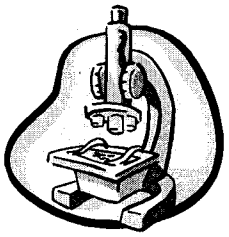
Name _____
Date _____ Period _____



Microscope Lab

Objectives:
To learn the parts of the microscope.
To find specimens using low and high power.
To make a wet mount.
To view your own human cheek cells under the microscope.
To compare plant and animal cells.

Procedure: **Letter "e"**

1. Cut out the letter "e" and place it on the slide face up.
2. Add a drop of water to the slide.
3. Place the cover slip on top of the "e" and drop of water at a 45-degree angle and lower. Draw what is on the slide in **Figure 1**.

Figure 1 **Figure 2**

4. Place the slide on the stage and view in low power (4x). Center the "e" in your field of view. Draw what you see in **Figure 2**.
5. Move the slide to the left, what happens? _____

- Move the slide to the right, what happens? _____
- Move the slide up, what happens? _____
- Move the slide down? _____

6. View the specimen in high power (10x). Use the fine adjustment **only** to focus. Draw what you see in **Figure 3**.

Name _____

Date _____ Period _____

7. View the specimen in high power (40x). Use the fine adjustment only to focus. Draw what you see in **Figure 4.**

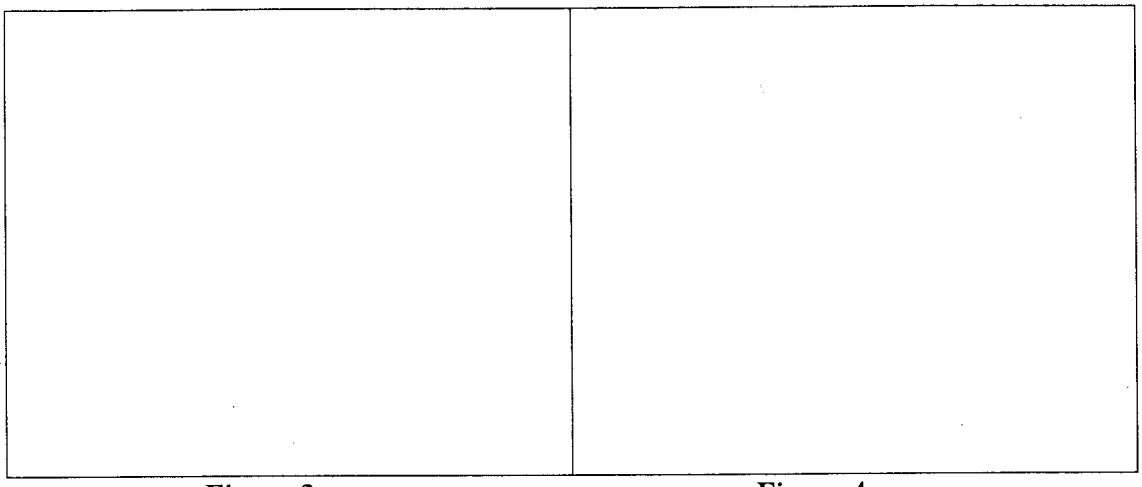


Figure 3 **Figure 4**

Analysis:

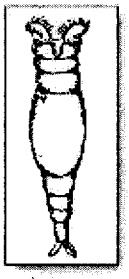
1. How does the letter "e" as seen through the microscope differ from the way an "e" normally appears?

2. How does the ink appear under the microscope compared to normal view?

3. Why does a specimen placed under the microscope have to be thin?

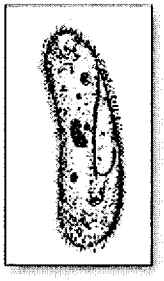
Name: _____ **Date:** _____ **Period:** _____

Pond Water Lab

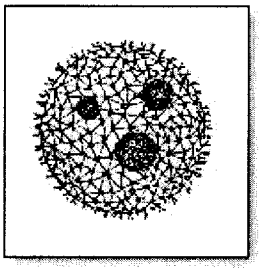


Introduction:

Why Study Pond Microlife?
Right, what are all those little things really good for? Well, for one thing, without bacteria no fish, no frogs, no birds, no pretty pond lilies, cat tails, or sedges would survive. Bacteria are essential because they break down dead organic material, allowing raw materials once locked up in animal and plant bodies to recycle through the pond community. The bacteria themselves, become food for protozoans such as *Paramecium* and *Vorticella* , and these organisms, in turn, feed the insects, crustaceans, and baby fish, building up food chains and creating a pond community. The green and yellow algae (diatoms) are examples of microscopic producers that convert solar energy into complex molecules that can be passed on to consumers. The same principles apply to a forest, grassland, or ocean. The simple fact is that microorganisms create the ecological foundation for life on planet earth — a foundation that supports humans and all of life!



