

Cells and Systems

Students investigate the role of cells as the basic unit of life and analyze how cells, tissues and organs work together in living organisms ([Outcome](#)). They examine how body systems respond to stimuli and maintain healthy function ([Outcome](#)).

Exercises

1. A single-celled amoeba and a multicelled grizzly bear both need to gather food and remove waste. Describe one similarity and one difference in how these two organisms meet these functions ([Outcome](#)).

Similarity: _____

Difference: _____

2. Plant cells and animal cells share many features, but plant cells have structures that animal cells do not. Which of the following is found in plant cells but NOT in animal cells?

- A) Cell membrane
- B) Cell wall
- C) Nucleus
- D) Mitochondria

3. The diagram below shows a cell membrane with water and salt particles on either side. The side marked X has a higher concentration of salt than the side marked Y.

Side X (high salt)	Cell Membrane	Side Y (low salt)
•••••		••
(salt particles)		(salt particles)

In which direction will water molecules move across the membrane, and why?

Direction: _____

Reason: _____

4. Match each human body system with its main function ([Outcome](#)).

System	Function
A. Respiratory system	1. Breaks down food into nutrients
B. Circulatory system	2. Exchanges oxygen and carbon dioxide
C. Digestive system	3. Carries oxygen and nutrients throughout the body

A = _____, B = _____, C = _____

5. When you exercise, your heart rate increases. Explain why this is an example of your body responding to a changing condition ([Outcome](#)).

6. Research has led to improvements in human health. Which of the following is an example of how research about body systems has improved health?

- A) Understanding how the heart works has led to better treatments for heart disease
- B) Studying cells has helped scientists develop new medicines
- C) Learning about the respiratory system has improved air quality
- D) Both A and B are correct

Answer Key

1. Similarity: Both organisms need to obtain food and remove waste products. Difference: An amoeba is single-celled and performs all functions within one cell; a grizzly bear is multicelled with specialized organs and tissues for each function.
2. B
3. Direction: From side Y to side X (into the cell or across the membrane toward higher salt concentration). Reason: Water moves from an area of lower salt concentration to an area of higher salt concentration to balance the concentration difference.
4. A = 2, B = 3, C = 1
5. Exercise causes muscles to work harder and use more oxygen. Your body responds by increasing heart rate to pump blood faster and deliver more oxygen to the working muscles.
6. D