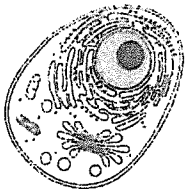
Coahoma County Jr-Sr High School

Foundations of Biology
&
Biology

Week 1

March 23-27, 2020

Cell Organelle Reading



Looking Inside Cells

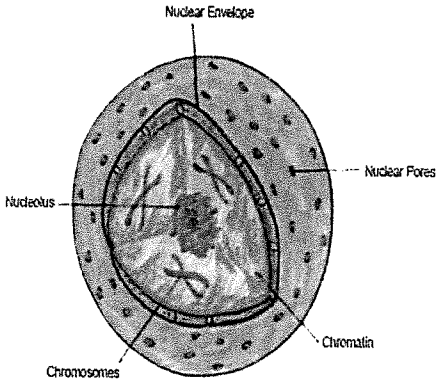
Cells are too small to see without a microscope. When you look at a cell through a microscope, you can usually see the outer edge of the cell. Sometimes you can also see smaller structures within the cell. Each kind of cell structure has a different function within its cell.

Organelles In the picture, you can see many of the tiny cell structures inside a cell. These structures are called **organelles**. Each organelle carries out specific functions within its cell.

What makes up the outside of a cell?

Cell Wall The **cell wall** is a rigid layer that surrounds the cells of plants and some other organisms. The cells of animals, in contrast, do not have cell walls. A plant's cell wall helps protect and support the cell. The cell wall is made mostly of a strong material called cellulose. Still, many materials, including water and oxygen, can pass through the cell wall easily.

Cell Membrane Think about how a window screen allows air to enter and leave a room but keeps insects out. One of the functions of the cell membrane is something like that of a screen. The **cell membrane** controls what substances pass into and out of a cell. Everything a cell needs, such as food particles, water, and oxygen, enters through the cell membrane. Waste products leave the same way. In addition, the cell membrane prevents harmful materials from entering the cell. The figure above shows an animal cell, with the cell membrane around it. All cells have cell membranes. In plant cells, the cell membrane is just inside the cell wall. In cells without cell walls, the cell membrane forms the border between the cell and its environment.



What is the nucleus?

A cell doesn't have a brain, but it has something that functions in a similar way.

A large oval structure called the **nucleus** (NOO klee us) acts as a cell's control center, directing all of the cell's activities. The nucleus is the largest of the cell's organelles. Notice in Figure to the left, that the nucleus is surrounded by a membrane, called the nuclear envelope. Materials pass in and out of the nucleus through pores in the nuclear envelope.

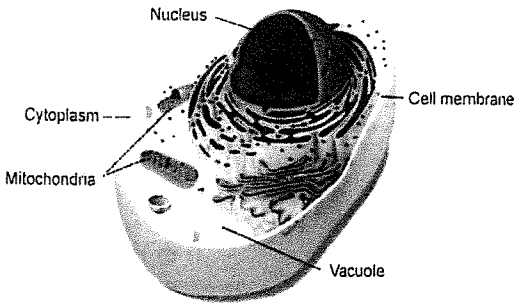
You may wonder how the nucleus "knows" how to direct the cell. **Chromosomes**, thin strands of heredity material that fill the nucleus, contains information for directing a cell's functions. For example, the instructions in the chromosome ensure that leaf cells grow and divide to form more leaf cells. Notice the small, round structure in the nucleus.

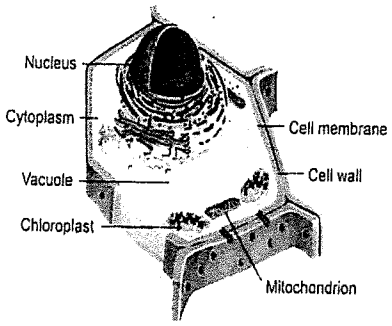
What is in the cytoplasm?

Cytoplasm Most of a cell consists of a thick, clear, gel-like fluid. This **cytoplasm** fills the region between the cell membrane and the nucleus. The fluid of the cytoplasm moves constantly within a cell, carrying along the nucleus and other organelles that have specific jobs.