Protists, Single Cells That Do It All
An amazing world exists just beyond the naked eye. Pond water is one place to investigate this landscape of single cells that behave as independent organisms. Biologists have named this group protists. Protists have both animal-like and plant-like characteristics.

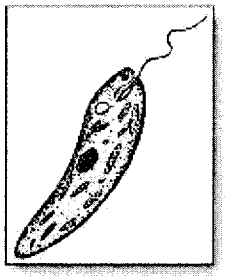


Stepping Stones
Protist were around long before plants and animals appeared. Fossil protists have been found in rocks dated at more than 1.8 billion years old. In fact, your local pond is a very good place to find protists very similar to those that started the lines of multicellular life — and these organisms seem relatively unchanged from that ancient time. The transition from single cell life to multicellular life is one of the most fascinating questions of modern biology. This step is exemplified by the colonial alga *Volvox*. All animal life is now thought to have evolved from a simple colonial organism that lived over 700 million years ago.

Ancient Branching of the Tree Of Life
Protists represent some of the most diverse branches in the tree of life. The evolutionary branch leading to *Closterium* may have split from the yellow pigmented diatoms as far back as two billion years ago. The line leading to ciliated protists such as *Blepharisma* or *Stentor* probably branched even earlier. Although amoebas share the characteristics that their cell membrane is flexible, there is even a great diversity among this protist group. Evidence from molecular biology studies shows that some amoebas are much more closely related to *Euglena* than they are to the classic textbook amoeba, *Amoeba proteus*. Compared to these diverse lines of protist life, we animals are actually more closely related to our cousins, the fungi!

Have a Look at How Life Works
Single-celled pond life gives us a unique chance to study the processes of life right in the living cell! A close study of *Paramecium* with a microscope allows for the observation of phagocytosis, digestion, water balance, ciliary action, cell excretion and a variety of responses to stimuli..

Four common groups of protozoa - from Greek: proto (first), zoa (animals)
Listed below are four common groups of protozoa that you may see during this lab.
1. Ciliates – single celled, free swimming, smooth and well coordinated. Usually covered with many small hair-like projections – cilia.
2. Flagellates – single celled, jerky free swimmers. Have one or two longer hair-like projections – flagella.
3. Amoeboids – move by streaming their cytoplasm.
4. Sporozoans – parasitic protozoa that spend most or all of their life cycles in a host organism.



Plant-like protists
Algae – single celled, but may form groups, green in color, often in filaments. Does not swim or move

So much more!
There is so much more to see in a single drop of pond water! This lab is just an introduction to the amazing world of protozoa and other microscopic and macroscopic organisms that can be found in ponds, lakes, and streams.

Remember to be careful with the microscopes and follow all directions. Always start and end with the low power and use the course adjustment only under low power!

Procedure (Make all drawings on the drawings page!):

1) Carefully observe the pond water sample in the collection jar. Look for movement and any green organisms. Organisms that are green contain the pigment chlorophyll and are probably algae.

2) Following the teachers directions, use the pipette to collect water from the sample jar and make a slide. ***Observe your slide under low power***. Using your colored pencils, ***sketch in detail*** what you see.

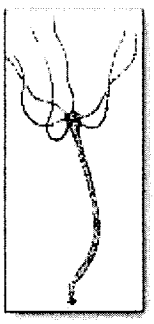
3) ***When directed by the teacher, switch to medium power and observe your slide***. Remember to use only the fine adjustment to focus under medium and high powers. Using your colored pencils, ***sketch in detail*** what you see.

