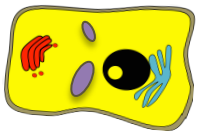
Name: _____ Date: _____

The Cell Theory

As you've grown, or watched a sibling or pet grow, you have seen remarkable changes over time. Plants, animals (yourself included) grow in height and weight with each passing year. These changes result from an increase in the number and size of cells in the organism's body.

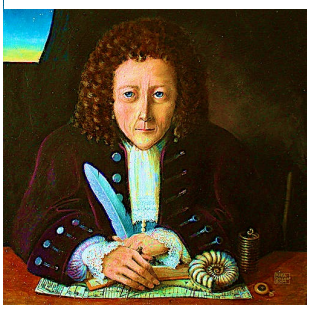
All living things are made up of basic units called cells. Your body contains trillions of cells. Your cells have their own life cycles, which means that some are dying right now, while others are brand new. Your body is constantly making new cells. In order to do this, certain materials must be supplied, and wastes must be removed. Your body takes care of itself by carrying out these processes.



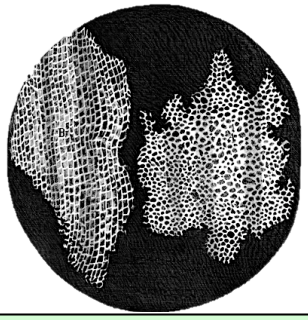
Discovery of Cells and the Cell Theory

Today we know that all organisms are made up of cells. The cell is the basic unit of structure and function in all living things. It is the smallest unit that performs all life processes, such as growth, reproduction, and metabolism. However, we did not always know that cells existed, or what they were.

Robert Hooke



In 1665, a scientist by the name of Robert Hooke used a microscope to view some slices of cork. Cork is simply a processed wood product from the bark of an oak tree. Hooke noticed that the cork was divided into thousands of tiny walled sections. He described these individual sections as "cells".



Cork cells under the microscope as Robert Hooke observed.

In 1839, nearly 200 years after Hooke's discovery, a German botanist by the name of Matthias Schleiden looked at living plant parts through a microscope. He discovered that living plants are also made up of cells. At around the same time, a German physiologist named Theodor Schwann used the microscope to view the parts of animals. He discovered that animals are also made up of cells. Shleiden and Schwann suggested that cells are found in all living things and are the basic unit of life.

Rudolf Virchow, who practiced medicine in Germany, added to the findings of Schleiden and Schwann. When studying organisms under a microscope, Virchow showed that all cells come from other living cells by viewing the stages of cell division.

For each scientist listed below, explain how they contributed to the cell theory.

Scientist	Contribution to Cell Theory
1. Robert Hooke	
2. Matthias Schleiden	
3. Theodor Schwann	
4. Rudolf Virchow	

The observations of Hooke, Schleiden, Schwann, Virchow, and others led to the development of the cell theory. The cell theory is a widely accepted explanation of the relationship between cells and living things. The cell theory states:

- **All living things or organisms are made of cells and their products.**
- **New cells are created by old cells dividing into two.**
- **Cells are the basic building units of life.**

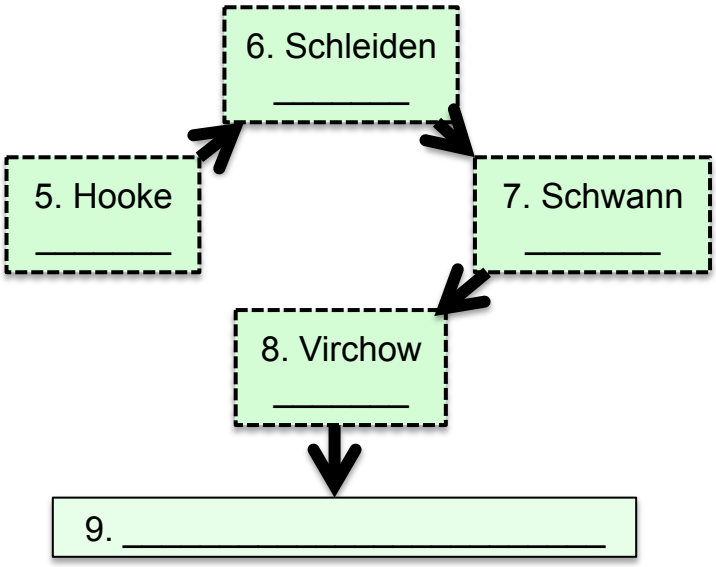
The cell theory holds true for all living things, no matter how big or small. Since cells are common to all living things, they can provide information about all life. And because all cells come from other cells, scientists can study cells to learn about growth, reproduction, and all other functions that living things perform.

Honorable Mention...

Anton Van Leeuwenhoek was friends with Robert Hooke. He gets an honorable mention for the cell theory, because he expressed some interest in microscopes when they first became popular within the Renaissance men. He fashioned his own microscope and looked at many different things, including scrapings from his own teeth. That was when he saw moving particles that he called “animalcules”. He shared this information with his English friend, Hooke.

Complete the diagram below by writing the letter of the statement that appropriately explains what each scientist accomplished or discovered. **For number 9, list the theory that these scientists contributed to.**

a. Concluded that cells arise from other living cells.
b. Discovered that living plant cells are comprised of cells.
c. Discovered that animals are made of cells.
d. The first person to use the word "cells" to describe the nonliving plant (cork) he observed under the microscope.



With the historical discoveries of these scientists, we have been able further classify cells into prokaryotes and eukaryotes. Prokaryotic cells make up organisms called prokaryotes. All prokaryotes are tiny and consist of single cells. Bacteria are prokaryotic cells. Eukaryotic cells make up eukaryotes. You are a eukaryote, as are plants and some types of single-celled organisms. All multicellular organisms, or organisms that have many cells, are eukaryotes.

Eukaryotic cells contain a membrane-bound nucleus, while prokaryotic cells have no nucleus at all! In eukaryotic cells, the DNA, or genetic information, is found within the nucleus. In prokaryotic cells, the DNA is found in the cytoplasm, the jellylike substance that fills both types of cells.

Analysis Questions

10. What is the smallest, most basic unit of life? _____

11. What instrument was necessary to view cells and thus establish the cell theory? _____.

Analysis Questions

12. Why do you think that Robert Hooke used the term “cell” to describe what he saw?

_____
_____.

13. How were the discoveries of Schleiden and Schwann alike? How were they different?

_____
_____.

14. What is the cell theory?

_____
_____.

15. Why does Anton Van Leeuwenhoek get the honorable mention? _____
_____
_____.

16. Where is the DNA in a prokaryote? In a eukaryote?

_____
_____.

17. Prokaryotic cells are (circle one) bigger | smaller than eukaryotic cells.

18. A friend tells you he read somewhere that rotting garbage can turn into maggots, which are fly larvae, and the maggots then can grow into adult flies. What part of the cell theory could you use to refute his claim? _____
_____
_____
_____.