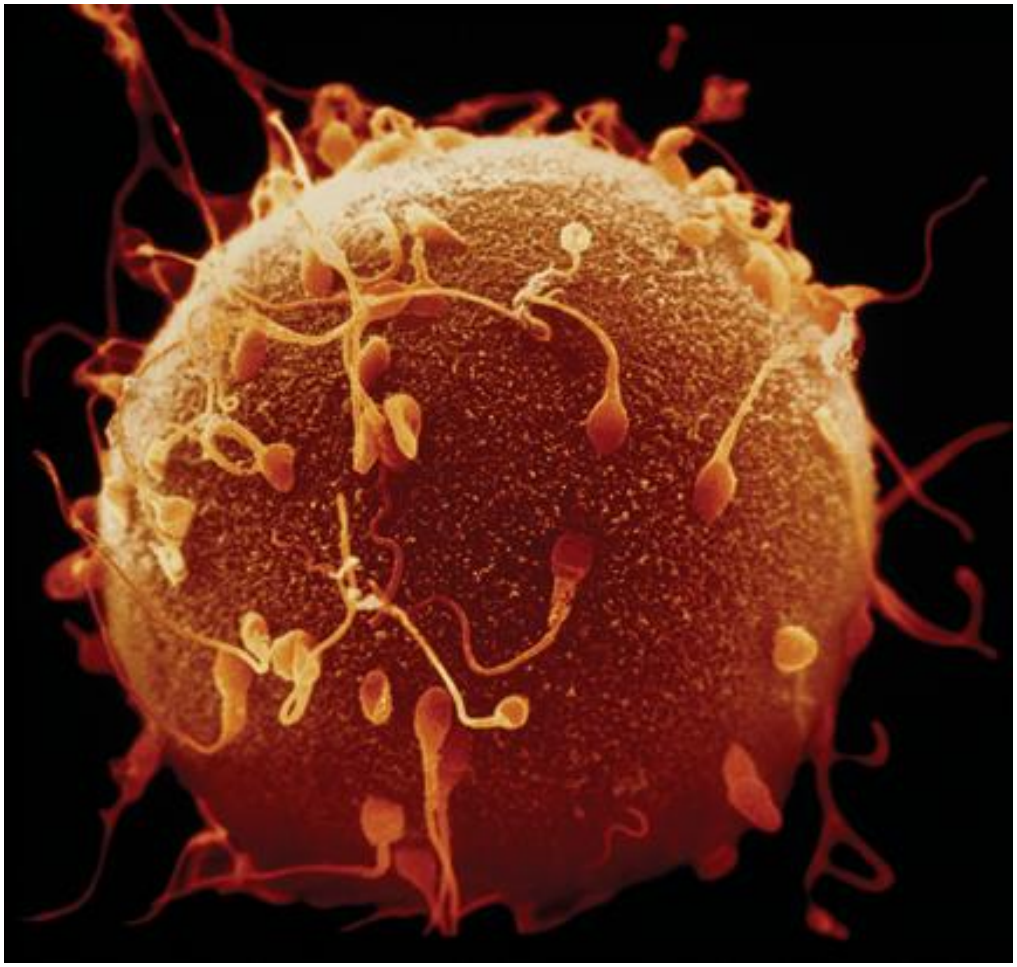
6.3 Mendel and Heredity

KEY CONCEPT

Mendel's research showed that traits are inherited as discrete units.



6.3 Mendel and Heredity

Mendel laid the groundwork for genetics.

- **Traits** are distinguishing characteristics that are inherited.
- **Genetics** is the study of biological inheritance patterns and variation.
- **Gregor Mendel** showed that traits are inherited as discrete units.
- Many in Mendel's day thought traits were blended.

6.3 Mendel and Heredity

Mendel's data revealed patterns of inheritance.

- Mendel made **three key decisions** in his experiments.
  - use of purebred plants
  - control over breeding
  - observation of seven "either-or" traits