Mitochondria Floating in the cytoplasm are rod-shaped structures that are nicknamed the "powerhouses" of a cell. You can see them in Figure 3. **Mitochondria** (myt oh KAHN dree uh; singular: *mitochondrion*) convert energy stored in food to energy the cell can use to live and function.

Figure 3. Animal Cell





Vacuoles Plant cells often have one or more large, water-filled sacs floating in the cytoplasm. This type of sac, called a **vacuole** (VAK yoo ohl), stores water, food, or other materials needed by the cell. Vacuoles can also store waste products until the wastes are removed. Some animal cells do not have vacuoles.

Chloroplasts A typical plant cell contains green structures—called chloroplasts—in the cytoplasm. A **chloroplast** captures energy from sunlight and changes it to a form of energy that cells can use in making food. Animal cells don't have chloroplasts, but the cells of plants and some other organisms do. Chloroplasts make leaves green because leaf cells contain many chloroplasts. The figure to the left is a plant cell.

1. What science tool is needed to view cells? _____
2. How are the outsides of plant and animal cells different in their structure, and how are they the same?
   Similarities _____
   Differences _____
3. Complete the analogy.
   Bark is to *tree* as _____ is to *plant cell.*
4. Consider the functions of an animal cell's nucleus. Compare how it functions like an animal's brain.
   _____
5. Compare the vacuoles in plant cells and animal cells. Explain how they are the same and different.
   Compare: _____
   Contrast: _____
6. Describe the difference in structure and function between how plant and animal cells obtain food.
   plant cells _____
   animal cells _____
7. For each structure listed below, record the function of that cell part and identify whether it is found in plants, animals, or both plants and animals.

Structure	Function	Plant, Animal, or Both
a. cytoplasm		
b. chloroplast		
c. cell membrane		
d. nucleus		
e. vacuole		
f. cell wall		
g. mitochondrion		

Vocabulary
Structure/& Functions

Cell – the smallest unit capable of performing life functions

Cell membrane: protective outer covering of all cells that is made up of a double layer of fatlike molecules and regulates the interaction between the cell and the environment.

Cell wall: rigid structure that encloses, supports, and protects the cells of plants

Centriole: one of two tiny structures located in the cytoplasm of animal cells near the nuclear envelope

Chlorophyll: green, light trapping pigment in plant chloroplast.

Chloroplast: green, chlorophyll-containing, plant-cell organelle that converts sunlight, carbon dioxide, and water into sugar.

Chromosome: threadlike structure within the nucleus containing the genetic information that is passed from o ne generation of cells to the next.

Cytoplasm: constantly moving, gel-like moving, gel-like mixture inside the cell membrane that contains heredity material.

Nucleus: directs all cell activities and is separated from the cytoplasm by a membrane.

Mitochondria – organelles where energy is released from breaking down food into carbon dioxide and water.

Ribosome: small structure on which cell make their own proteins.

Golgi bodies: organelles that package cellular materials and transport them within the cell or out of the cell.

Organelle: structure in the cytoplasm of a eukaryotic cell that can act as a storage site, process energy, move materials, or manufacture substances.

Endoplasmic reticulum (ER): a complex series of folded membranes in which materials can be processes and moved around inside of the cell. (may be rough or smooth)

Vacuole: membrane-bound spaces for the temporary storage of materials.

Nucleolus: a structure found in the nucleus.

Lysosome: a rounded organelle that contains digestive enzymes.

Cell Types:

- Prokaryotic – cells without membrane-bound structures, such as one-celled organisms – bacteria
- Eukaryotic – Cells with membrane-bound structures, such as fungi, plants, animals

Name _____

Directions: Read the following questions and/or statements. Choose the correct answer and darken the circle by your answer choice.

