

Plant and animal cells are eukaryotic cells.

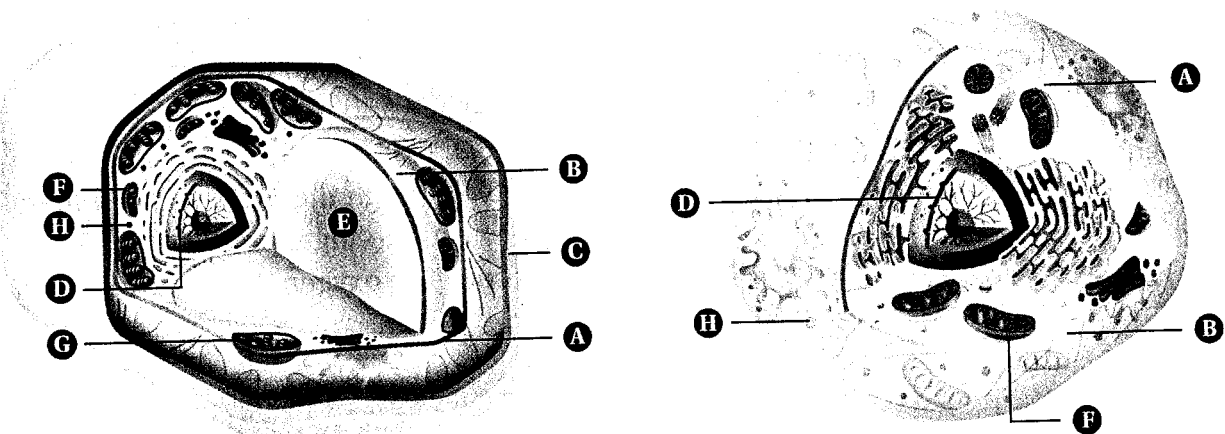
Activity

Considering Plant and Animal Cells

Observe the plant and animal cells in **Figure 1.11**. Look at all the labelled features. Summarize the key similarities and differences.



Figure 1.11 shows the two main types of eukaryotic cells.



Cell Organelle	Structure and Function
A cell membrane	<ul style="list-style-type: none"> • surrounds and protects the contents of the cell • helps to control the movement of foods, wastes, and other substances into and out of the cell
B cytoplasm	<ul style="list-style-type: none"> • jelly-like fluid in which internal organelles float
C cell wall	<ul style="list-style-type: none"> • tough, rigid structure surrounding the cell membrane, giving plant cells a regular, box-like shape
D nucleus	<ul style="list-style-type: none"> • large, often round structure containing the genetic material that controls a cell's growth, reproduction, and other life-sustaining activities
E vacuoles	<ul style="list-style-type: none"> • balloon-like spaces within the cytoplasm to store wastes, food, and substances the cell cannot use right away • smaller and more numerous in animal cells
F mitochondria	<ul style="list-style-type: none"> • bean-shaped structures that release energy from food molecules to power cell processes
G chloroplasts	<ul style="list-style-type: none"> • structures containing chlorophyll (a green substance), which captures energy from the Sun to produce food (sugars) in the leaves and green stems of plants
H vesicles	<ul style="list-style-type: none"> • small sacs that transport materials and sometimes help materials enter and leave the cell

Figure 1.11 Some common organelles of plant and animal cells. Organelles help cells carry out their life processes.

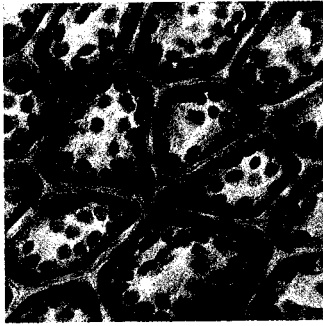


Figure 1.12 Chloroplasts are green-coloured structures in plant cells.

photosynthesis a chemical reaction in the cells of plants that converts the Sun's light energy into chemical energy that organisms can use

Figure 1.13 Photosynthesis converts the energy of sunlight into chemical energy (in the form of sugar).

