

3 EXERCISE

REVIEW SHEET The Microscope

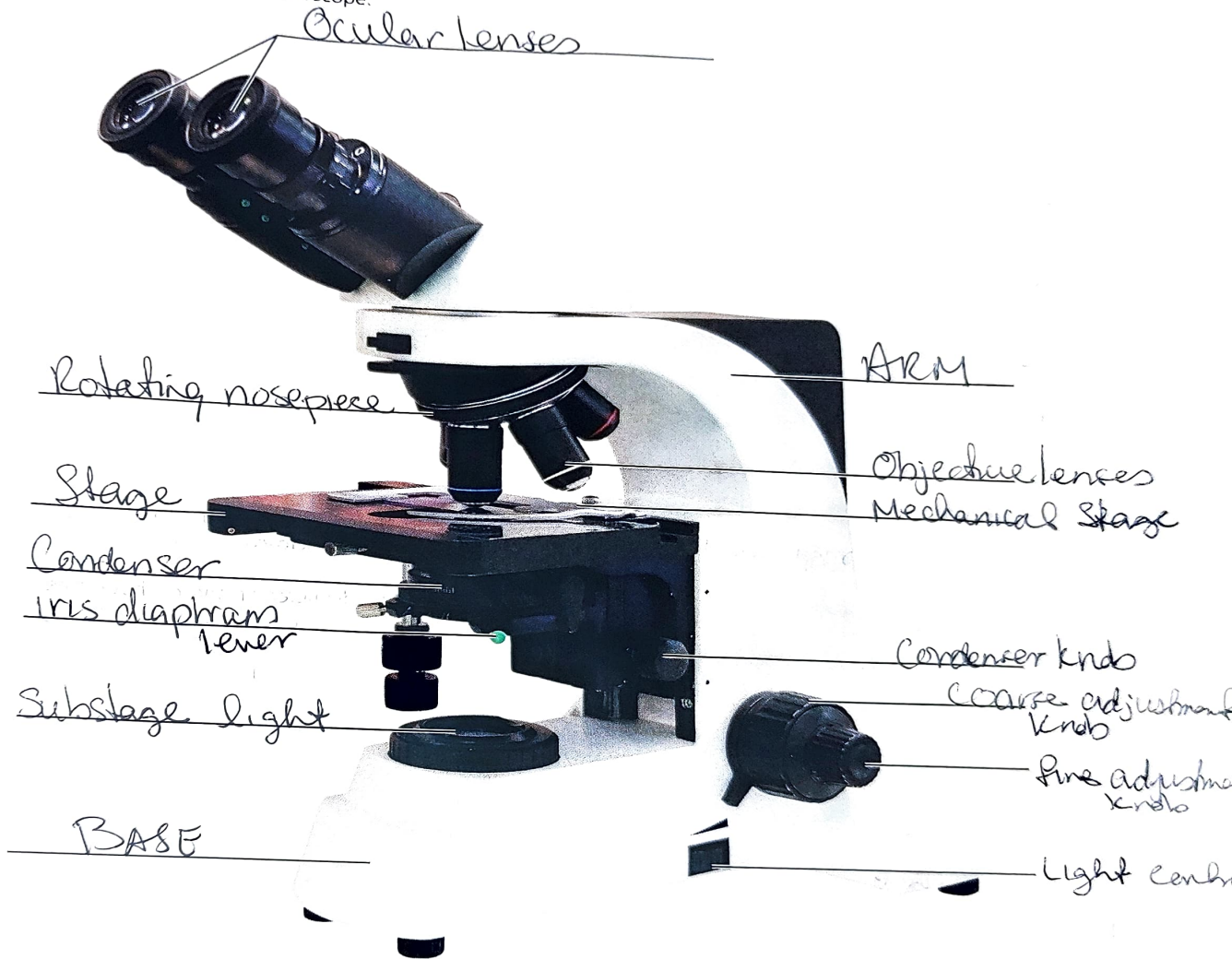
Instructors may assign a portion of the Review Sheet questions using Mastering A&P™

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Lab Time/Date Wed 6pMLAB

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 upright position, w/ one hand on arm & other supporting it base.

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.

Only a not free lens
paper

remove lens + rotate lens

True

only when objective lens

True

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 specimen.

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: Specimen being viewed is equal to the power of the power of the ocular lens multiplied by the power of the objective lens

resolution: ability to discriminate 2 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 surface of the slide is called

the _____.

