Cells – Ch. 4 Review

1. Complete Table 1 in your notebook.

Organelle	Function	In plant, animal, or both types of cell?
nucleus	regulates cell activities; contains genetic information	both
cell membrane	controls movement of materials into and out of cell	both
vacuole	stores water and nutrients	both
chloroplast	carries out photosynthesis	plant only
mitochondria	produces energy for the cell	both
cell wall	provides support and protection; filters substances	plant only
ribosome	site of protein production	both

2. Explain the cell theory in your own words.

   The cell theory states that all living things are made up of at least one cell, that the cell is the basic unit of life, and that all cells come from pre-existing cells.

3. What are genes? What is genetic information?

   A gene is a portion of a chromosome. Each gene contains a code to direct the production of a particular protein. The coded information is called genetic information and allows the cell to function and reproduce.

4. What parts of the microscope are responsible for magnification? What parts are used to focus the image?

   Lenses are responsible for magnification. The coarse adjustment and fine adjustment knobs are used to focus the image

5. What is the difference between a wet mount and a dry mount? Give one example of each.

   A dry mount is a slide in which there is no liquid between the slide and the cover slip. A wet mount is a slide in which the specimen is covered with water or other liquid on the slide and the cover slip is placed on top. An example of a dry mount is a piece of a leaf placed on a slide and covered with a cover slip. An example of a wet mount is a drop of pond water placed on a slide and covered with a cover slip.

6. Which objective lens should you use to begin observing a specimen under a microscope?

   You should use the low-power objective to begin observing the specimen.

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7. List the characteristics of living things, using examples to illustrate each one.

Sample answer: Living things produce wastes. For example, humans give off carbon dioxide as a waste product when they exhale. Living things have a lifespan. For example, a dog eventually grows old and dies. Living things grow in size, reproduce, and are able to repair themselves. For example, a cut on a person's finger will heal itself because the body produces new skin cells. Living things require energy. For example, humans require food to stay alive. Living things respond to changes in their environment. For example, when a forest fire occurs, deer move to another location to find food. All living things are made up of cells.

8. Write a definition in your own words for each of the following terms:

(a) Cell

A cell is the building block of life. It is the smallest unit that can carry out life processes.

(b) Organelle

An organelle is a structure within a cell that carries out a specific function.

(c) compound microscope

A compound microscope is a tool that magnifies objects using light and lenses.

(d) electron microscope

An electron microscope uses magnets and a beam of electrons to produce a highly magnified image.

(e) magnification

Magnification means making an object appear larger.

9. Where in a cell would you find chromosomes?

Chromosomes are found in the nucleus.

10. What are the features of a good-quality biological diagram?

A biological diagram is drawn with short firm strokes. It is two-dimensional. Horizontal lines are used to label structures. The diagram includes the total magnification of the object, and it shows only what is visible in the microscope's field of view.

11. What are the two main types of electron microscopes?

The two main types of electron microscopes are transmission electron microscopes and scanning electron microscopes.

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What Do You Understand?

12. (a) Explain how a compound microscope works.

In a compound microscope, visible light passes through a specimen on a slide. Lenses magnify and focus the image of the specimen so that we can observe it.

(b) List two characteristics of the compound microscope that make it the most widely used microscope.

The compound microscope is relatively inexpensive and requires relatively little training to use.

13. Describe the main structural differences between plant and animal cells. Explain why these differences are important for each type of cell.

Plant cells contain cell walls and chloroplasts. The cell wall provides structure and allows the plant to support itself. The chloroplasts allow the plant cell to carry out photosynthesis. Animal cells do not have cells walls or chloroplasts. Animals have other ways of supporting themselves, and they do not need to carry out photosynthesis. Animals may also have structures that plants do not, such as flagella and/or cilia.

14. Explain the importance of genetic information to an organism. What do you think might happen if a cell was missing genetic information?

Genetic information tells the cell how to carry out its processes as well as how to reproduce. If the genetic information were missing, the cell would die because it would not have the instructions telling it how to operate.

15. Cilia are used in some parts of the human body to remove particles of dust and debris. Where in the human body might you find cells with cilia? Explain your answer.

I would expect to find cells with cilia in the respiratory tract, such as in the nose. Those parts of the body are most likely to be exposed to dust and debris and to have to get rid of them.

16. Why are cells considered to be the basic units of life?

Cells are considered the basic units of life because a cell is the smallest unit that can carry out all the processes of life.

17. Why was the invention of the electron microscope significant to our understanding of cellular functions?

The electron microscope made it possible for scientists to see structures that they were not able to see with compound microscopes. It also allowed them to see the details of these structures.

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18. Why is it not possible to see some organelles with a compound microscope?

The most a compound microscope can magnify an object is about 1500. Some organelles are so small that they cannot be seen even at that magnification.

19. The mitochondrion is called the powerhouse of the cell. How would your life be limited if you only had half the mitochondria that you would normally have?

Your body would only be able to produce half as much energy on a daily basis, making it harder to perform tasks.

20. Calculate the total magnification for a microscope that has a 10× ocular lens and a 20× objective lens.

A magnification of 10 times a magnification of 20 equals a total magnification of 200, or 200.