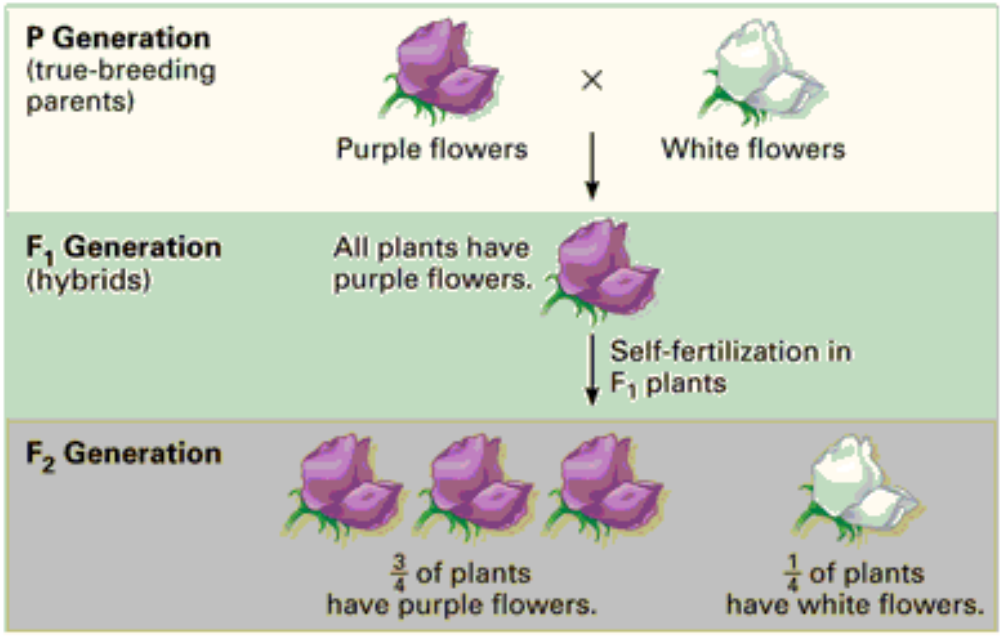
6.3 Mendel and Heredity

- **Mendel's data revealed patterns of inheritance.**
  - Pea plant characteristics:
    1. seed color
    2. seed shape
    3. pod shape
    4. pod color
    5. flower color
    6. flower position
    7. stem length

Character	Dominant Trait	×	Recessive Trait
Flower color	Purple 	×	White 
Flower position	Axial 	×	Terminal 
Seed color	Yellow 	×	Green 
Seed shape	Round 	×	Wrinkled 
Pod shape	Inflated 	×	Constricted 
Pod color	Green 	×	Yellow 
Stem length	Tall 	×	Dwarf 

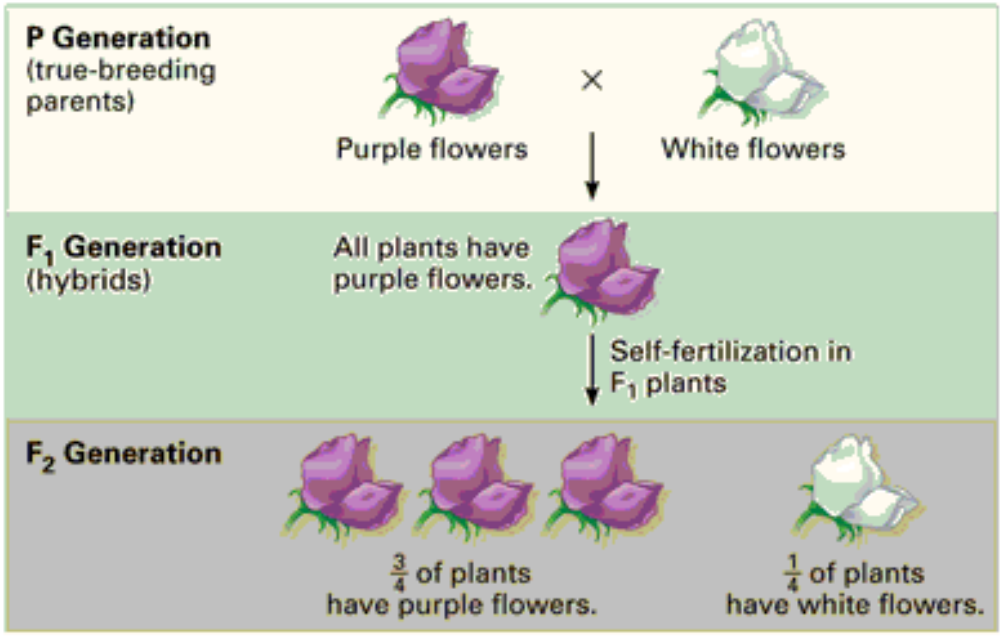
6.3 Mendel and Heredity

- **Cross** – the mating of two organisms.
- **P**:
  - The parental generation.
  - Mendel used purebred plants for the parental generation
  - He crossed purebred purple flowered plants with purebred white-flowered plants