Right 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 of view

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 _____ ×.

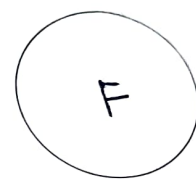
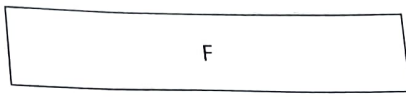
It increases the contrast

Parfocal

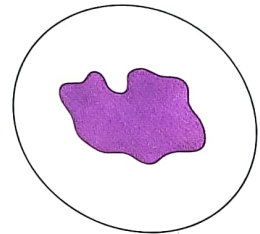
.75 mm

.4 mm

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 _____.
 7. You are using a 10x ocular and a 15x objective, and the field diameter is 1.5 mm. The approximate field size with a 30x objective is _____ 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 _____ 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 = 100x
 Field diameter = 1.6 mm
 Length of object = _____ 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? Occurs because in lower power you have a wide field of view + when you switch to higher power it narrows your view + it becomes out of focus which does not help.

What should you do initially to prevent this from happening? Center the object you want view as much as possible before switching to a higher power + increase 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-power lens in position and appears to be intently observing the specimen. The instructor, noting a distance of about 1 cm, knows the student isn't actually seeing the specimen.

How so? A high-Dry lens is high power, non-oil immersion lens. It would have shorter working distance than 1cm.

Describe the proper procedure for preparing a wet mount.

1) The object is placed in a drop of water or saline on a slide. 2) Cover-slip is held at a 45 degree angle w/ fingers. 3) It is lowered carefully over the water & the object.

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

a. Only half of the field is illuminated: Blockage in the light path

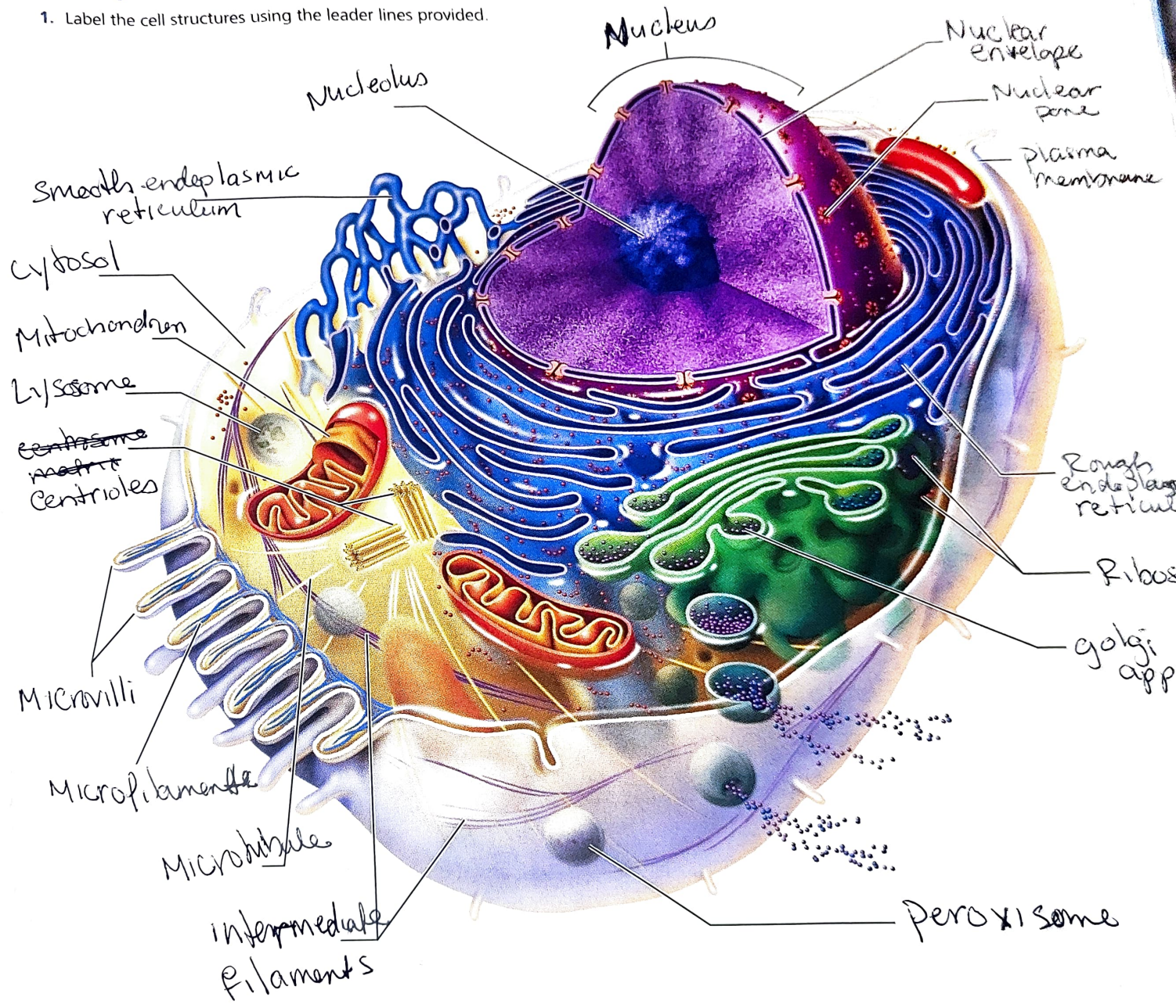
b. The visible field does not change as the mechanical stage is moved: Mechanical contact between the specimen & the objective lens.

