



Modeling Cell Structure and Function

MODELING

PEOPLE, PLANTS, AND microbes have an important thing in common—they are all made of cells. By 1846, scientists realized that cells were not hollow shapes, like balloons, but were more solid, like gelatin. You have observed cells under a microscope and seen structures inside a cell. Some organisms, like bacteria, consist of only one cell. Other organisms consist of several to many cells. An adult human being is made up of approximately 10 trillion cells. One drop of human blood contains about 500 *million* cells! In this activity, you will use your knowledge of cells to create your own unique cell model.

GUIDING QUESTION

How do the parts of a cell work together?

MATERIALS

For the activity

clay, paper, food items, computer software, or other model-building materials

1 computer with Internet access

1 set of colored pencils

PROCEDURE

Part A: Using the Cell Simulation to Review Plant and Animal Cells

1. Click on the Modeling Cell Structure and Function simulation link.
Note that you will be working with organelles that you have not studied. Focus on understanding the cell model as a whole and comparing the two types of cells.

2. Follow the directions for constructing a model of an animal cell and then a plant cell.

Hint: To begin each cell, you must start with the cellular structure that separates the inside of every cell from the outside.

3. In the simulation, complete the Venn diagram comparing the structures of the animal cell and the plant cell.
4. Think about the following:
 - What is the most important difference between animal and plant cells?
 - Which cell structure(s) do you consider the most important part of a cell? Explain your reasoning.
 - What were some of the strengths and weaknesses of the simulation in illustrating the structure and function of a cell?
 - What did you learn about cells from the simulation that you did not know before?

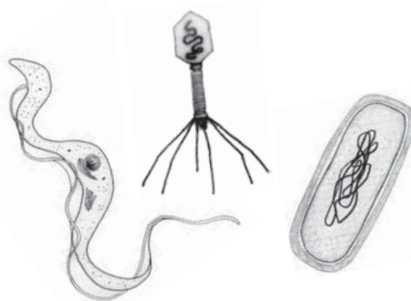
Part B: Create a Model of a Cell

5. Use clay, paper, food items, computer software, or other materials to make your own model of an animal or plant cell. Your cell model can also be a drawing. Be creative and address the following steps:

a. Your cell model should include the following structures:

- cell membrane
- cytoplasm
- nucleus
- nuclear membrane
- genetic material
- mitochondria
- cell wall and chloroplasts, if appropriate

b. Your model should include information about the functions of each of these structures within the cell.



Drawings, such as these of cells and a virus, are one type of model.

ANALYSIS

1. How would a model of a bacterial cell be similar to and different from the cell model you created in Part B?
2. Explain the strengths and weaknesses of the model cell you created for Part B in illustrating the structure and function of a cell.
3. Think about how cell models represent the whole organism.
 - a. If you constructed a cell model of a *Paramecium*, how many cell models would you need to represent the whole organism?
 - b. If you constructed a cell model of a human, how many cell models would you need to represent the whole organism?