

Plant and Animal Cells

Plants and animals look very different from one another (Figure 1). What does this mean about the cells that are found in each of these living things? Plant and animal cells have many differences, but they also have many similarities. In fact, the cells of all living things have common components.



Figure 1 On the outside, the trees and flowers (a) look very different from the ladybugs (b). Do you think that their cells look this different?

organelle: a small structure found within a cell; performs a specific function in a cell

cytoplasm: the watery substance in a cell in which the organelles are suspended; also used for transport and chemical reactions

LINKING TO LITERACY

Comparing and Contrasting

Ideas in scientific text are often compared to each other to identify similarities and differences. As you read, ask yourself, “How are the organelles of plant and animal cells alike? How are they different?”

cell membrane: the part of a cell that surrounds and holds the cell contents together; controls movement of substances into and out of a cell

A number of small structures are seen within cells when they are observed under a microscope. These small structures are called organelles. **Organelles** (little organs) have unique functions, but work together to contribute to the cell’s life processes.

All plant and animal cells contain a watery fluid called **cytoplasm**. This fluid makes up most of the cell volume. The cytoplasm is not an organelle, but it is an important component in the cell. Organelles are suspended in the cytoplasm, and materials are transported through it. Many chemical reactions occur in the cytoplasm. This is also where wastes are stored until they can be disposed of.

Some organelles are found in both plant and animal cells. Other organelles are unique to one type of cell. Both plant and animal cells have organelles that are visible with a compound microscope, such as the cell membrane, the nucleus, and vacuoles. Plant cells also have two structures that animal cells do not have: the cell wall and chloroplasts.

Cell Membrane

In both plant and animal cells, the **cell membrane** surrounds the cell’s contents. The cell membrane acts as a gatekeeper by controlling the movement of materials, such as nutrients and waste, into and out of the cell. It is sometimes called a plasma membrane. You can think of the cell membrane as the skin of the cell.

Nucleus

The **nucleus** is known as the control centre of the cell because it regulates all cellular activities. In both plant and animal cells, the nucleus is surrounded by a membrane called the nuclear membrane. Some single-celled organisms, such as bacteria, do not have a nuclear membrane.

The nucleus contains rod-like structures called **chromosomes**, which carry the information that the cell needs to keep functioning, along with the information it needs to reproduce. This information is stored as a code in certain parts of the chromosomes called genes. We refer to this coded information as genetic information. When a cell reproduces, the genetic information is copied and passed on to offspring cells.

Vacuole

Vacuoles are fluid-filled compartments that the cell uses for storage. Water and nutrients, such as sugar, are stored in vacuoles. Vacuoles are also used to store wastes, which are eventually moved out of the cell along with excess water. Plant cells usually have a very large vacuole that takes up most of the cell's interior space.

Figure 2 shows an animal cell and the organelles that are visible through a compound microscope. 🌐

nucleus: the control centre in a cell; stores the genetic information that directs all of the cell's functions

chromosomes: rod-like structures in the nucleus of a cell: contain the genetic information of a cell

vacuole: a membrane-surrounded storage compartment in a cell; stores food, water, and other materials

To view an interactive illustration of an animal cell and its organelles,

[Go to Nelson Science](#)

