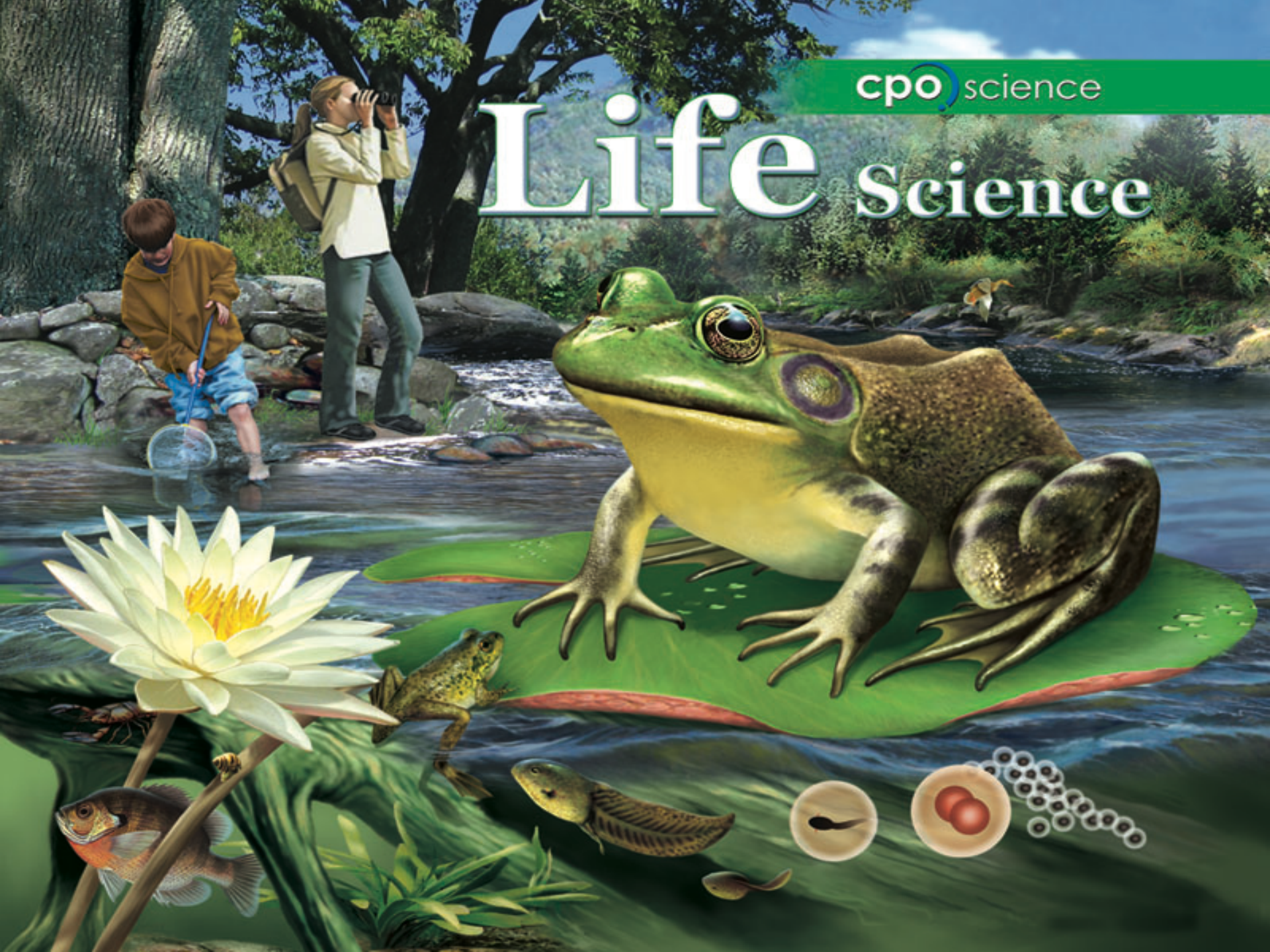


cpo science

# Life Science







Traits,  
Genes  
&  
Chromosomes

My  
Family

UNIT  
**4**

# Genetics

A blue-tinted background image of a science laboratory. It shows various pieces of equipment including a microscope, a computer monitor, a keyboard, a globe, and several papers or charts on a desk.

