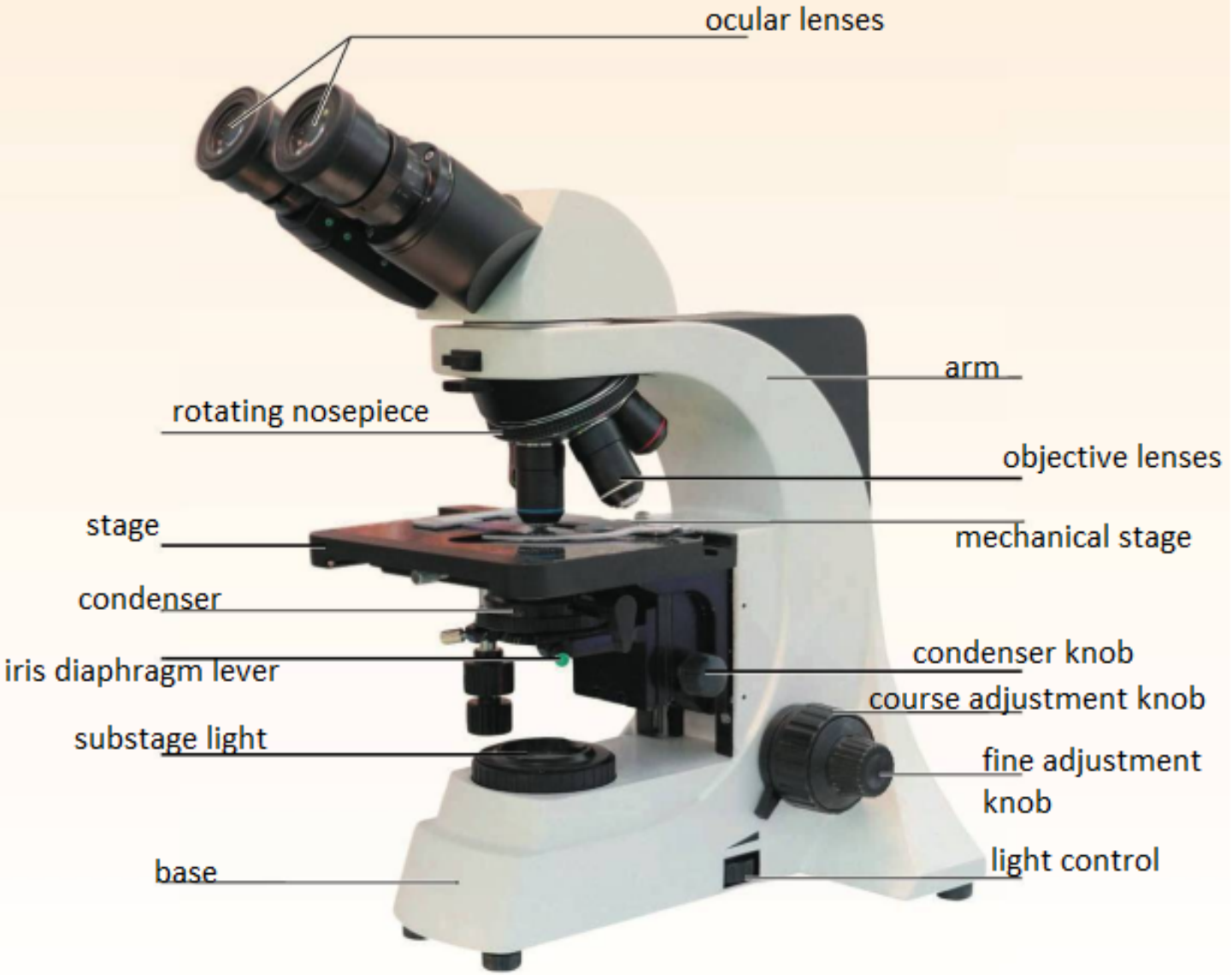
EXERCISE 3

The Microscope

Name Ayde Amir Lab Time/Date Wed. 6:00 - 8:30 pm

Care and Structure of the Compound Microscope

1. Label all indicated parts of the microscope.



2. Explain the proper technique for transporting the microscope.

_____

3. Each of the following statements is either 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.

false, grit-free lens paper 1. The microscope lens may be cleaned with any soft tissue.

false, lowest-power objective lens 2. The microscope should be stored with the oil immersion lens in position over the stage.

true 3. When beginning to focus, use the scanning objective lens.

false, fine 4. When focusing on high power, always use the coarse adjustment knob to focus.

true 5. A coverslip should always be used with wet mounts.

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

b 2. used to adjust the amount of light passing through the specimen

e 3. controls the movement of the slide on the stage

d 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 specimena.

Column B

a. coarse adjustment knob
b. condenser
c. fine adjustment knob
d. iris diaphragm lever
e. mechanical stage
f. nosepiece
g. objective lenses
h. ocular lens
i. stage

5. Define the following terms.

total magnification: equal to the power of the ocular lens multiplied by the power of objective lens

total magnification is the amount of magnification with all of the optics

resolution: the ability to discriminate two close objects as seprate (more light more resolution)

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 surface of the slide is called the _____.

to the right 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 slide seen when looking through the microscope is the _____.

95x 4. If a microscope has a 10× ocular lens and the total magnification is 950×, the objective lens in use at that time is _____ ×.

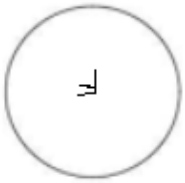
5. Why should the light be dimmed when looking at living (nearly transparent) cells?

6. If, after focusing in low power, you need to use only the fine adjustment to focus the specimen at the higher powers, the microscope is said to be parafocal / don't need to use coarse.

7. You are using a 10× ocular and a 15× objective, and the field diameter is 1.5 mm. The approximate field size with a 30× objective is 0.75 mm.

8. If the diameter of the low-power field is 1.5 mm, an object that occupies approximately a third of that field has an estimated diameter of 0.5 mm.

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



8. Estimate the length (longest dimension) of the object in µm:

Total magnification = 100×

Field diameter = 1.6 mm

Length of object = 533 µm

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? Moving to a higher power lens narrows the field of view, and the object could be outside of the new field of view if it was not perfectly centered under the lower powered lens.

What should you do initially to prevent this from happening? Center the object being viewed before switching to a higher powered lens.

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

resolution: increases within limits amount of light needed: increses

working distance: decreases depth of field: decreases

11. A student has the high-power 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 high-power lens should be much smaller - about 0.5 mm, so the whatever the student is observing is not in focus.

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

~~Place a drop of water or saline on a clean slide. Place the object/sample in the drop of~~ water. Hold a cover sip at a 45 degree angle at on side of the drop and slowly lower the coverslip.

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

a. Only half of the field is illuminated: something is blocking light path

b. The visible field does not change as the mechanical stage is moved: working distance too large

14. A blood smear is used to diagnose malaria. In patients with malaria, the protozoa can be found near and inside red blood cells. Explain why a microscope capable of high magnification and high resolution would be needed to diagnose malaria.

to protozoa is very small

15. Histopathology is the use of microscopes to view tissues to diagnose and track the progression of diseases. Why are thin slices of tissue ideal for this procedure? to observe individual cells and see what changes occured