The Hidden Seed

Use scientific sources to explain how traits pass from parents to offspring.

L.8.2B.2 "Use various scientific resources to research and support the historical findings of Gregor Mendel to explain the basic principles of heredity."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one finding from each named scientific resource. Number the findings 1, 2, and 3 to show how the sources build an explanation of heredity.

How Did the Wrinkled Seeds Return?

1. In a greenhouse, two pea plants can look alike but carry different versions of a trait. In his 1866 paper, *Experiments on Plant Hybridization*, Gregor Mendel reported crossing pea plants with contrasting traits, such as round and wrinkled seeds. The first generation had round seeds. When those plants self-pollinated, wrinkled seeds returned. For seed shape, Mendel counted 5,474 round and 1,850 wrinkled seeds, close to a three-to-one ratio. The return of wrinkled seeds supported his idea that inherited factors remain separate rather than blending together.

2. Mendel could count seeds, but he could not see the structures that carry his factors. In his 1903 article *The Chromosomes in Heredity*, biologist Walter Sutton described how chromosome pairs separate when reproductive cells form. Each reproductive cell receives one chromosome from each pair. Sutton argued that this pattern fits Mendel's finding that offspring receive one inherited factor from each parent. Sutton's work connected Mendel's counted traits to a process inside cells. It offered a physical explanation for how inherited factors could stay separate across generations.

3. Today, the National Human Genome Research Institute's *Talking Glossary of Genomic and Genetic Terms* defines an allele as a version of a gene and describes genes as stretches of DNA on chromosomes. For seed shape, a pea plant can inherit two alleles, one from each parent. If a round-seed allele masks a wrinkled-seed allele, the plant has round seeds but can pass on the wrinkled allele. The glossary explains the modern words; Mendel's counts and Sutton's chromosome observations provide different kinds of evidence for how traits pass between generations.

2 ANSWER WITH EVIDENCE

Use the passage

1. What evidence in Mendel's 1866 paper supports the idea that inherited factors do not blend together? Include his seed counts.

2. How does the observation in Sutton's 1903 article help explain Mendel's idea that offspring receive separate factors from their parents?

3. Use the glossary's definition of an allele to explain how a plant with round seeds could pass on the wrinkled trait.

4. Why is the glossary not a substitute for Mendel's 1866 paper when supporting the claim that wrinkled seeds returned?

3 YOUR TURN

Your own words

Two round-seed pea plants each carry a wrinkled-seed allele. Write four sentences for a seed collector predicting whether they could produce wrinkled seeds. Support your prediction with Mendel's counts and findings from both later resources named in the passage.

ANSWER KEY

The Hidden Seed

GRADE 8 · L.8.2B.2

PART 1 · READ AND MARK

Underline one finding from each named scientific resource. Number the findings 1, 2, and 3 to show how the sources build an explanation of heredity. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What evidence in Mendel's 1866 paper supports the idea that inherited factors do not blend together? Include his seed counts.	**Wrinkled seeds returned after the round-seeded first generation self-pollinated. Mendel counted 5,474 round seeds and 1,850 wrinkled seeds, showing that the wrinkled trait had not blended away.**
2	How does the observation in Sutton's 1903 article help explain Mendel's idea that offspring receive separate factors from their parents?	**Sutton described chromosome pairs separating as reproductive cells form, so each cell receives one chromosome from each pair. This provides a physical way for offspring to receive separate inherited factors from their parents.**
3	Use the glossary's definition of an allele to explain how a plant with round seeds could pass on the wrinkled trait.	**An allele is a version of a gene. A plant can have both a round-seed allele and a wrinkled-seed allele; the round-seed allele can mask the wrinkled-seed allele, which the plant can still pass on.**
4	Why is the glossary not a substitute for Mendel's 1866 paper when supporting the claim that wrinkled seeds returned?	**The glossary explains terms such as allele, but Mendel's paper reports the seed counts and the return of wrinkled seeds.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The two round-seed plants could produce wrinkled seeds because each carries a wrinkled-seed allele. In Mendel's 1866 paper, wrinkled seeds returned after the first generation self-pollinated, and he counted 1,850 wrinkled seeds. The National Human Genome Research Institute's *Talking Glossary of Genomic and Genetic Terms* explains that alleles are versions of a gene, so a round-seed plant can carry a wrinkled-seed allele. Sutton's 1903 article *The Chromosomes in Heredity* describes chromosome pairs separating into reproductive cells, helping explain how both parents could pass along that allele.

Accept explanations that distinguish Mendel's seed counts, Sutton's chromosome observations, and the glossary's definitions. For Part 3, the prediction must be possible rather than certain.