# Chapter Eleven: Heredity

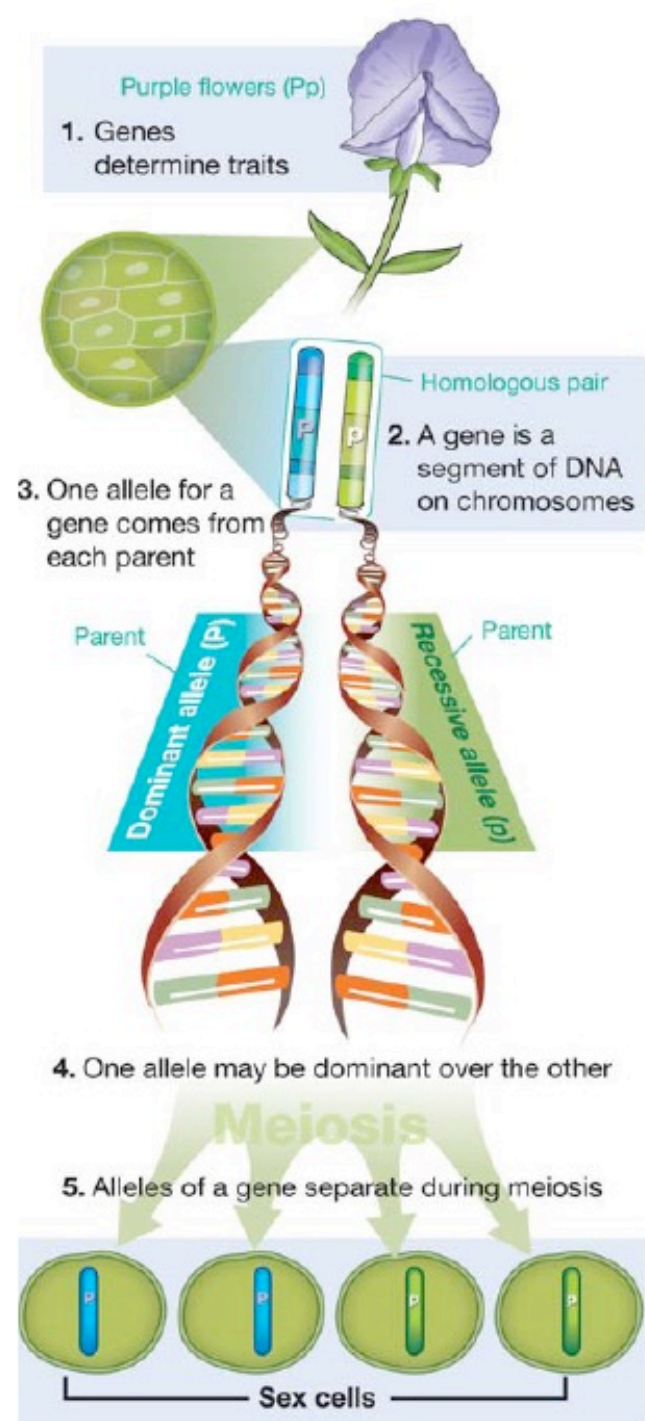
- **11.1 Traits**
- **11.2 Predicting Heredity**
- **11.3 Other Patterns of Inheritance**

## 11.2 Genes and Alleles

- Gregor Mendel did not know about genes, chromosomes, DNA, or meiosis.
- In 1903, American scientist **Walter Sutton** (1877 to 1916) examined the nucleus of the cell of a grasshopper under a microscope.
- Sutton observed cell parts separating during cell division.
- Soon chromosomes were discovered to contain genes.

