

Cells Change Survival

Trace cell theory, organism traits, and population change.

6.13 "Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations..."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each occurrence of these six classification terms: prokaryotic, eukaryotic, unicellular, multicellular, autotrophic, and heterotrophic. Then write 1, 2, and 3 above the three cell-theory claims in the final sentence of paragraph 1, from left to right.

Life at the Cell Level

- ① In 1665, Robert Hooke looked at thin cork through a microscope and named the tiny boxlike spaces cells. Later, Antonie van Leeuwenhoek observed living single-celled organisms. In 1838, Matthias Schleiden concluded that plants are made of cells, and Theodor Schwann soon concluded the same about animals. In 1855, Rudolf Virchow stated that new cells come from existing cells. These discoveries led to cell theory: all organisms are made of one or more cells, cells are the basic units of structure and function, and new cells come from pre-existing cells.
- ② Organisms can be sorted in several ways. Prokaryotic organisms, such as bacteria, have no nucleus, while eukaryotic organisms have cells with a nucleus. A unicellular organism has one cell that carries out life processes. A multicellular organism has many cells, often with different jobs. Autotrophic organisms make their own food, usually by using light energy. Heterotrophic organisms get energy by eating or absorbing other organisms or their products. One organism can fit more than one of these categories.
- ③ A population is a group of organisms of one species in one area. Variations are differences among individuals. Some variations are inherited and can be passed to offspring, while others result from conditions or experiences during an organism's life and are not passed on. In a beetle population, inherited color differences matter after wildfires darken ground. Dark beetles may be harder for birds to see, so more may survive and reproduce. Pale beetles may be easier to spot. As environments change, a variation can help or harm population survival, and helpful inherited traits can spread.

2 ANSWER WITH EVIDENCE Use the passage

- 1 How did Hooke's, Leeuwenhoek's, Schleiden and Schwann's, and Virchow's work contribute to the development of cell theory?

- 2 What are the three main claims of cell theory stated in paragraph 1?

- 3 Compare each pair: prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic.

- 4 After wildfires darken the ground, how can beetle color variation affect the population? Explain why dark color might become more common.

3 YOUR TURN Your own words

Write a five-sentence field note about a fictional population. Identify whether its organisms are prokaryotic or eukaryotic, unicellular or multicellular, and autotrophic or heterotrophic, state what their cells do and where new cells come from, then explain how one inherited variation affects survival after an environmental change.

PART 1 • READ AND MARK

Underline each occurrence of these six classification terms: prokaryotic, eukaryotic, unicellular, multicellular, autotrophic, and heterotrophic. Then write 1, 2, and 3 above the three cell-theory claims in the final sentence of paragraph 1, from left to right. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How did Hooke's, Leeuwenhoek's, Schleiden and Schwann's, and Virchow's work contribute to the development of cell theory?	Hooke named cells after seeing cork spaces. Leeuwenhoek saw living single-celled organisms. Schleiden and Schwann concluded that plants and animals are made of cells. Virchow stated that new cells come from existing cells.
2	What are the three main claims of cell theory stated in paragraph 1?	All organisms are made of one or more cells. Cells are the basic units of structure and function. New cells come from pre-existing cells.
3	Compare each pair: prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic.	Prokaryotic organisms have no nucleus, while eukaryotic organisms have cells with a nucleus. Unicellular organisms have one cell, while multicellular organisms have many cells. Autotrophs make their own food, while heterotrophs get energy by eating or absorbing organisms or their products.
4	After wildfires darken the ground, how can beetle color variation affect the population? Explain why dark color might become more common.	Dark beetles may be harder for birds to see, so more may survive and reproduce. If dark color is inherited, the helpful trait can be passed to offspring and become more common.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Sunreeds are multicellular eukaryotic organisms that live beside a lake. They are autotrophic because they use light to make food. Their many cells build their leaflike bodies and carry out life functions. New Sunreed cells come from pre-existing cells as the organisms grow. After a drought, plants with an inherited waxy coating lose less water, so they survive and reproduce more than plants without the coating.

Accept equivalent descriptions that accurately compare the organism categories and state all three cell-theory claims. For the field note, accept any scientifically coherent fictional organism and inherited variation that could affect survival after a stated environmental change.