One Becomes More

Trace how cell division produces asexual offspring

BIO.1E.3 "Relate the processes of cellular reproduction to asexual reproduction in simple organisms (i.e., budding, vegetative propagation, regeneration, binary fission). Explain why the DNA of the daughter cells is the same as the parent cell."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the cell events that help each organism produce offspring, and circle details about DNA copying. Use your marks to trace how offspring inherit DNA from one parent.

Four Ways to Make More

1. A baker leaves a bit of yeast in warm dough. Each yeast cell copies its DNA, separates the copies, and forms a small bud. One copy enters the bud before it pinches off as a new yeast cell. This is budding, an asexual way to make another organism from one parent. In a nearby sink, bacteria can also multiply without a partner. A bacterium copies its single circular chromosome, moves the copies apart as the cell grows, then splits into two cells. This process, binary fission, does not involve mitosis. Both examples turn one parent's copied DNA into new cells.

2. In a school garden, a strawberry plant sends out a runner, a stem that grows along the soil. Cells in the runner copy their DNA and divide by mitosis. Roots and leaves grow at a point on the runner, producing a new plant. That is vegetative propagation. In a freshwater pond, a flatworm called a planarian can reproduce when its body separates into two viable pieces. Cells in each piece copy their DNA and divide by mitosis to replace missing parts, until each piece becomes a whole worm. This form of regeneration produces new organisms from one parent.

3. What connects a bud, a runner, a regrowing fragment, and a splitting bacterium? Before a new cell forms, its parent copies the DNA instructions. In yeast, strawberry plants, and planarians, mitosis separates copied chromosomes into two nuclei, and cell division produces new cells. In bacteria, chromosome copying and separation lead directly to binary fission instead. Because each new cell receives a copy of the parent's DNA, offspring usually have the same DNA as the parent. A copying mistake, called a mutation, can change DNA, so identical DNA is the expected result, not an absolute guarantee.

2 ANSWER WITH EVIDENCE

Use the passage

1. How do DNA copying and cell division allow a yeast bud to become a new organism?

2. How does a bacterium produce offspring through binary fission without using mitosis?

3. How does cell reproduction turn a strawberry runner into a new plant with the parent's DNA?

4. Why can each viable planarian piece become a whole worm with DNA that is usually the same as the parent's, but not always?

3 YOUR TURN

Your own words

A grower plants a potato tuber, and one of its eyes sprouts into a new plant. In three or four sentences, explain how cell reproduction builds the plant, name the asexual process, and explain why its DNA usually matches the original potato plant's but might differ.

One Becomes More

PART 1 · READ AND MARK

Underline the cell events that help each organism produce offspring, and circle details about DNA copying. Use your marks to trace how offspring inherit DNA from one parent. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How do DNA copying and cell division allow a yeast bud to become a new organism?	**The yeast cell copies its DNA, puts one copy into the bud, and the bud pinches off as a new cell.**
2	How does a bacterium produce offspring through binary fission without using mitosis?	**It copies its circular chromosome, moves the copies apart as it grows, and splits into two cells.**
3	How does cell reproduction turn a strawberry runner into a new plant with the parent's DNA?	**Runner cells copy their DNA and divide by mitosis. The new plant grows from those cells and receives copies of the parent's DNA.**
4	Why can each viable planarian piece become a whole worm with DNA that is usually the same as the parent's, but not always?	**Cells in each piece copy their DNA and divide by mitosis to replace missing parts. The copies usually match the parent's DNA, but a mutation can change them.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Cells in the potato eye copy their DNA and divide by mitosis as the shoot grows. A new plant forms from the tuber without fertilization, which is vegetative propagation. Its DNA usually matches the original potato plant's because the new cells receive copies of the parent's DNA. A mutation during DNA copying could make some of its DNA different.

Accept explanations that connect DNA copying and cell division to new organisms. For the potato task, accept a clear description of vegetative propagation even if the term is not used.