

Unit L3 • Traits and Heredity

Mendel's Experiments

The first table below shows what happened when Mendel crossed purebred purple-flowering pea plants with purebred white-flowering pea plants. Each F₁ **hybrid inherits** one purple-flower allele and one white-flower allele. Because the purple-flower allele is **dominant**, the flowers on all the F₁ plants are purple.

FLOWER COLOR: Making the F₁ generation

All allele pairs inherited from the purebreds are the same	purple white	purple white	purple white	purple white
F ₁ flower color will be:	purple	purple	purple	purple

But when the F₁ **hybrids** produce the next **generation of hybrids**, things are different. Each F₁ parent has an equal chance of giving a purple-flower or a white-flower allele to each of its F₂ **offspring**. The four possible outcomes shown below are all equally likely, and will tend to show up in equal numbers when two plants have a large number of **offspring**.

FLOWER COLOR: Making the F₂ generation

The 4 equally likely allele pairs inherited from the F ₁ generation	purple purple	purple white	white purple	white white
F ₂ flower color will be:	purple	purple	purple	white

The two tables above show why Mendel found that none of the F₁ plants showed **recessive traits**, but **recessive traits** showed again in about one quarter of the F₂ **generation** plants. Compare these tables to the F₁ and F₂ rows in the diagrams earlier in this section.

Complete the tables below by writing in the **traits** for the F₂ **generation** plants in the stem-length and pod-shape breeding experiments:

STEM LENGTH: Making the F₂ generation

The 4 equally likely allele pairs inherited from the F ₁ generation	long long	long short	short long	short short
F ₂ stem length will be:				

POD SHAPE: Making the F₂ generation

The 4 equally likely allele pairs inherited from the F ₁ generation	smooth smooth	smooth bumpy	bumpy smooth	bumpy bumpy
F ₂ pod shape will be:				