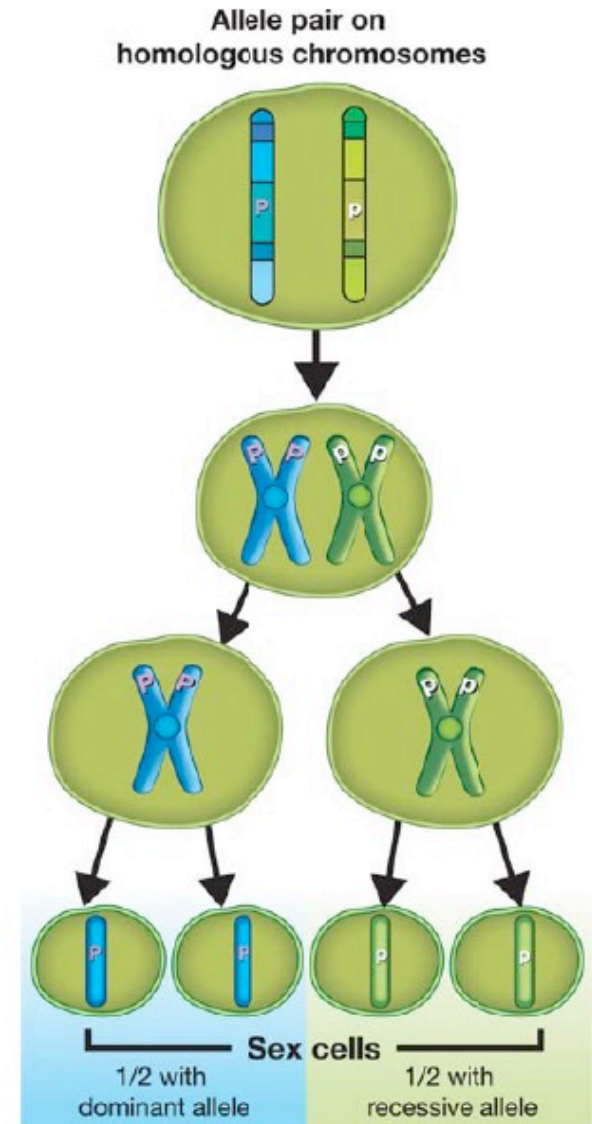


1. Individual units called **genes** determine an organism's traits.
2. A gene is a segment of DNA located on a **chromosome** that carries hereditary instructions from parent to offspring.
3. For each gene, an organism typically receives one **allele** from each parent.
4. If an organism inherits different alleles for a trait, one allele may be **dominant** over the other.
5. The alleles of a gene separate from each other when sex cells are formed during **meiosis**.

