

Cells and Systems

Students investigate the structures and functions of cells and body systems, and describe how different organisms meet similar needs through varied structures ([Outcome](#), [Outcome](#)). You will examine how cells work together in tissues and organs, and explain how body systems respond to changes in the environment ([Outcome](#)).

Exercises

1. Single-celled and multicelled organisms

An amoeba is a single-celled organism. A grizzly bear is a multicelled organism. Both organisms need to gather food and respond to their environment.

Identify one similarity and one difference between these organisms in how they meet these needs.

Similarity: _____

Difference: _____

2. Plant and animal cells

The table below shows structures found in different cell types. Place an X in each cell to show whether the structure is found in plant cells, animal cells, or both.

Structure	Plant cells	Animal cells
Cell membrane		
Cell wall		
Nucleus		
Chloroplast		

3. Movement of materials into cells

Water moves into and out of cells through diffusion and osmosis. This movement depends on the concentration of dissolved materials on either side of the cell membrane.

Which statement correctly describes why water moves across a cell membrane?

- A) Water moves from where there is more water to where there is less water.
- B) Water moves because the cell membrane pumps it across.
- C) Water moves only into cells, never out.
- D) Water moves because the cell uses energy to transport it.

4. Organs and tissues in the human body

The lungs are organs that work with other structures to help your body exchange gases. Name the gas that the lungs take in from the air and the gas that the lungs release into the air.

Gas taken in: _____

Gas released: _____

5. Body systems responding to stimuli

You are running a race. Your heart rate increases during the race and returns to normal afterward.
Explain why your heart rate increases during exercise.

6. Research and human health

Scientists have developed vaccines to prevent certain diseases. Vaccines work by helping the immune system recognize harmful pathogens before they cause illness.

Which of the following best describes how vaccine research has improved human health?

- A) Vaccines eliminate all bacteria and viruses from the environment.
- B) Vaccines allow people to avoid getting sick from certain diseases.
- C) Vaccines replace the need for a healthy immune system.
- D) Vaccines cure diseases after a person becomes ill.

Answer Key

- 1. Similarity: Both need to take in food and sense changes in their surroundings. Difference: An amoeba is one cell that does all these tasks; a grizzly bear has many specialized cells organized into tissues and organs that perform these functions.
- 2. Cell membrane: Plant X, Animal X; Cell wall: Plant X, Animal blank; Nucleus: Plant X, Animal X; Chloroplast: Plant X, Animal blank.
- 3. A
- 4. Gas taken in: oxygen; Gas released: carbon dioxide.
- 5. During exercise, your muscles need more oxygen and nutrients. Your heart beats faster to pump blood more quickly to deliver oxygen and nutrients to your muscles and remove waste products like carbon dioxide.
- 6. B