

Section: The Origins of Genetics

Read the passage below. Then answer the questions that follow.

Mendel's initial experiments were monohybrid crosses. A **monohybrid cross** is a cross that involves one pair of contrasting traits. For example, crossing a plant with purple flowers and a plant with white flowers is a monohybrid cross. Mendel carried out his experiments in three steps.

Step 1: Mendel allowed each variety of garden pea plants to self-pollinate for several generations. This method ensured that each variety was **true-breeding** for a particular trait; that is, all the offspring would display only one form of a particular trait. For example, a true-breeding purple-flowering plant should produce only plants with purple flowers in subsequent generations.

These true-breeding plants served as the parental generation in Mendel's experiments. The parental generation, or **P generation**, are the first two individuals that are crossed in a breeding experiment.

Step 2: Mendel then cross-pollinated two P generation plants that had contrasting forms of a trait such as purple and white flowers. Mendel called the offspring of the P generation the first filial generation, or **F₁ generation**. He then examined each F₁ plant and recorded the number of F₁ plants expressing each trait.

Step 3: Finally, Mendel allowed the F₁ generation to self-pollinate. He called the offspring of the F₁ generation plants the second filial generation, or **F₂ generation**. Again, each F₂ plant was characterized and counted.

SKILL: READING EFFECTIVELY

Read each question, and write your answer in the space provided.

1. The prefix *mono-* means "one." How does this apply to the key term *monohybrid cross*?

2. What information does the third sentence tell the reader?

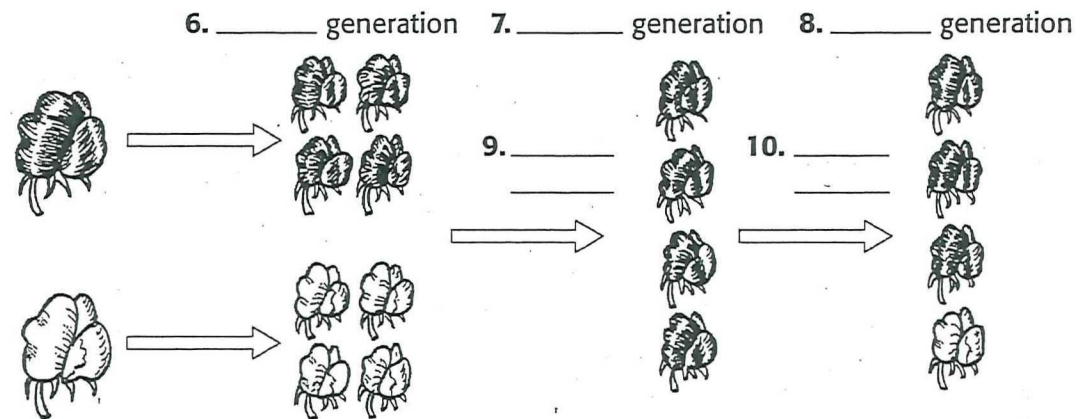
3. Describe the offspring of a true-breeding white-flowering plant.

4. What is the P generation?

5. What does the term *F₁ generation* refer to?

SKILL: INTERPRETING GRAPHICS

The figure below shows three generations of plants. Insert the following labels in the spaces provided: **cross-pollination**, **F₁**, **F₂**, **P**, **self-pollination**.



In the space provided, write the letter of the phrase that best completes the statement.

- _____ 11. During the course of his experiment, Mendel studied traits in
- one generation of plants.
 - two generations of plants.
 - three generations of plants.
 - more than five generations of plants.

Directed Reading

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Read each question, and write your answer in the space provided.

1. What did T. A. Knight discover?

2. How did Mendel's scientific work differ from the work of T. A. Knight?

3. What are three reasons the garden pea is a good subject for studying heredity?

Complete each statement by writing the correct term or phrase in the space provided.

4. A mating that considers one pair of contrasting traits is called a(n)

_____ cross.

5. The first two individuals that are crossed in a breeding experiment are called

the _____ generation.

6. In Mendel's experiment, the _____ generation was

obtained by cross-pollinating the P₁ generation.

7. The _____ generation in Mendel's experiment showed both forms of the trait in a ratio of 3:1.