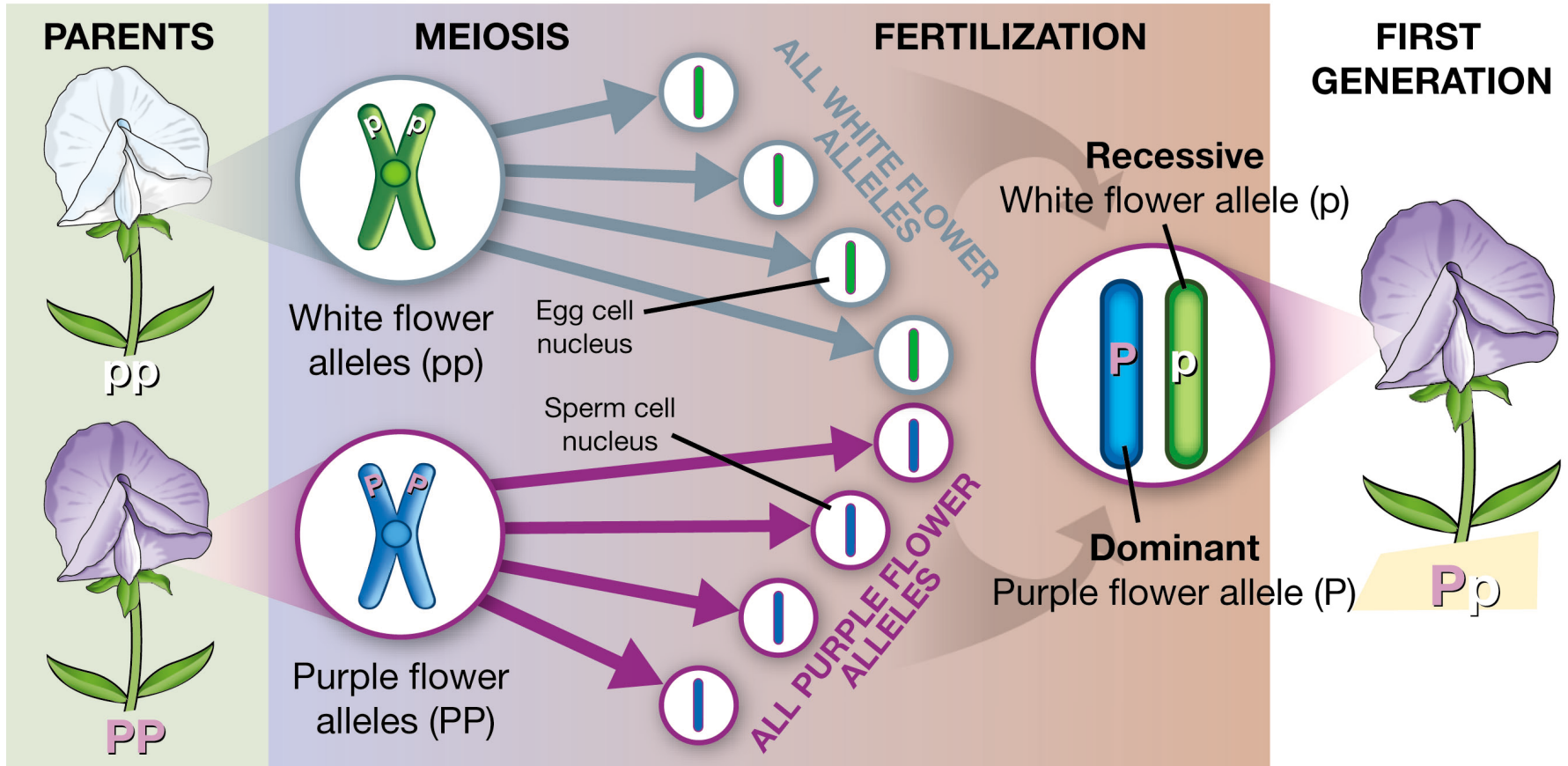


# 11.2 Alleles and meiosis

- Homologous pairs of chromosomes separate during meiosis.
- Since alleles of a gene are found in matching locations on homologous pairs of chromosomes, they also separate during meiosis.