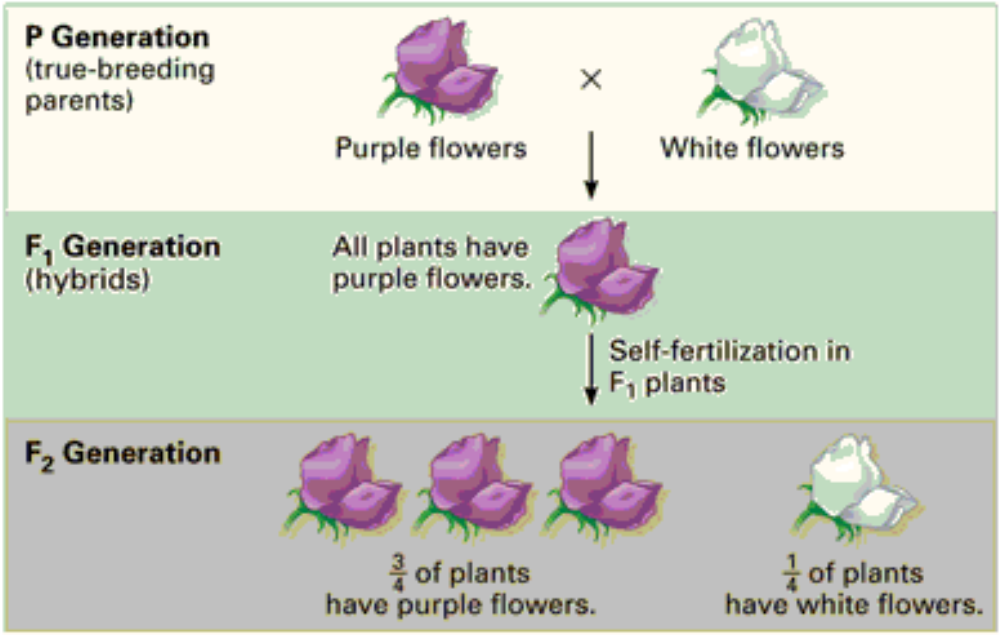
6.3 Mendel and Heredity

- **Cross** – the mating of two organisms.
- **F_1**:
  - The first generation of offspring resulting from the parental cross.
  - For example: Mendel's F1 plants all had purple flowers
  - Mendel allowed this generation to self-pollinate



