

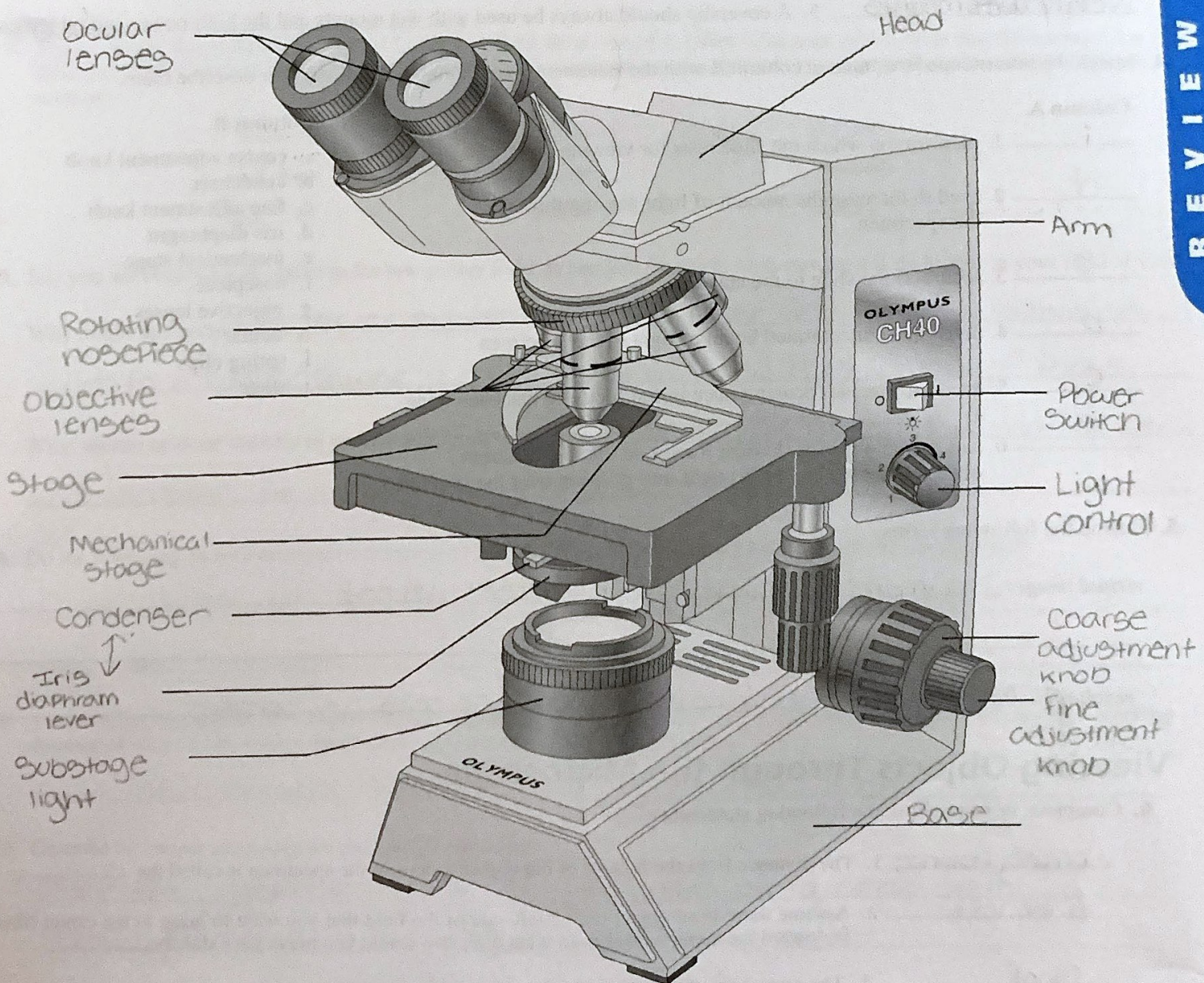
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Lab Time/Date \_\_\_\_\_

# The Microscope

## Care and Structure of the Compound Microscope

1. Label all indicated parts of the microscope.



2. Explain the proper technique for transporting the microscope.

Hold it in upright position with one hand on its arm and the other supporting its base.



3. The following statements are true or false. If true, write *T* on the answer blank. If false, correct the statement by writing on the blank the proper word or phrase to replace the one that is underlined.

