Cells in the Dough

Compare cell structures to explain what microbes do.

7.1.b "Construct an explanation of how prokaryotic and eukaryotic cells differ in structure and function."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one structure shared by bacteria and yeast, then circle two structures found in yeast but not bacteria. Number two places where a cell structure is linked to a function.

The Tiny Team Behind Sourdough

1 When a baker mixes flour and water, microbes begin to feed on sugars in the dough. Two common partners are lactic acid bacteria and yeast. Each cell has a membrane that controls what enters and leaves, cytoplasm where many reactions occur, and ribosomes that build proteins. Those proteins help the cells grow and carry out chemical reactions. Yet the partners do not have the same internal layout. Lactic acid bacteria are prokaryotes. Yeast cells are eukaryotes. Their different structures help explain what each cell can do.

2 In a bacterial cell, DNA lies in the cytoplasm, in a region without a surrounding membrane. The cell has no nucleus or other membrane-bound organelles. Its ribosomes build proteins using instructions from DNA. Lactic acid bacteria break down sugars and release acids, which give sourdough its tangy taste. Without mitochondria, bacteria can carry out energy-releasing reactions at their cell membrane. Bacteria are usually smaller than yeast cells. Their small size gives them more membrane surface compared with their volume, helping materials move in and out fast enough for the cell's needs.

3 A yeast cell keeps most of its DNA inside a nucleus, a membrane-bound compartment. It also has mitochondria, organelles that release usable energy from food when oxygen is available. Like bacteria, yeast has ribosomes that make proteins, but yeast keeps some cell tasks in separate compartments. Yeast breaks down sugars and releases carbon dioxide gas, which forms bubbles that lift the dough. Yeast is usually larger than the bacteria beside it. Both partners use sugar, yet their different products change the bread in different ways.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does the location of DNA differ in a bacterial cell and a yeast cell? Name the structure that makes the difference.

2. Compare how bacteria and yeast can release usable energy from food. Name a cell structure involved in each.

3. Bacteria and yeast have different internal layouts. What structure do both use to make proteins, and why do both need proteins?

4. How do these two differently structured cells each change sourdough after using sugar? Include one structural difference and each cell's product.

3 YOUR TURN

Your own words

Imagine two newly discovered cells living in a jar of fruit juice, one prokaryotic and one eukaryotic. In four sentences, describe a structure in each cell and explain a function it supports, then name one structure they share.

ANSWER KEY

Cells in the Dough

GRADE 7 · 7.1.b

PART 1 · READ AND MARK

Underline one structure shared by bacteria and yeast, then circle two structures found in yeast but not bacteria. Number two places where a cell structure is linked to a function. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does the location of DNA differ in a bacterial cell and a yeast cell? Name the structure that makes the difference.	**Bacterial DNA lies in the cytoplasm without a surrounding membrane. Most yeast DNA is inside a nucleus.**
2	Compare how bacteria and yeast can release usable energy from food. Name a cell structure involved in each.	**Bacteria can carry out energy-releasing reactions at their cell membrane. Yeast can use mitochondria to release usable energy when oxygen is available.**
3	Bacteria and yeast have different internal layouts. What structure do both use to make proteins, and why do both need proteins?	**Both use ribosomes to make proteins. Proteins help the cells grow and carry out chemical reactions.**
4	How do these two differently structured cells each change sourdough after using sugar? Include one structural difference and each cell's product.	**Bacteria lack a nucleus and release acids that give sourdough a tangy taste. Yeast has a nucleus and releases carbon dioxide that forms bubbles and lifts the dough.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

My prokaryotic cell has no nucleus, so its DNA lies in the cytoplasm and provides instructions for making proteins. Its membrane controls what enters and leaves the cell. My eukaryotic cell has mitochondria that release usable energy from food when oxygen is available. Both cells have ribosomes that build proteins needed for growth.

Accept other accurate structure-function links supported by the passage. Do not require students to claim that a nucleus causes yeast to produce carbon dioxide.