

Name _____ Date _____ Period _____

USING A COMPOUND MICROSCOPE

PURPOSE:

In this investigation, you will learn how compound microscopes function by completing various activities. You will also learn how plant cells respond to different types of solutions.

HYPOTHESES:

1. If *Elodea* leaves are placed in fresh water, then the cells will _____.
2. If *Elodea* leaves are placed in salt water, then the cells will _____.
3. If *Elodea* leaves are placed in sugar water, then the cells will _____.

WORD BANK FOR HYPOTHESES: shrink / expand / stay the same size

MATERIALS:

- compound microscope
- 4 microscope slides
- 4 coverslips
- small square of newspaper
- distilled water with dropper pipette
- prepared slide of crossed fibers
- clear plastic ruler
- prepared slide of *Allium* root tip cells
- prepared slide of a hydra
- 2 prepared slides of animal cells
- 3 *Elodea* leaves
- 1 M salt solution with dropper pipette
- 1 M sugar solution with dropper pipette
- permanent marker
- paper towels

PROCEDURE:

1. Prepare a microscope slide: Place a small square of newspaper in the center of the microscope slide. Add a few drops of water. Place the coverslip on top. Use a paper towel to remove any excess water.
2. Place the slide on the microscope and secure it using the stage clips. Make sure that the letters of the newspaper are facing you (so that you can read them) when it is on the microscope. Use the low-power objective to bring the letters on the paper square of newspaper into focus.
3. Locate a lowercase “e” and **take a photo** of it. Record two qualitative observations about how the “e” looks different under the microscope. Do not write things like “it looks bigger”, “I can see fibers”, etc. Specifically write observations about how the letter looks different.

2 Qualitative Observations:

4. Observe a prepared slide of crossed fibers through the low-power objective. Use the fine adjustment knob to focus up and down through the area where the fibers cross. **Take a photo** of that area. Record the order of the fibers, from top to bottom.

Order of the Crossed Fibers, From Top to Bottom:

5. Observe a transparent ruler through the low-power objective. Use the ruler to determine the diameter (in millimeters) of your field of view as precisely as you can. Round your answer to the nearest 0.5 mm. HINT: Line up any one of the millimeter lines on the left-hand edge of the field of view. **Take a photo** of the field of view.

Diameter of the Field of View:

6. Examine a prepared slide of *Allium* root tip cells. Focus the cells at low power. **Take a photo** of the field of view and record 2 qualitative observations. Next, focus the cells using the medium-power objective. Make sure your image is centered. Finally, switch to the high-power objective and focus the cells again. **Take a photo** of the field of view at high power and record 2 additional qualitative observations.

2 Qualitative Observations at Low Power:

2 Qualitative Observations at High Power:

7. Repeat step 6 using a prepared slide of a hydra.

2 Qualitative Observations at Low Power:

2 Qualitative Observations at High Power:

8. Prepare microscope slides by placing one *Elodea* leaf in the center of 3 different slides. On the first slide, add a few drops of distilled water. On the second slide, add a few drops of salt water. On the third slide, add a few drops of sugar water. Place a coverslip over each leaf. Wipe away any excess liquid. Label each slide using a permanent marker. Wait 10 minutes.
9. Repeat step 6 for each of the three *Elodea* leaf slides.

DISTILLED WATER	2 Qualitative Observations at Low Power:	2 Qualitative Observations at High Power:
SALT WATER	2 Qualitative Observations at Low Power:	2 Qualitative Observations at High Power:
SUGAR WATER	2 Qualitative Observations at Low Power:	2 Qualitative Observations at High Power:

10. Repeat step 6 using a prepared slide of an animal or animal cells.

2 Qualitative Observations at Low Power:	2 Qualitative Observations at High Power:
NAME OF ANIMAL OR ANIMAL CELLS:	

11. Repeat step 6 using a second prepared slide of an animal or animal cells.

2 Qualitative Observations at Low Power:	2 Qualitative Observations at High Power:
NAME OF ANIMAL OR ANIMAL CELLS:	

POST-LAB QUESTIONS:

1. What are the advantages of using the high-power objective?
2. What are the disadvantages of using the high-power objective?
3. In what direction did the image move if you moved the slide to the left? Cite data from the newspaper activity to support your claim.
4. In what direction did the image move if you moved the slide down? Cite data from the newspaper activity to support your claim.
5. Use the internet or your textbook to research the effect of distilled (fresh) water on plant cells. Does your evidence support this research? Explain your reasoning.
6. Use the internet or your textbook to research the effect of salt water on plant cells. Does your evidence support this research? Explain your reasoning.
7. Use the internet or your textbook to research the effect of sugar water on plant cells. Does your evidence support this research? Explain your reasoning.