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

EXERCISE 3

REVIEW SHEET
The Microscope

Name Sahesha Walters Lab Time/Date _____

Care and Structure of the Compound Microscope

1. Label all indicated parts of the microscope.

2. Explain the proper technique for transporting the microscope.

When transporting hold in upright position.

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.

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

Scanning objective lens 2. The microscope should be stored with the oil immersion lens in position over the stage.

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

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

T 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		Column B
I	1. platform on which the slide rests for viewing	a. coarse adjustment knob
B	2. used to adjust the amount of light passing through the specimen	b. condenser
E	3. controls the movement of the slide on the stage	c. fine adjustment knob
D	4. delivers a concentrated beam of light to the specimen	d. iris diaphragm lever
C	5. used for precise focusing once initial focusing has been done	e. mechanical stage
F	6. carries the objective lenses; rotates so that the different objective lenses can be brought into position over the specimena.	f. nosepiece
		g. objective lenses
		h. ocular lens
		i. stage

5. Define the following terms.

total magnification: The total magnification of any specimen being viewed is equal to the power of the Power of the ocular lens multiplied by the power of the objective lens use.

resolution: The 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 surface of the slide is called 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 _____.

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

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

parfocal 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 _____.

0.75 mm 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 _____ mm.

1.5 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.

F

F

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

Total magnification = 100×

Field diameter = 1.6 mm

Length of object = 16 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? Changing to a high power lens narrows the field view and the object will be out be out of focus and not centered

What should you do initially to prevent this from happening? To prevent this from happening you should focus on the object.

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 working distance of about 1 cm, knows the student isn't actually seeing the specimen.

How so? High-power lenses are used for a shorter 1cm working distance.

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

Make sure to obtain the appropriate items such as a clean microscope slide and cover-slip and a dropper bottle of physiological saline. Place a drop of physiological saline in the center of the slide. Add a tiny drop of the iodine. When making preparations make sure the cover slip is tight against the slide.

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

a. Only half of the field is illuminated: The light path is blocked causing only half of the field being To be illuminated

b. The visible field does not change as the mechanical stage is moved: An issue with the 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? Thin slices are ideal because thin slices are more transparent and are easier to be seen