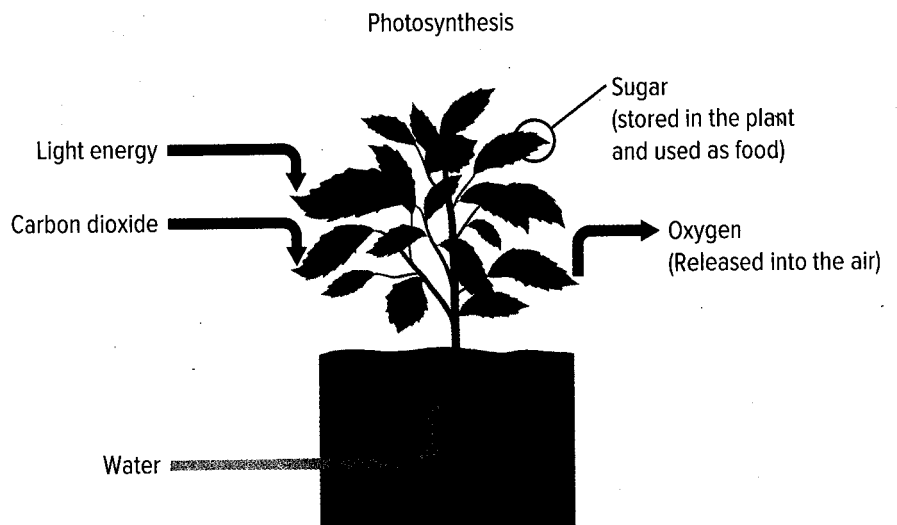
Plant Cells

Plant cells have organelles that carry out all of the processes needed for the whole plant to survive. Plant cells also have some structures that animal cells don't. Plant cells have thick, rigid cell walls to provide support. They also have a large vacuole, which is a structure that stores water and other substances.

Plant cells have a type of organelle that animal cells do not: the chloroplast. Chloroplasts, like the ones shown in **Figure 1.12**, capture the energy in sunlight. This energy is needed to power a process that takes place in chloroplasts: photosynthesis.

Photosynthesis

Photosynthesis is a chemical reaction that uses the energy of sunlight to change carbon dioxide and water into sugar and oxygen. As shown in **Figure 1.13**, plants take in carbon dioxide from the air and absorb water through their roots. Light energy comes from the Sun. Plants need the sugar produced by photosynthesis for use as food. The oxygen is a waste by-product that is released into the air.



Animal Cells

Animal cells have organelles that carry out all of the processes needed for the whole animal to survive. Animal cells have a cell membrane that controls the movement of substances into and out of a cell. Vesicles break down waste materials, which may be recycled or moved out of the cell.

In plant and animal cells, the nucleus directs cell activities and contains genetic material for reproduction. Plant and animal cells also have mitochondria. These organelles play a key role in another important life process called cellular respiration.

Connect to Investigation 1-B on Pages 34–35

Connect to Investigation 1-C on pages 36–37

Cellular Respiration

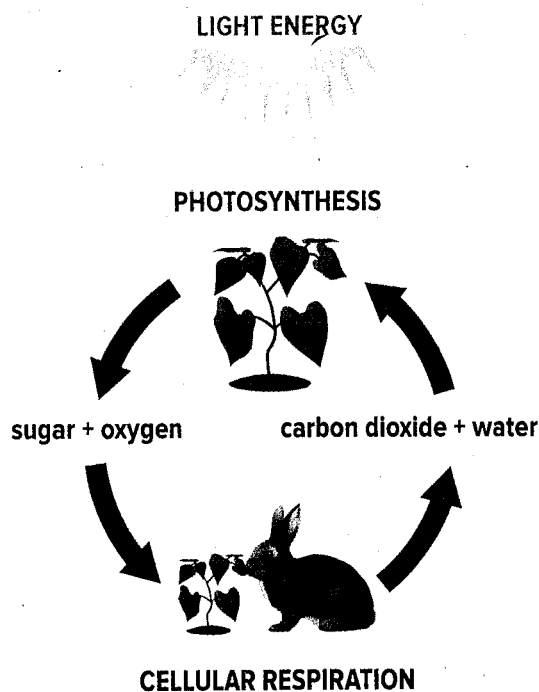
Cellular respiration is a chemical reaction in which sugar and oxygen in cells are changed into carbon dioxide and water. As part of this reaction, energy is released. The energy produced from cellular respiration is used by organisms to carry out life functions. Carbon dioxide and water are waste by-products.

cellular respiration a chemical reaction in the cells of most organisms that releases the energy needed to carry out life processes

Photosynthesis and Cellular Respiration

Figure 1.14 shows the relationship between photosynthesis and cellular respiration. These two processes function together as part of an important cycle. Most living things depend on this cycle to survive.

Figure 1.14 Photosynthesis stores energy, and cellular respiration releases energy. As well, each process makes the raw materials that the other process needs to store or release energy.



Plants and other organisms use the carbon dioxide and water produced by cellular respiration as part of photosynthesis.

Plants, animals, and other organisms use the sugar and oxygen produced by photosynthesis as part of cellular respiration.

Before you leave this page . . .

1. Identify and describe the key similarities and differences of plant and animal cells.
2. Explain how chloroplasts are related to cellular processes?
3. Some people describe photosynthesis and cellular respiration as the reverse of each other. Use well-reasoned arguments to explain why you agree or disagree with this idea.