

Cells and Systems Formative Assessment

Time: 20 min. 6 questions.

Instructions

Answer all six questions. For multiple choice questions, select the best answer. For short answer questions, write one or two sentences to explain your thinking. For the true or false question, write True or False and briefly say why. For the numeric question, show your calculation and include units in your answer.

Questions

1. A single-celled organism like an amoeba and a multicelled organism like a grizzly bear both need to gather food. Which statement best explains how they meet this common function?
A) Both organisms use identical food-gathering structures.
B) Both organisms have the same number of cells working together.
C) Different organisms meet the same functions in a variety of ways.
D) Single-celled organisms are more efficient at gathering food than multicelled organisms.

([Outcome](#))

2. Describe the role of cells as the basic unit of life. Why are cells important to all living things? ([Outcome](#))
3. Plant cells and animal cells are both found in living organisms, but they have some structural differences. Name one structure that is found in plant cells but not in animal cells, and explain what role that structure plays. ([Outcome](#))
4. True or false: During diffusion, molecules move from an area where they are less concentrated to an area where they are more concentrated. Explain your answer. ([Outcome](#))
5. Your heart rate increases when you exercise. Which body system is responsible for this change, and what is the purpose of this response? ([Outcome](#))
6. A student observes that a plant's stomata (tiny pores on leaves) respond to changes in light and humidity. If a plant's stomata allow gases to enter and exit the leaf, calculate how the plant's response to these conditions helps it conserve water. If the plant loses 200 millilitres of water per hour through the stomata under one set of conditions, and it loses 40% less water under different conditions, how much water would it lose per hour under the different conditions? ([Outcome](#))

Curriculum Coverage

Question	Outcome	Content
1	Outcome	Organisms meet similar functions in a variety of ways
2	Outcome	Role of cells as basic unit of life
3	Outcome	Distinction between plant and animal cells
4	Outcome	Movement of gases and liquids through diffusion
5	Outcome	Body systems and response to stimuli

6	Outcome	Movement of gases and liquids through diffusion
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Answer Key

- Answer: C)** Different organisms meet the same functions in a variety of ways. The outcome explicitly states that students should recognize food gathering as a common function of animals and note a variety of food-gathering structures ([Outcome](#)).
- Answer:** Cells are the basic unit of life because all living things are made of cells, and cells carry out the functions necessary to keep organisms alive, such as growth, reproduction and response to the environment. Possible variations: Students may mention that cells are the smallest living unit, or that cells come from existing cells.
- Answer:** Plant cells have a cell wall (or chloroplasts, or a large vacuole); accept any one. The cell wall provides structure and support to the plant, helping it stand upright and protecting the cell membrane inside. Chloroplasts capture light energy for photosynthesis. A large vacuole stores water and nutrients.
- Answer: False.** During diffusion, molecules move from an area of high concentration to an area of low concentration (down the concentration gradient), not the other way around. This is the definition of diffusion ([Outcome](#)).
- Answer:** The circulatory system (or cardiovascular system) is responsible for the increase in heart rate. When you exercise, your muscles need more oxygen and nutrients, so your heart pumps faster to deliver blood more quickly to those tissues. Your heart rate also increases to remove carbon dioxide and other waste products ([Outcome](#)).
- Answer: 120 millilitres per hour.** If water loss under the different conditions is 40% lower than under the original conditions, the plant loses 60% of the water it loses under the original conditions. $200 \text{ mL} \times 0.60 = 120 \text{ mL}$ per hour. The plant's response to light and humidity conditions reduces water loss because stomata open and close in response to these environmental factors, controlling how much water can evaporate through the leaf ([Outcome](#)).