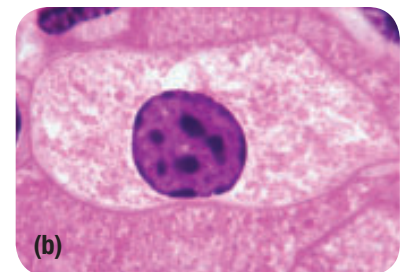
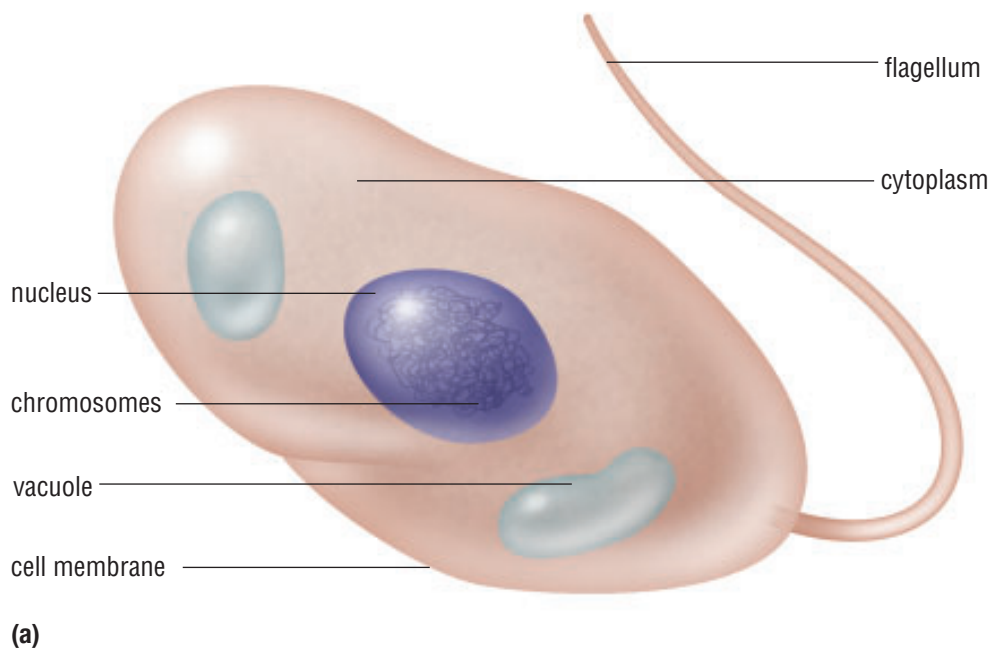


Figure 2 (a) An animal cell (b) An animal cell seen under a microscope (magnification 480×)

Plant cells have many of the same structures as animal cells, including the cell membrane, nucleus, chromosomes, and vacuoles. They also have some organelles that are not found in animal cells.

Cell Wall (Plants Only)

cell wall: a structure surrounding plant cells that protects and supports the cell; made of cellulose

The **cell wall** is a rigid structure surrounding plant cells that provides support and protection. The cell wall also acts as a filtering mechanism. Nutrients, wastes, water, and other substances are able to pass through small pores (holes) in the cell wall. The cell wall is made up of a substance called cellulose. Paper is composed of cellulose from the cell walls of certain tree cells. The stringy strands in celery are also made of cellulose.

Chloroplasts (Plants Only)

chloroplast: site of photosynthesis; chloroplasts in a plant cell absorb sunlight, carbon dioxide, and water to make food

The **chloroplast** is a green organelle found only in plant cells. Chloroplasts are the site of photosynthesis, a process that allows plants to use the Sun's energy to make food. Animals cannot make food from sunlight because they do not have chloroplasts in their cells. The membranes inside chloroplasts contain a green chemical called chlorophyll. Chlorophyll absorbs sunlight and helps make food for the plant. The green colour of many plants comes from chlorophyll.

Figure 3 shows a plant cell and the organelles that are visible through a compound microscope. Notice that plant and animal cells share many of the same structures. Some of the structures may look slightly different (for example, the size of the vacuole may differ), or they may not be as obvious (for example, the cell membrane in plant cells is often hidden by the cell wall).

To learn more about plant cell structure,

[Go to Nelson Science](#)

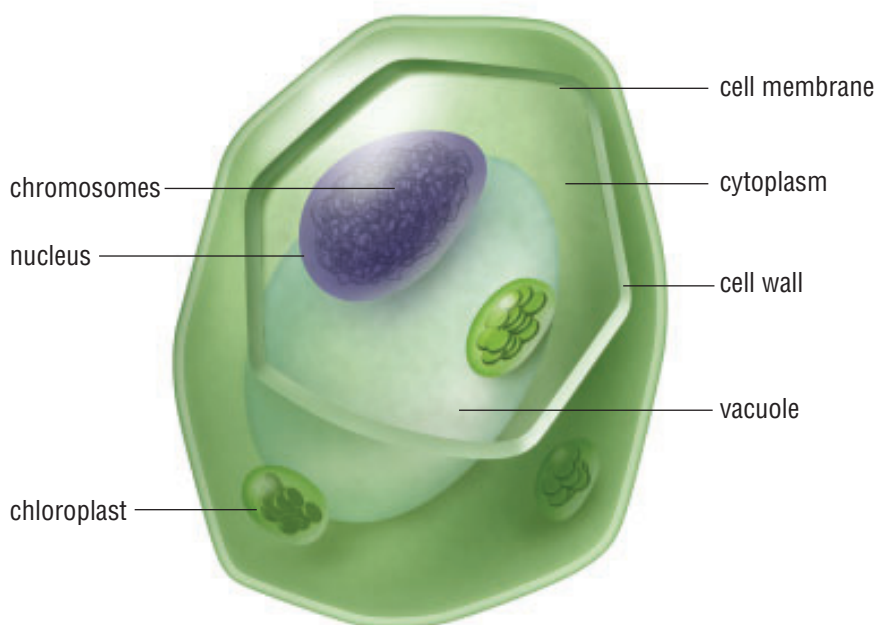
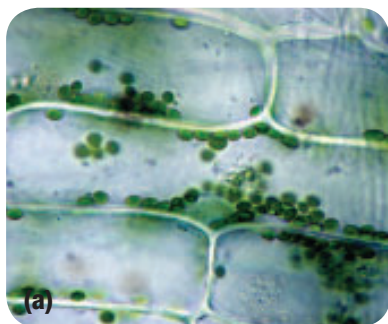