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EXERCISE 4

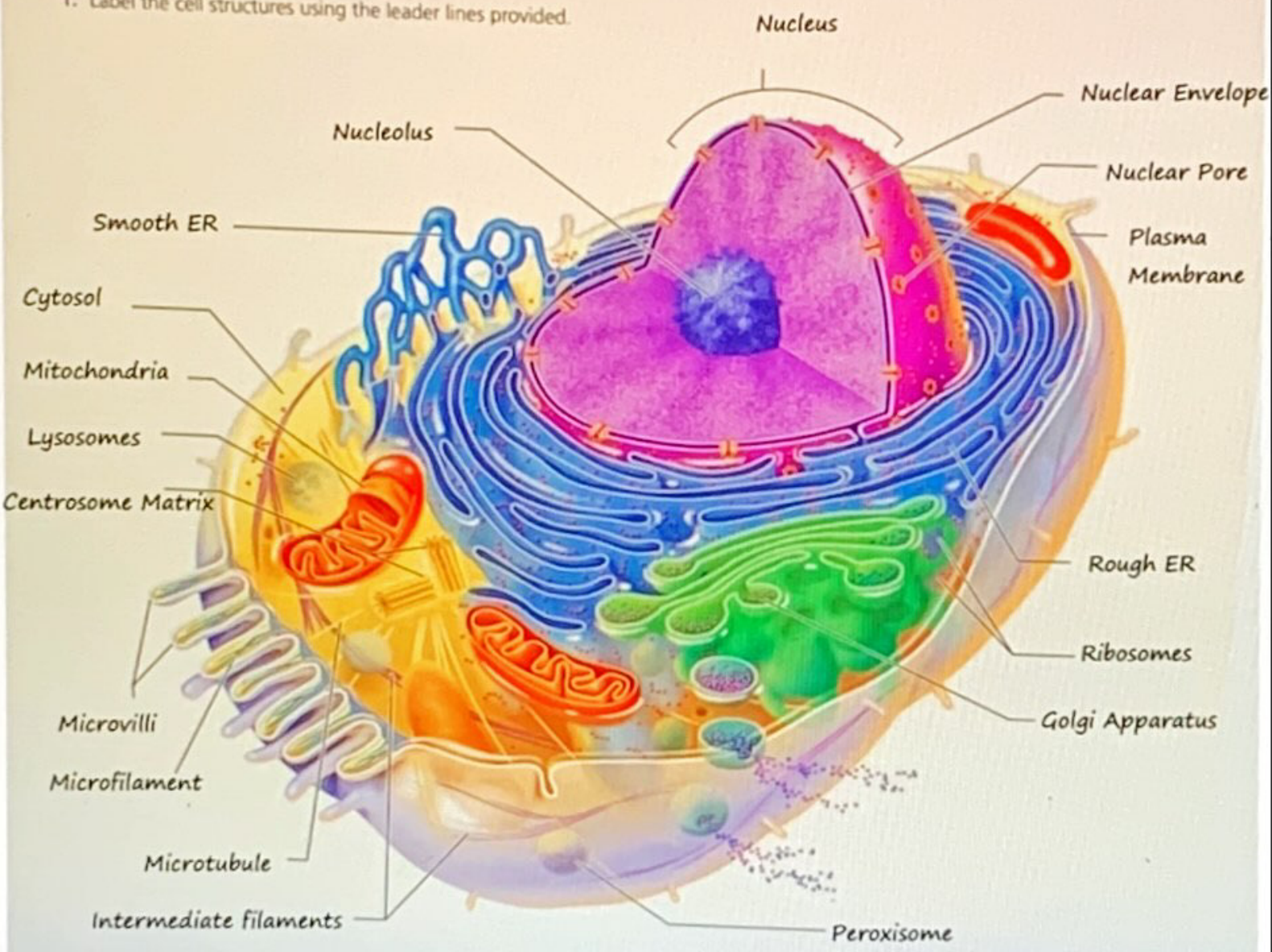
REVIEW SHEET

The Cell: Anatomy and Division

Name _____ Lab Time/Date _____

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	c.	sac of digestive enzymes
B	4. nucleus	d.	examples include glycogen granules and ingested foreign materials
J	5. Golgi apparatus	e.	forms basal bodies and helps direct mitotic spindle formation
C	6. lysosome	f.	site of protein synthesis
E	7. centriole	g.	forms the external boundary of the cell
K	8. cytoskeleton	h.	site of lipid synthesis
D	9. inclusion	i.	packaging site for ribosomes
G	10. plasma membrane	j.	packages proteins for transportation
I	11. nucleolus	k.	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.

1. Sperm cells — cell has a flagellum for movement
2. Smooth muscle — cells have an elongated shape (tapered at each end)
3. Squamous epithelium — cells are close together
4. Red blood cells — cells are circular
5. Squamous epithelium — cells are thin and flat, with irregular borders
6. Red blood cells — cells are anucleate (without a nucleus)
7. Smooth muscle — longest cell

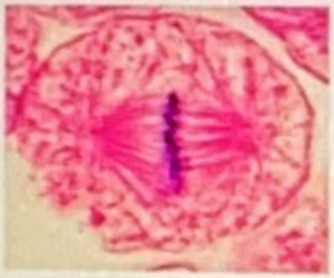
Cell Division

4. What is the function of mitotic cell division? Cellular repair and growth

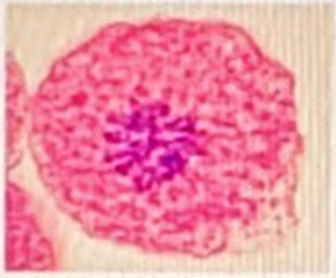
5. Identify the four phases of mitosis shown in the following photomicrographs, and select the events from the key that correctly identify each phase. On the appropriate answer line, write the letters that correspond to these events.

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.

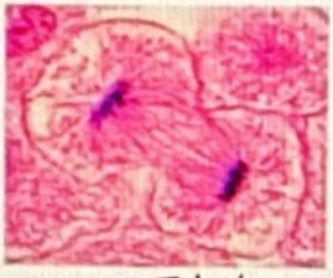


1. Phase: Metaphase
   Events: b



2. Phase: Prophase
   Events: c

3. Phase: Anaphase
   Events: e,g



4. Phase: Telophase
   Events: a,d

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.

Interphase is the period when the cell carries out its normal metabolic activities and grows.

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. Copied DNA of the mother cell
2. Cytoplasm
3. Condensed
4. Centromeres
5. Binucleate cell
6. Spindle
7. Interphase
8. Neurons
9. Skeletal muscles
10. Cardiac muscles

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?

Ribosome because they have cells that can synthesize protein

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

Lysosomes because they release enzymes that digest human tissues

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.

S phase because that is where growth and DNA synthesis occurs