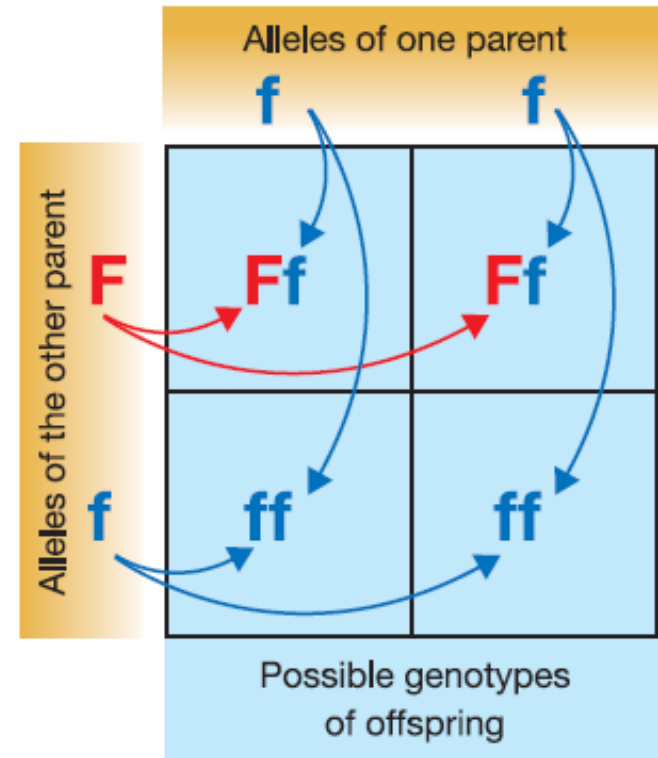


# Fertilization in Peas



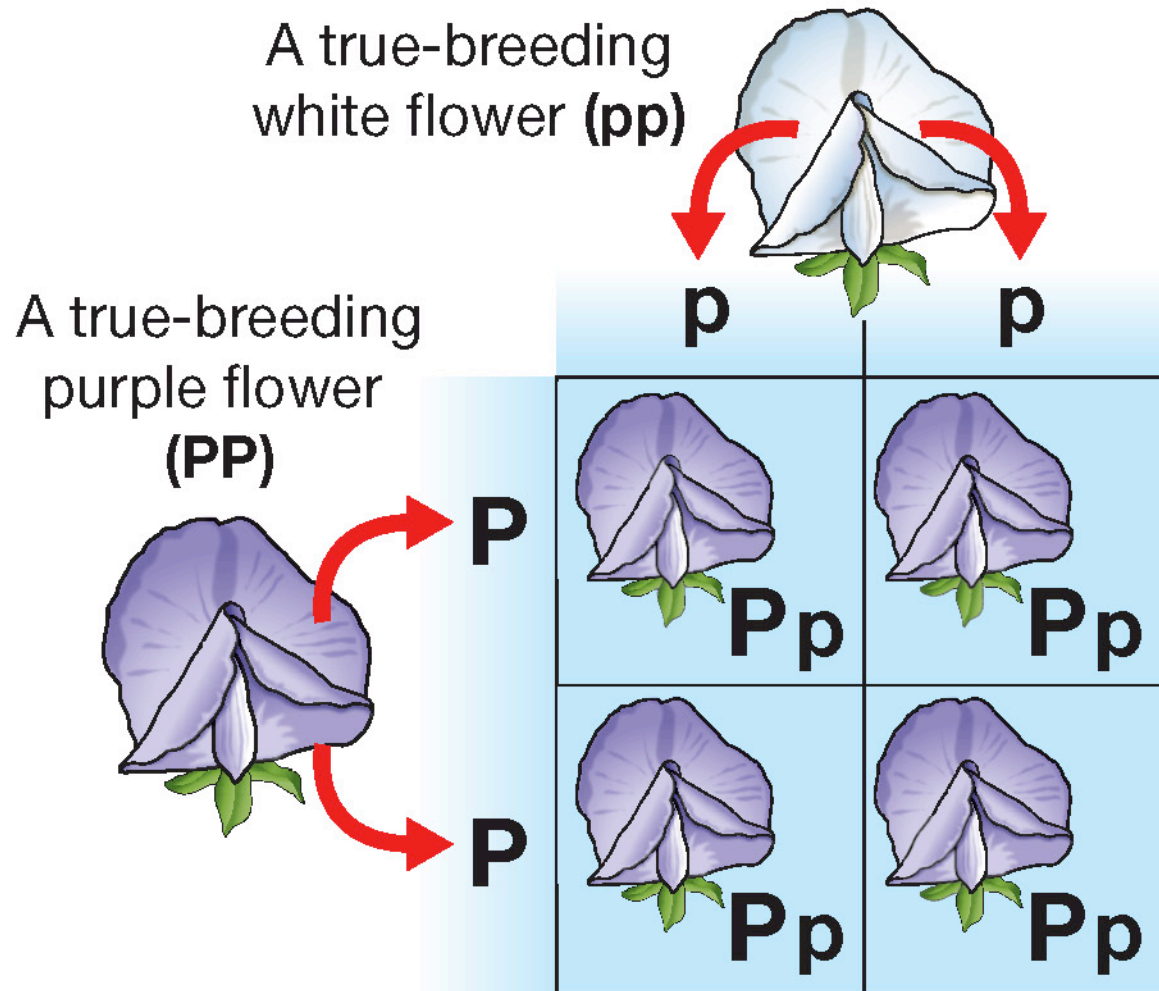
# 11.2 Predicting Genotypes and Phenotypes

- You can predict the possible genotypes and phenotypes of offspring if you know the genotypes of the parents.
- A **Punnett square** shows all of the possible combinations of alleles from the parents.





# First Generation Punnett



## 11.2 Punnett squares and probability

- **Probability** is the mathematical chance that an event will occur.
- Probability can be expressed as a fraction or a percentage.

Offspring

$$\frac{3}{4} = \text{purple} \quad \frac{1}{4} = \text{white}$$

3 purple and 1 white - 3:1 ratio

$$\frac{3}{4} \times 100 = 75\%$$

$$\frac{1}{4} \times 100 = 25\%$$

# Investigation 11B

## Crazy Traits

- *What role does chance play in an organism's heredity?*

