

Genes in Two Ways

Model how reproduction affects genetic information.

S7L3.b "Develop and use a model to describe how asexual reproduction can result in offspring with identical genetic information while sexual reproduction results in genetic variation."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline words that show genetic information is copied or identical, circle words that show genetic information combines or is unique, and write A beside the asexual model and S beside the sexual model.

Following Genetic Information

- ① Imagine a freshwater hydra growing on a rock. A small bud forms on its side. As the bud grows, cells copy the hydra's genetic information through mitosis. The bud develops into a new hydra and separates. Because it received copied genetic information from one parent, the new hydra has genetic information identical to the parent's. This is an asexual reproduction model: one parent produces offspring without combining genetic information from another parent. The model uses matching gene labels to show the copies.
- ② A sexual reproduction model can use two pea plants. One plant's pollen carries genetic information from one parent. An ovule in a flower of another plant carries genetic information from a second parent. When pollen and ovule join during fertilization, their genetic information combines in a seed. The seed's new plant receives a unique combination of genetic information. It is not genetically identical to either parent or to every sibling plant. This model shows why sexual reproduction creates genetic variation.
- ③ Models are tools for showing relationships that cannot be seen easily. In an asexual model, draw one parent and an offspring with the same set of lettered gene cards, such as A, B, C. Arrows show copied information moving to the offspring. In a sexual model, show two parents, one with gene cards A, B, C and one with cards a, b, c. A seed or offspring receives one card from each pair, creating a new combination. Use arrows to trace each card.

2 ANSWER WITH EVIDENCE Use the passage

1 How does the hydra model show why the new hydra has genetic information identical to its parent?

2 What happens to genetic information when pollen and an ovule join during fertilization?

3 Why is a new pea plant in the sexual reproduction model not genetically identical to either parent?

4 Compare the source of genetic information in the asexual hydra model and the sexual pea plant model.

3 YOUR TURN Your own words

Create a two-panel model. In Panel 1, show asexual reproduction with one parent and an offspring that have matching lettered gene cards. In Panel 2, show sexual reproduction with two parents and an offspring with a combination of their gene cards. Draw arrows and labels, then write one sentence below each panel explaining the genetic information.

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PART 1 • READ AND MARK

Underline words that show genetic information is copied or identical, circle words that show genetic information combines or is unique, and write A beside the asexual model and S beside the sexual model. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How does the hydra model show why the new hydra has genetic information identical to its parent?	Cells copy the parent's genetic information through mitosis as the bud grows, so the new hydra receives copied information from one parent.
2	What happens to genetic information when pollen and an ovule join during fertilization?	Genetic information from the two parents combines in the seed.
3	Why is a new pea plant in the sexual reproduction model not genetically identical to either parent?	It receives a unique combination of genetic information from two parents.
4	Compare the source of genetic information in the asexual hydra model and the sexual pea plant model.	The hydra offspring receives copied genetic information from one parent. The pea plant offspring receives combined genetic information from two parents.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1: A parent hydra has gene cards D, E, F. Arrows labeled "copied genetic information" point to a bud offspring with D, E, F. Sentence: The offspring has identical genetic information because it received copied information from one parent. Panel 2: One pea plant has gene cards M, N, and another pea plant has gene cards m, n. Arrows from both parents point to a seed with M, n. Sentence: The seed has a new combination of genetic information from two parents.

Accept models that clearly show copied, matching genetic information from one parent in the asexual panel. In the sexual panel, accept any plausible mixed combination that is traced by arrows to two parents and is explained as genetic variation.