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.

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?

Anatomy of the Composite Cell

1. Label the cell structures using the leader lines provided.



2. Match each cell structure listed on the left with the correct description on the right.

- | | | | |
|--------------|---------------------|--------------|---|
| F | 1. ribosome | a | main site of ATP synthesis |
| H | 2. smooth ER | b | encloses the chromatin |
| A | 3. mitochondrion | e | sac of digestive enzymes |
| B | 4. nucleus | d | examples include glycogen granules and ingested foreign materials |
| I | 5. Golgi apparatus | f | forms basal bodies and helps direct mitotic spindle formation |
| C | 6. lysosome | n | site of protein synthesis |
| E | 7. centriole | j | forms the external boundary of the cell |
| K | 8. cytoskeleton | k | site of lipid synthesis |
| D | 9. inclusion | i. | packaging site for ribosomes |
| G | 10. plasma membrane | h | packages proteins for transportation |
| J | 11. nucleolus | l | internal cellular network of rodlike structures |

Differences and Similarities in Cell Structure

3. Choose the specimen observed in Activity 5 (squamous epithelium, sperm cells, smooth muscle, or human red blood cells) that fits the description below.

- _____ cell has a flagellum for movement
- _____ cells have an elongated shape (tapered at each end)
- _____ cells are close together
- _____ cells are circular
- _____ cells are thin and flat, with irregular borders
- _____ cells are anucleate (without a nucleus)
- _____ longest cell

Cell Division

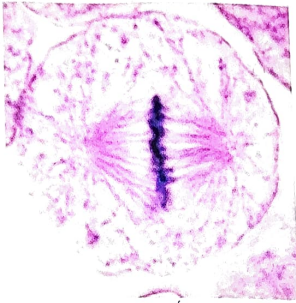
4. What is the function of mitotic cell division?

when the cell reproduces
itself by dividing

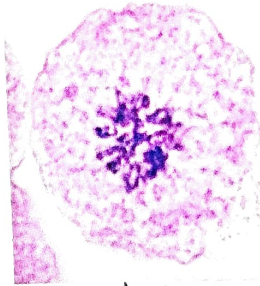
5. Identify the four phases of mitosis shown in the following photomicrographs, and select the events from the key that correctly identify each phase. On the appropriate answer line, write the letters that correspond to these events.

Key:

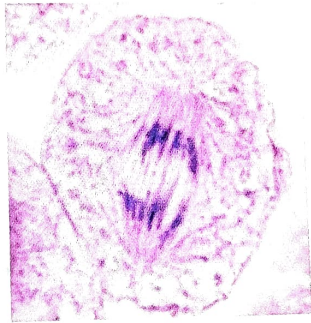
- a. The nuclear envelope re-forms.
- ~~b.~~ Chromosomes line up in the center of the cell.
- c. Chromatin coils and condenses, forming chromosomes.
- d. Chromosomes stop moving toward the poles.
- e. The chromosomes are V shaped.
- f. The nuclear envelope breaks down.
- ~~g.~~ Chromosomes attach to the spindle fibers.
- h. The mitotic spindle begins to form.



