NAME _____

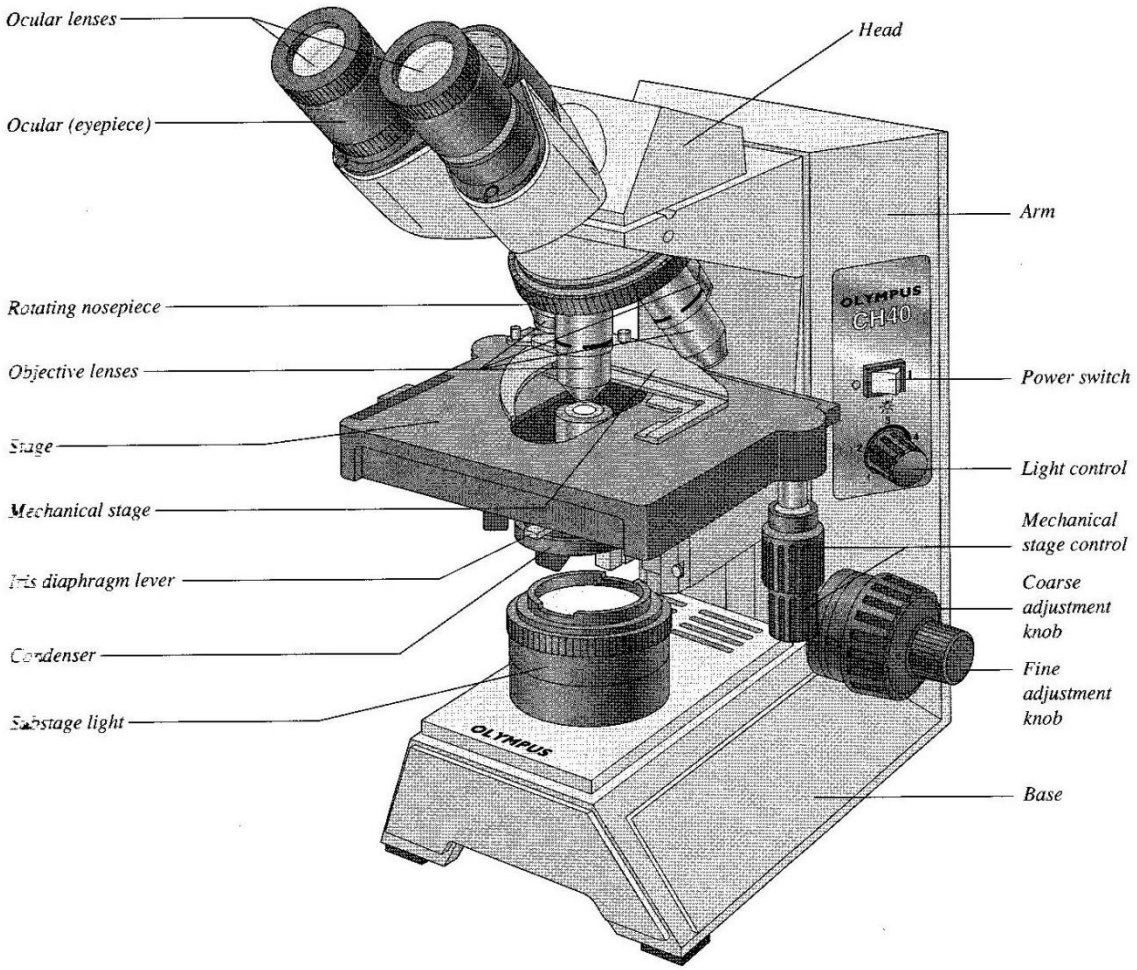
LAB TIME/DATE _____

REVIEW SHEET EXERCISE 3

The Microscope

Care and Structure of the Compound Microscope

1. Label all indicated parts of the microscope.



2. Determine whether each of the following statements is true or false. If it is true, write *T* on the answer blank. If it is false, correct the statement by writing on the blank the proper word or phrase to replace the one that is underlined.

with grit-free lens paper 1. The microscope lens may be cleaned <u>with any soft tissue</u>.

low-power or scanning 2. The microscope should be stored with the <u>oil immersion</u> lens in position over the stage.

T 3. When beginning to focus, the <u>lowest-power</u> lens should be used.

away from 4. When focusing, always focus <u>toward</u> the specimen.

T 5. A coverslip should always be used <u>with wet mounts and the high-power and oil lenses</u>.

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

	Column A	**Column B**
i	1. platform on which the slide rests for viewing	a. coarse adjustment knob
h	2. lens located at the superior end of the body tube	b. condenser
e	3. secure(s) the slide to the stage	c. fine adjustment knob
b	4. delivers a concentrated beam of light to the specimen	d. iris diaphragm
c	5. used for precise focusing once initial focusing has been done	e. mechanical stage or spring clips
f	6. carries the objective lenses; rotates so that the different objective lenses can be brought into position over the specimen	f. movable nosepiece
d	7. used to increase the amount of light passing through the specimen	g. objective lenses
		h. ocular
		i. stage

4. Explain the proper technique for transporting the microscope.

Carry with two hands—one supporting the base, the other holding the arm.

5. Define the following terms.

real image: *An image formed by the objective lens that is inverted, reversed from left to right, and larger than the object.*

resolution: *Ability to discriminate two closely situated 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 in use 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 _____×.

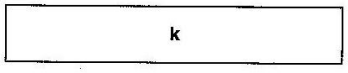
increases contrast 5. Why should the light be dimmed when looking at living (nearly transparent) cells?

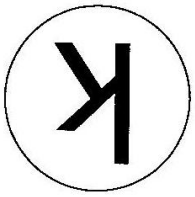
parfocal 6. If, after focusing in low power, only the fine adjustment need be used to focus the specimen at the higher powers, the microscope is said to be _____.

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

1. 5 mm → ○ ← *50*×

2. *2.5* mm → ○ ← 100×

3. 0.5 mm → · ← *500*×

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? *The field decreases proportionately as magnification increases. Therefore, unless the object is centered at low power, it might be outside the higher-power field.*

What should be done initially to prevent this from happening? *Center the object that you wish to view.*

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

resolution: *increases (to a point)* amount of light needed: *increases*

working distance: *decreases* depth of field: *decreases*

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 for the h.p. lens is closer to 1 mm.*

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

Place the specimen on the slide with a medicine dropper or place a drop of water or saline on the slide. Mix specimen into drop using a toothpick. If staining, add a drop of stain and mix with a toothpick. Hold a coverslip with forceps so that the coverslip touches one side of the specimen drop, and then ***slowly*** *and* ***carefully*** *lower the angled coverslip onto the specimen.*

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

a. Only half of the field is illuminated: *The lens is not correctly rotated into place.*

b. Field does not change as mechanical stage is moved: *The slide is not correctly positioned in the clamp on the mechanical stage and does not move when the mechanical stage moves.*