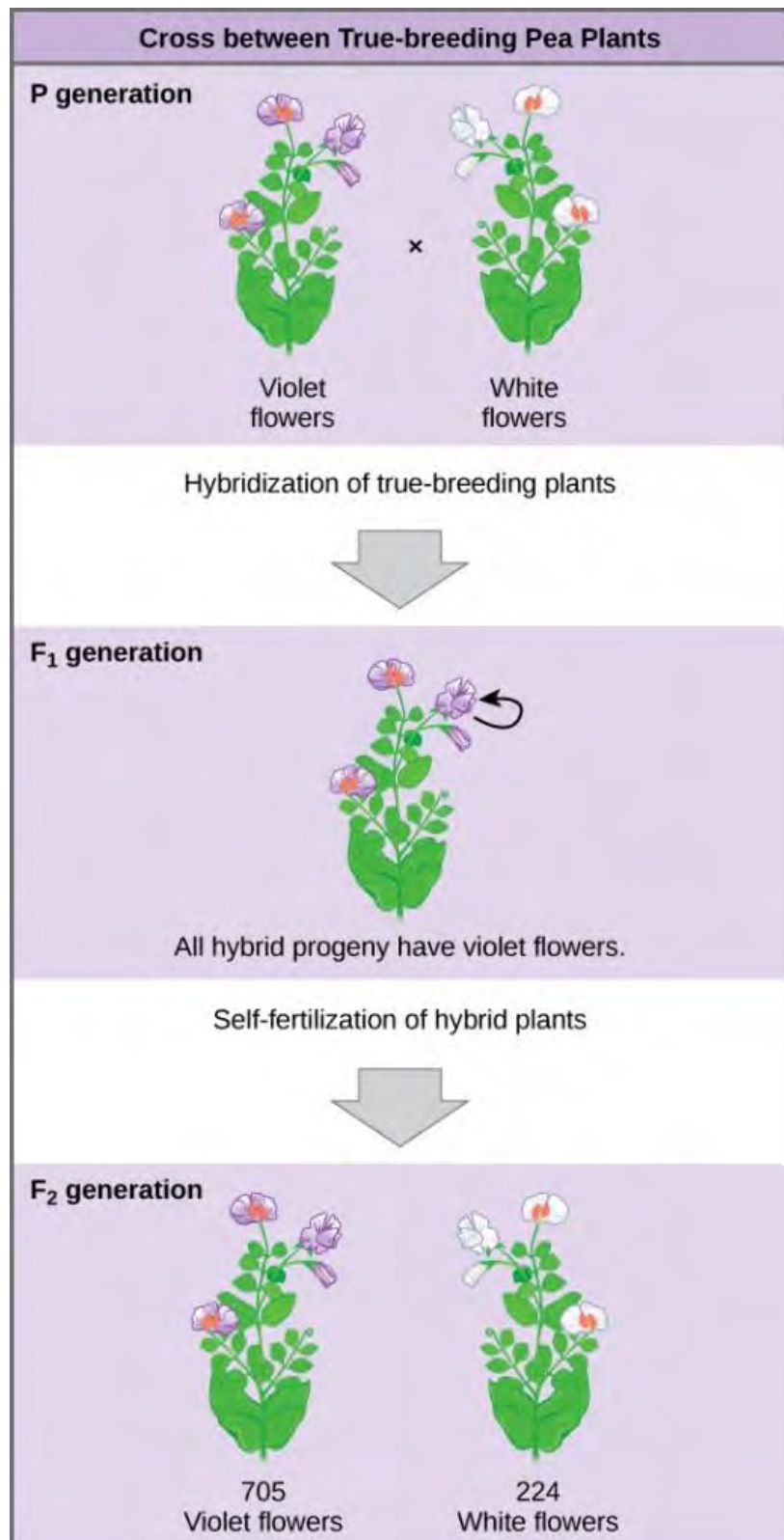


flowered plant. In this cross, the true-breeding violet flower plant and true-breeding white-flowered plant are called the parental generation, or **P generation** (Figure 9.4). After each cross, Mendel collected the seeds belonging to the P generation and grew them the following season. These offspring were called the first filial generation, or the **F₁ generation**. Filial means offspring, daughter or son. Once Mendel examined the characteristics in the F₁ plants, he allowed them to self-fertilize naturally. He then collected and grew the seeds from the F₁ plants to produce the second filial generation, or **F₂ generation**. Mendel's experiments extended beyond the F₂ generation to the F₃ and F₄ generations, and so on. It was the ratio of characteristics in the P, F₁, and F₂ generations that were by far the most intriguing and became the basis for Mendel's hypotheses.

Figure 9.4 Mendel's experiments involved cross-fertilizing true-breeding plants with different traits, such as purple-flowered plant and a white-flowered plant. These plants are the P generation. Their offspring, the F₁ generation, were allowed to self-fertilize, resulting in the F₂ generation. (credit: Clark et al. / [Biology 2E OpenStax](#))



Section Summary

The blending hypothesis of inheritance stated that when two individuals made an offspring, their original parental traits were lost because their traits blended together when the offspring was formed. We now know that this is not the case. Many people supported the blending hypothesis because of what is commonly referred to as continuous variation. Continuous variation occurs when a character, such as height in humans, is influenced by several different genes. Mendel worked with traits that show discontinuous variation. Discontinuous variation is when each individual exhibits one of two easily distinguishable traits, such as violet or white flowers. Mendel's decision to use traits that show discontinuous variation allowed him to see experimentally that offspring were not a result of "blending." Mendel studied inheritance using the common garden pea plant, *Pisum sativum*. This species of plants naturally self-fertilizes itself, always producing offspring that look like the parent plant. By experimenting with true-breeding pea plants, Mendel avoided the appearance of unexpected traits in offspring. Mendel performed hybridizations, or cross-fertilizations, which involve mating two true-breeding individuals that have different traits.

Exercises

1. Height in humans is an example of:
 - a. Discontinuous variation
 - b. Continuous variation
 - c. The blending hypothesis
 - d. Both b and c
2. Describe one of the reasons that made the garden pea an excellent choice of a model system for studying inheritance.

Answers

1. (b)
2. The garden pea has flowers that close tightly during self-pollination. This helps to prevent accidental or unintentional fertilizations that could have diminished the accuracy of Mendel's data.

Glossary

blending hypothesis of inheritance: states that when two individuals made an offspring, their original parental traits were lost because their traits blended together when the offspring was formed

characteristic: different heritable, physical features

continuous variation: a variation in a characteristic in which individuals show a range of traits with small differences between them

discontinuous variation: a variation in a characteristic in which individuals show two, or a few, traits with significant differences between them

F₁: the first filial generation in a cross; the offspring of the parental generation

F₂: the second filial generation produced when F₁ individuals are self-crossed or fertilized with each other

hybridization/cross-fertilization: the process of mating two individuals that differ, to achieve a certain characteristic in their offspring

P: the parental generation in a cross

trait: a variation in an inherited characteristic

Footnotes

¹ Johann Gregor Mendel, “Versuche über Pflanzenhybriden.” *Verhandlungen des naturforschenden Vereines in Brünn*, Bd. IV für das Jahr, 1865 Abhandlungen (1866):3–47. [for English translation, see <http://www.mendelweb.org/Mendel.plain.html>]