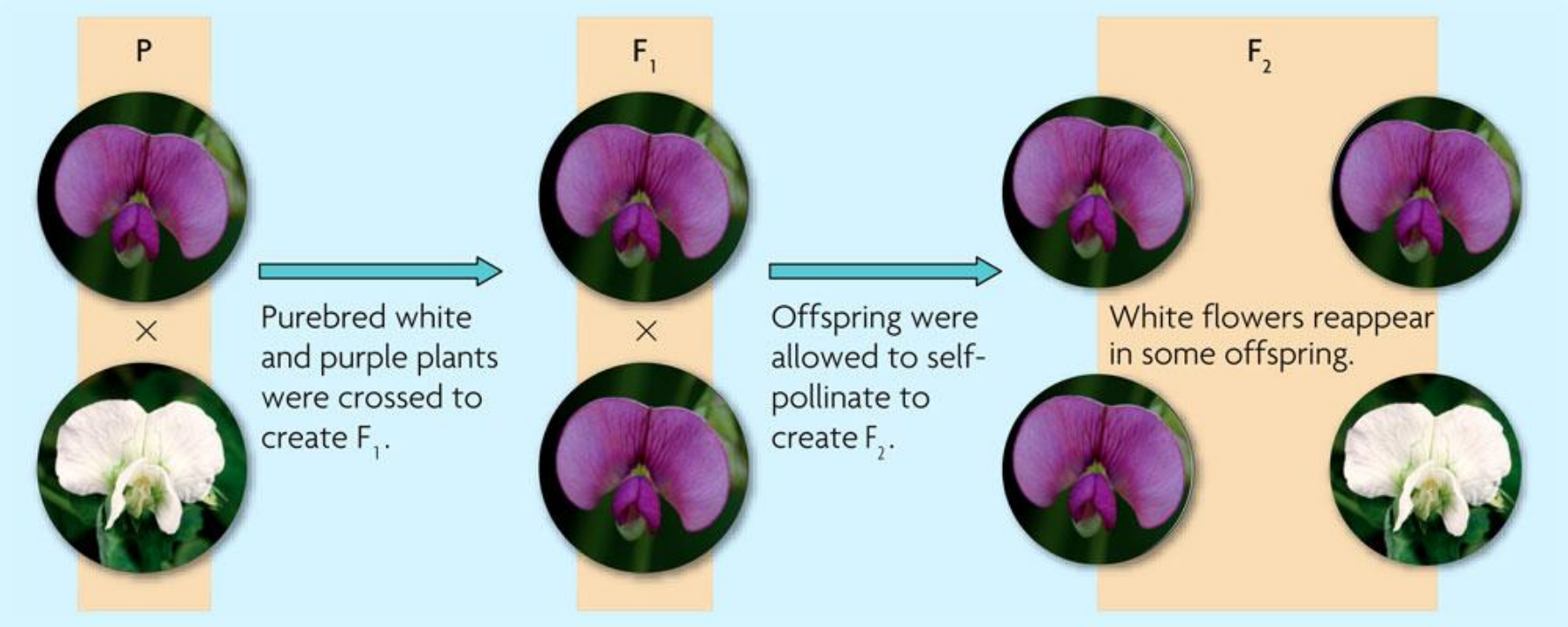
6.3 Mendel and Heredity

- **Cross** – the mating of two organisms.
- **F_2**:
  - The second generation;
  - Result from self-pollination of F1 plants
  - For example: in Mendel's F2 generation, ¾ had purple flowers and ¼ had white flowers.



6.3 Mendel and Heredity

- Mendel allowed the resulting plants to self-pollinate.



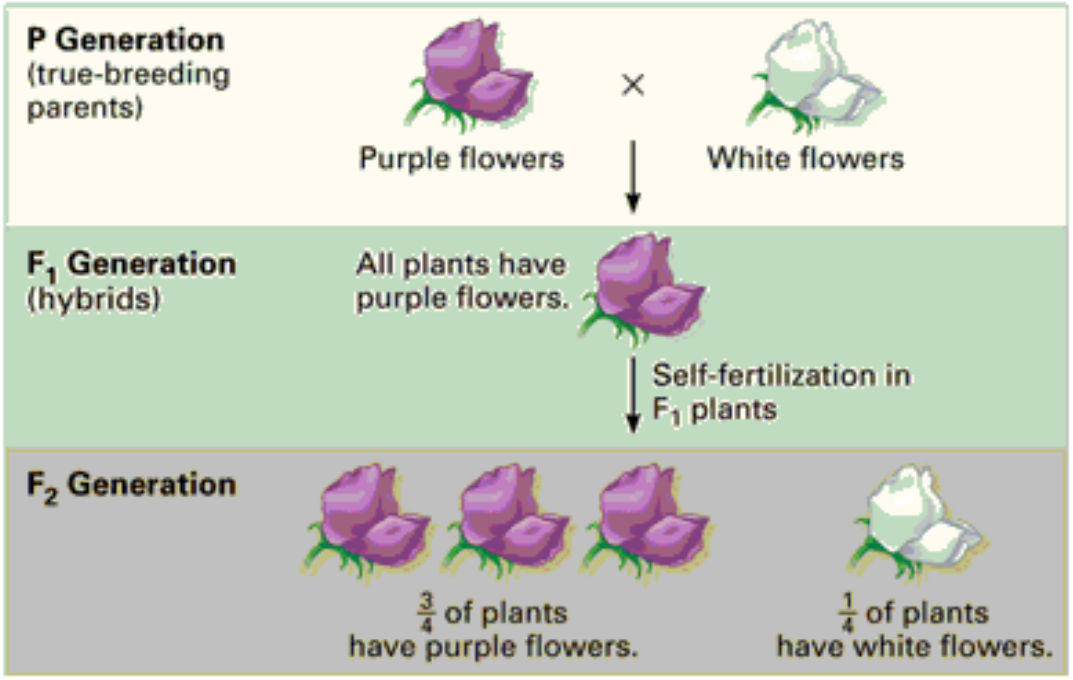
6.3 Mendel and Heredity

- **RESULTS**:

  For all 7 traits, Mendel found that approximately:

  – ¾ of F2 offspring had 1 trait, and

  – ¼ of the offspring had the other trait



6.3 Mendel and Heredity

- **CONCLUSIONS**:
  - Traits are inherited as discrete units (**Genes**).

Law of Segregation:

- Organisms inherit two copies of each gene, one from each parent.
- The two copies segregate during gamete formation.