Figure 3 (a) A plant cell seen under a microscope (magnification 250 \times) (b) A plant cell

Cell Movement

Some cells need to move from place to place in their environment.

Flagella (singular, flagellum) are long, tail-like structures that project out from a cell, allowing it to move through fluids, either by beating with a whip-like motion or by rotating in a corkscrew fashion (Figure 4(a)). Cells that use flagella for movement usually have no more than two. **Cilia** (singular, cilium) are tiny hairs found on the surface of a cell that work together to move the cell or move the fluid surrounding the cell (Figure 4(b)). Unlike flagella, cilia are numerous and are often found covering the surface of a cell. Cilia and flagella can sometimes be seen with a compound microscope, though they are not found on all cells. Bacterial cells often use flagella to move. Cilia are found on some of the cells that line the lungs and intestines of animals.

flagella: tail-like structures that propel cells through their environment

cilia: hair-like projections that help propel the cell or move the substances surrounding the cell

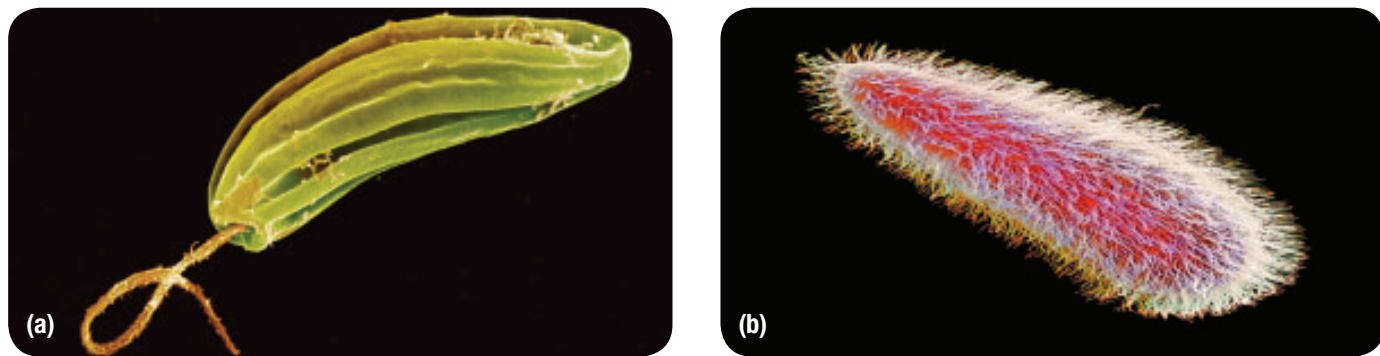


Figure 4 Both a flagellum (a) and cilia (b) are projections from the cell, but they work differently to produce different types of movement.

Unit Task Plant and animal cells have both similarities and differences.

Now that you are more familiar with the cellular structure of plant and animal cells, how will you apply this knowledge when completing the Unit Task?

✓ CHECK YOUR LEARNING

- (a) Describe an idea in Section 4.5 that you already knew something about.

(b) Describe similarities and differences between what you already knew and what you learned from the reading.
- What are organelles?
- Go back to the drawings of onion cells that you made in Section 4.4. Label the structures that you saw, now that you know what they are called.

- Copy Table 1 into your notebook. Complete the table by listing the parts of the cell you learned about in this section. Use a check mark to indicate if the structure is found in animal cells, plant cells, or both. Provide a brief description of both the structure and function of the organelle. The nucleus is done as an example.

Table 1 Comparing Plant and Animal Cells

Name	Animal cell	Plant cell	Structure/Location	Function	Visible with a light microscope?
nucleus	✓	✓	found in the cell; surrounded by a nuclear membrane	controls all of the cell's functions; stores genetic information	yes