Cells Under Comparison

Use structural clues to compare three cell types.

FB.3.1 "Compare and contrast prokaryotic/eukaryotic and plant/animal/bacteria cells."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two features shared by different cell types and circle three differences that help you tell the cell types apart.

Three Samples, Three Cell Types

1. Imagine a drop of pond water beside a scrap of spinach and a swab from your cheek. Each sample contains cells, but their inner layouts differ. Bacteria are prokaryotes: their DNA lies in the cytoplasm rather than inside a nucleus. Plant and animal cells are eukaryotes, with DNA held inside a nucleus. All three cell types have a cell membrane that controls what enters and leaves, cytoplasm where many reactions occur, and ribosomes that build proteins. Those shared parts do not make the cells identical; the presence or absence of a nucleus separates the two broad groups.

2. A spinach leaf cell has chloroplasts that capture light for photosynthesis, turning light energy into chemical energy stored in sugars. It also has a stiff cell wall made of cellulose outside its cell membrane, plus a large central vacuole that helps keep the cell firm. A cheek cell has a nucleus but lacks chloroplasts and a cell wall; its flexible membrane forms its outer edge. Most bacteria have a cell wall, yet bacterial walls are not made of cellulose. Their walls typically contain peptidoglycan. Unlike a plant cell, a bacterium has no chloroplasts, even if it uses light for energy.

3. Picture each cell as a workspace. The plant and animal workspaces contain membrane-bound compartments, including a nucleus and mitochondria, where much usable energy is released from food. Bacteria lack these membrane-bound compartments, although they still carry out life processes. A bacterium can break down nutrients and release usable energy without mitochondria. Cell size offers a clue but not proof: bacteria are generally smaller than plant and animal cells, yet sizes can overlap. To identify a cell, use several structural clues together. A wall alone is not enough, because both many bacteria and plant cells have one.

2 ANSWER WITH EVIDENCE

Use the passage

1. How is the location of DNA different in bacteria and cheek cells, and what is one cell part they share?

2. Compare the outer boundaries of spinach leaf cells and cheek cells. Which cell type can use chloroplasts for photosynthesis?

3. A plant cell and a bacterium may both have cell walls. How are their walls different, and which cell type has chloroplasts?

4. How do plant and animal cells differ from bacteria in the structures they use to release usable energy from food?

3 YOUR TURN

Your own words

A lab report describes three unknown cells: A has a nucleus, a cellulose wall, and chloroplasts; B has no nucleus and has a peptidoglycan wall; C has a nucleus and mitochondria but no wall or chloroplasts. In four sentences, identify each cell as plant, animal, or bacterium, then compare a feature shared by two of them with the third.

Cells Under Comparison

PART 1 · READ AND MARK

Underline two features shared by different cell types and circle three differences that help you tell the cell types apart. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How is the location of DNA different in bacteria and cheek cells, and what is one cell part they share?	**Bacterial DNA lies in the cytoplasm, while cheek cell DNA is inside a nucleus. Both have a cell membrane, cytoplasm, or ribosomes.**
2	Compare the outer boundaries of spinach leaf cells and cheek cells. Which cell type can use chloroplasts for photosynthesis?	**Spinach leaf cells have a cellulose wall outside their membrane; cheek cells have no wall. Spinach leaf cells have chloroplasts for photosynthesis.**
3	A plant cell and a bacterium may both have cell walls. How are their walls different, and which cell type has chloroplasts?	**Plant cell walls are made of cellulose; bacterial walls typically contain peptidoglycan. Plant cells have chloroplasts, but bacteria do not.**
4	How do plant and animal cells differ from bacteria in the structures they use to release usable energy from food?	**Plant and animal cells have mitochondria, where much usable energy is released from food. Bacteria release usable energy without mitochondria.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Cell A is a plant cell because it has a nucleus, a cellulose wall, and chloroplasts. Cell B is a bacterium because it lacks a nucleus and has a peptidoglycan wall. Cell C is an animal cell because it has a nucleus and no wall or chloroplasts. A and C share a nucleus, while B has no nucleus.

Accept any correctly identified shared part in question 1. For Your Turn, accept four sentences that classify all three cells and accurately compare a shared feature with the third cell.