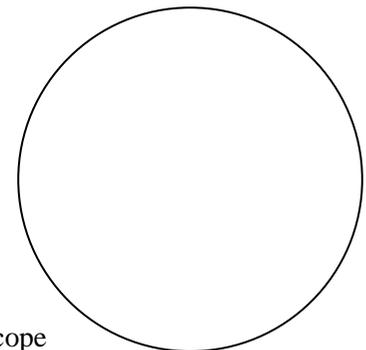
\*Observe the color of Euglena. Record your observations: \_\_\_\_\_

Trace the outline of a microscope slide onto an index card. Using scissors cut out the outline. In the center of the cut-out piece of the index card, cut a slit about 2 cm wide

Place the index card under the slide so that the slit is placed over the opening of the microscope stage.

Observe the organisms that are visible through the slit. Wait about 30 seconds, then quickly remove the index card.

\*Where did you find the Euglena after moving the index card? \_\_\_\_\_



\*What can you infer from the color & movement of Euglena about its method of obtaining nutrition? \_\_\_\_\_

\*How do the red eyespot & chloroplasts work together to help Euglena survive? \_\_\_\_\_

\*What characteristics of an animal does Euglena possess? \_\_\_\_\_

**Part C: Ciliates – Paramecium**

Label a clean regular slide with the name paramecium.

Prepare the slide using a drop of paramecium culture - add a drop of “Detain” to slow the organisms, place a few cotton fibers over this mixture & cover the culture with a coverslip.

Observe under low power – look for the slipper shaped paramecia that are relatively motionless or trapped near the cotton fiber – switch to high power & low light setting which will allow better contrast for observing the organelles.

Observe one paramecium for a few minutes.

\*Describe the motion as it moves about the microscope field:

\_\_\_\_\_

\*How does the paramecium react when it bumps into a cotton fiber?

\_\_\_\_\_

\*Draw what you see in the space provided – indicate which end is anterior or posterior

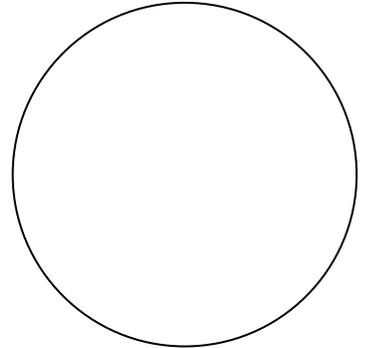
\*Label the parts of the organism that you observe using your “Popular Protists” diagrams or coloring pages as a guide.

Look for hairlike structures on the outer edge of the organisms. These are called cilia.

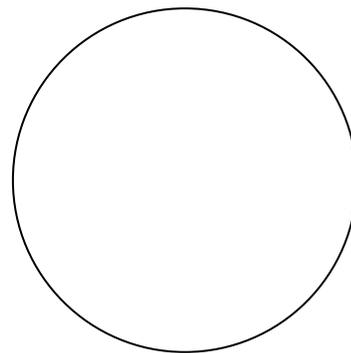
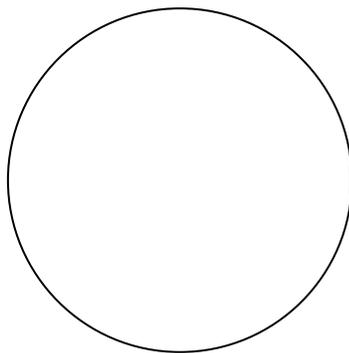
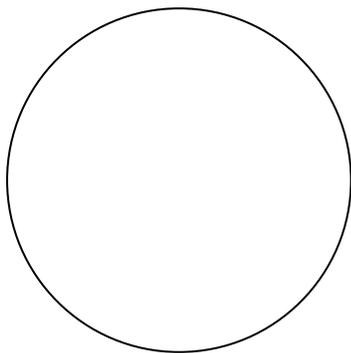
\*Describe the movement of the cilia on the paramecium: \_\_\_\_\_

\*What is the function of cilia? \_\_\_\_\_

\*Are the cilia located only on the visible perimeter of the organism? \_\_\_\_\_



**Part D: More Protists – Volvox, Stentor & Spirostomum (draw them)**



**Analysis & Conclusion:**

1. Explain why using the high-power lens of your microscope would not be helpful in observing the overall structures of many of the protists observed. \_\_\_\_\_

2. Identify the organisms that appear to have a front & rear end. On which observations did you base your answer? \_\_\_\_\_

3. From your observations of Paramecium, how would you describe the movement of cilia? \_\_\_\_\_

4. What did you observe about the movement of amoeba that is different from other protists you observed? \_\_\_\_\_

DATA TABLE

	Ameba	Euglena	Paramecium
Relative Size			
Shape			
Relative Speed			
Structures for Movement			
Description of Movement			
Method of food-getting			
Other Observations			