CELL ORGANELLES AND THEIR FUNCTIONS

1. This organelle functions in cellular respiration:
○lysosome
○endoplasmic reticulum
○mitochondrion
○golgi apparatus

2. The organelle functions to package and deliver proteins:
○lysosome
○endoplasmic reticulum
○mitochondrion
○golgi apparatus

3. Cell organelles are located within the ____ of the cell.
○nucleus
○cytoplasm
○cell membrane
○lysosomes

4. The endoplasmic reticulum functions to:
○transport materials
○destroy old cell parts
○make ribosomes
○package proteins

5. Genetic material is contained within the ___ of the cell.
○ribosomes
○cytoplasm
○nucleus
○nucleolus

6. This organelle is responsible for destroying worn-out cell parts:
○lysosomes
○mitochondrion
○golgi apparatus
○ribosomes

Name _____

Directions: Read the following questions and/or statements. Choose the correct answer and darken the circle by your answer choice.

CELL ORGANELLES AND THEIR FUNCTIONS

7. The _____ controls what enters and leaves the cell.
- mitochondrion
- golgi apparatus
- nucleus
- cell membrane

8. The rough endoplasmic reticulum has ____ located on it.
- lysosomes
- cytosol
- ribosomes
- proteins

9. Located within the nucleus, it is responsible for producing ribosomes:
- centrosome
- nucleolus
- lysosome
- endoplasmic reticulum

10. Which structure is directly responsible for the formation of proteins within the cell.
- lysosomes
- vacuoles
- centrioles
- ribosomes

Name _____ Class _____ Date _____

CELL STRUCTURE AND FUNCTION

The History of Cell Biology

Read the passage below, which covers topics from your textbook. Answer the questions that follow.

The discovery of cells was made possible by the development of the microscope in the 17th century. In 1665, the English scientist Robert Hooke used a microscope to examine a thin slice of cork. Hooke described it as consisting of "a great many little boxes." These "little boxes" reminded him of the cubicles or "cells" in which monks lived, so he called them cells.

What Hooke had observed were actually the remains of dead plant cells. The first person to observe living cells was a Dutch trader, Anton van Leeuwenhoek. Although van Leeuwenhoek's microscope was rather simple, in 1673 it was powerful enough to enable him to view the world of microscopic organisms which had never before been seen.

About 150 years passed before scientists began to organize the observations begun by Hooke and van Leeuwenhoek into a unified theory known as the cell theory. This theory has three parts:

(1) All living things are composed of one or more cells.
(2) Cells are the basic units of structure and function in an organism.
(3) Cells come only from the reproduction of existing cells.

Read each question and write your answer in the space provided.

SKILL: Identifying Main Ideas

1. What caused scientists to discover the existence of cells?

_____

2. What are the small rooms that monks lived in called?

_____

3. What did Hooke observe in the cork slice?

_____

Name _____ Class _____ Date _____

4. What discovery is van Leeuwenhoek noted for?

_____

5. What are the three parts of the cell theory?

_____

_____

_____

Read the passage below, which covers topics from your textbook. Answer the questions that follow.

Early evidence for the cell theory was provided by German scientists. In 1838, the botanist Matthias Schleiden concluded that all plants are composed of cells. A year later, the zoologist Theodor Schwann came to the same conclusion about animals. In 1855, Rudolf Virchow, a physician who had been studying how disease affects living things, reasoned that cells come only from other cells. Over the years, modern scientists have gathered much additional evidence that strongly supports the cell theory.

Use the two passages to complete the table below.

SKILL: Organizing Information

6. The figure below indicates events that lead up to the cell theory. Complete the table by filling in the blank spaces.

Date	Scientist	Discovery
1665	**a.**	observed the remains of dead plant cells
b.	Anton van Leeuwenhoek	**c.**
1838	Matthias Schleiden	**d.**
e.	**f.**	stated that all animals are made of cells
1855	**g.**	**h.**

Name _____ Class_____ Date_____

Circle the letter of the phrase that best completes the sentence.

7. The cell theory was
   a. first identified in 1665.
   b. the end result of many scientific investigations.
   c. described by Rudolf Virchow.
   d. Both (a) and (b)