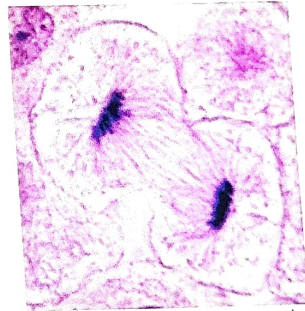
1. Phase: Metaphase
 Events: B



2. Phase: late Prophase
 Events: ~~B~~ G

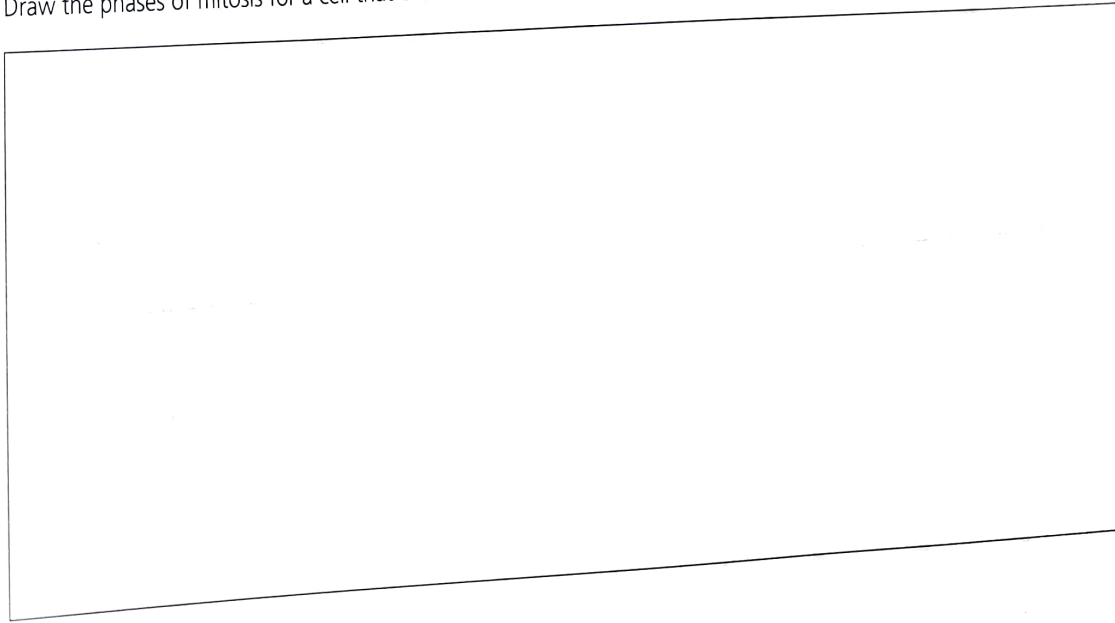


3. Phase: Anaphase
 Events: E



4. Phase: Telophase / cytokinesis
 Events: _____

6. Draw the phases of mitosis for a cell that contains four chromosomes as its diploid, or 2n, number.



7. Describe the events that occur during interphase.

Material is in form of Chromatin, nuclear envelope
 & one or more nucleoli are intact & visible

8. Complete or respond to the following statements:

Division of the 1 is referred to as mitosis. Cytokinesis is division of the 2. The major structural difference between chromatin and chromosomes is that the latter are 3. Chromosomes attach to the spindle fibers by undivided structures called 4. If a cell undergoes mitosis but not cytokinesis, the product is 5. The structure that acts as a scaffolding for chromosomal attachment and movement is called the 6. 7 is the period of cell life when the cell is not involved in division. Three cell populations in the body that do not routinely undergo cell division are 8, 9, and 10.

1. cell
2. cytoplasm
3. coiled/condensed
4. centromeres
5. a binucleate cell
6. spindle
7. interphase
8. Nerve cells
9. brain cells
10. cardiac muscle cells

9. **+** Plasma cells are key to the immune response because they secrete antibodies. Given that antibodies are made of protein, which membrane-enclosed cell organelle would you expect the plasma cells to have in abundance? Why? _____

10. **+** Name which organelle you would expect to play the largest role in decomposition of the human body. Why? _____

11. **+** Some antifungal medications work by blocking DNA synthesis in the fungal cell. Describe where in the cell cycle such a medication would halt the fungal cell and the consequences of this early termination of the cycle. _____