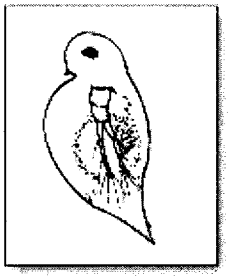
4) ***When directed by the teacher, switch to high power***. Remember to use only the fine adjustment under medium and high powers. Using your colored pencils, ***sketch in detail*** what you see. Also, if you lose or are unable to focus, you must switch back to low power and refocus. Always begin with low power, then medium power, and lastly high power. **Never begin with medium or high power!**

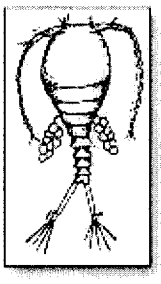
5) Focus on one type of algae, identify and make a ***detailed sketch*** of it. Make sure to include any structures and organelles that you see. You can use medium or high power – remember to follow correct procedure.

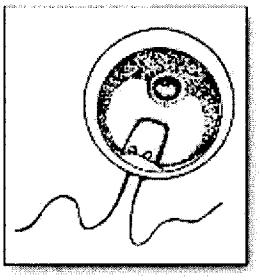
6) Focus on a single celled animal like organism, identify it and make a ***detailed sketch*** of the organism. Make sure to include any structures, internal and external, that you see. You can use medium or high power – remember to follow correct procedure.

7) Describe how the organism that you observed in #6 above moved. ***Be detailed in your description***. Include any structures that the organism has and describe its movement (straight line, spins, etc.).









Name: _____ **Date:** _____ **Period:** _____

Drawings Page – Use colored pencils to draw the organism(s) that you are viewing under the microscope. ***You must SHOW DETAIL!*** Use as much of the rectangle as you can for each drawing (do not draw a circle in the rectangle and then draw the organisms in the circle). At the bottom of each rectangle identify the organism(s) that you see.

1. Low Power	**2. Medium Power**
3. High Power	**4. Algae**
5. Animal-like organism	**6. One other organism of your choice!**

Draw any organism that you saw that is not in the above table.

Analysis and Conclusions

1. How many different microorganisms did you discover? _____

2. Which kind of microorganism had the highest population?(refer to your drawings) _____

3. What do you think microorganisms eat? _____

4. Do you think there is any competition between microorganisms for food? _____

5. What does decompose mean? _____

6. How many cells make up a paramecium and an amoeba? _____

7. Humans have cells that differentiate and become specialized. Does this same process occur in a paramecium or an amoeba? _____

8. Explain what cell differentiation means. _____
_____
_____
_____

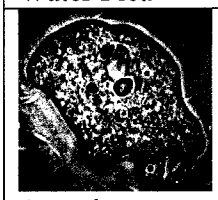
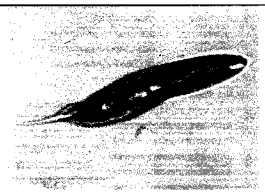
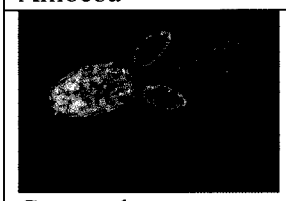
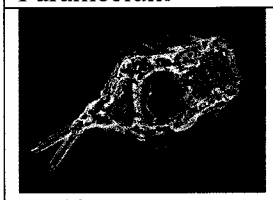
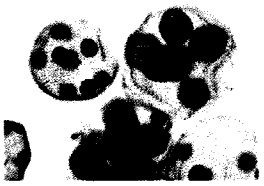
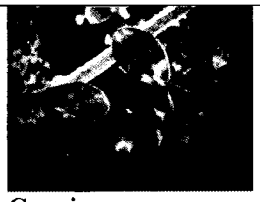
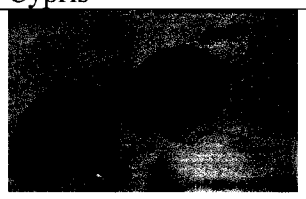
9. Look closely inside the rotifer cell. Are organelles present? _____

10. What structures do you see inside the water flea that are similar to human organs? _____
_____
_____

LAB Pond Water Organisms

Last Name _____, First _____ per___

Microscopic photos of microorganisms found in pond water. Draw each organism found.

Microorganism	Drawing	Microorganism	Drawing
 Water Flea		 Stentor	
 Amoeba		 Euglena	
 Copepod		 Hydra	
 Paramecium		 Philodena	
 Rotifer		 Volvox	
 Spirogyra		 Cypris	
 Diatoms		 Ostrocods	