- Grit-free lens paper 1. The microscope lens may be cleaned with any soft tissue.
- Lowest power 2. The microscope should be stored with the oil immersion lens in position over the stage.
- T 3. When beginning to focus, use the lowest-power lens.
- Away 4. When focusing, always focus toward the specimen.
- Only wet mounts 5. A coverslip should always be used with wet mounts and the high-power and oil lenses.

4. Match the microscope structures in column B with the statements in column A that identify or describe them.

**Column A**

- i 1. platform on which the slide rests for viewing
- d 2. used to increase the amount of light passing through the specimen
- e 3. secure(s) the slide to the stage
- b 4. delivers a concentrated beam of light to the specimen
- c 5. used for precise focusing once initial focusing has been done
- f 6. carries the objective lenses; rotates so that the different objective lenses can be brought into position over the specimen

**Column B**

- a. coarse adjustment knob
- b. condenser
- c. fine adjustment knob
- d. iris diaphragm
- e. mechanical stage
- f. nosepiece
- g. objective lenses
- h. ocular
- i. spring clips
- j. stage

5. Define the following terms.

virtual image: An image appearing to be where it's not.

resolution: Ability to discriminate two close objects as separate

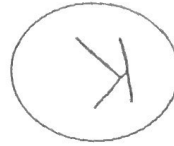
## Viewing Objects Through the Microscope

6. Complete, or respond to, the following statements:

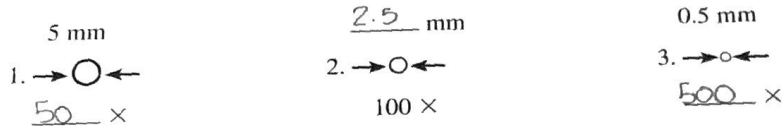
- Working distance 1. The distance from the bottom of the objective lens to the specimen is called the \_\_\_\_\_.
- to the left 2. Assume there is an object on the left side of the field that you want to bring to the center (that is, toward the apparent right). In what direction would you move your slide? \_\_\_\_\_
- field 3. The area of the specimen seen when looking through the microscope is the \_\_\_\_\_.
- 95 4. If a microscope has a 10× ocular and the total magnification at a particular time is 950×, the objective lens in use at that time is \_\_\_\_\_ ×.
- increases contrast 5. Why should the light be dimmed when looking at living (nearly transparent) cells?
- Parfocal 6. If, after focusing in low power, only the fine adjustment need be used to focus the specimen at the higher powers, the microscope is said to be \_\_\_\_\_.
- 0.75 7. If, when using a 10× ocular and a 15× objective, the field size is 1.5 mm, the approximate field size with a 30× objective is \_\_\_\_\_ mm.

0.4 8. If the size of the high-power field is 1.2 mm, an object that occupies approximately a third of that field has an estimated diameter of \_\_\_\_\_ mm.

7. You have been asked to prepare a slide with the letter *k* on it (as shown below). In the circle below, draw the *k* as seen in the low-power field.



8. Figure out the magnification of fields 1 and 3, and the field size of 2. (Hint: Use your ruler.) Note that the numbers for the field sizes below are too large to represent the typical compound microscope lens system, but the relationships depicted are accurate.



9. Say you are observing an object in the low-power field. When you switch to high-power, it is no longer in your field of view.

Why might this occur? In lower power there is a wider field of view. When you switch to a higher power it narrows your view and becomes out of focus.

What should be done initially to prevent this from happening? center the object you want to view and increase the magnification slowly.

10. Do the following factors increase or decrease as one moves to higher magnifications with the microscope?

resolution: Increase amount of light needed: Increase  
 working distance: Decrease depth of field: Decrease

11. A student has the high-dry lens in position and appears to be intently observing the specimen. The instructor, noting a working distance of about 1 cm, knows the student isn't actually seeing the specimen.

How so? The working distance is shorter than 1 cm.

12. Describe the proper procedure for preparing a wet mount.

Place the object in a drop of water/saline on a clean slide.

Carefully lower the coverslip over the water and object

13. Indicate the probable cause of the following situations arising during use of a microscope.

a. Only half of the field is illuminated: The light is blocked

b. Field does not change as mechanical stage is moved: Mechanical contact between the specimen and the objective lens.