

This is the **Foundation Combined** version — Higher Tier and Separate-only content removed.

Characteristics are inherited through the passing on of alleles from parents to offspring. Punnett squares predict the probability of different genotypes and phenotypes in offspring.

- **Dominant allele:** expressed when only ONE copy present — masks the recessive allele. Written as capital letter (e.g. B).
- **Recessive allele:** only expressed when TWO copies present (homozygous recessive). Written as lowercase (e.g. b).
- **Homozygous dominant (BB):** shows dominant phenotype; all offspring will inherit at least one dominant allele.
- **Heterozygous (Bb):** shows dominant phenotype (carrier for recessive disorders). Can pass either allele to offspring.
- **Homozygous recessive (bb):** shows recessive phenotype.
- **Monohybrid cross:**  $Bb \times Bb \rightarrow BB$  (25%),  $Bb$  (50%),  $bb$  (25%)  $\rightarrow$  3 dominant : 1 recessive phenotype ratio.
- **$Bb \times bb$  (test cross):**  $BB$  (0%),  $Bb$  (50%),  $bb$  (50%)  $\rightarrow$  1 dominant : 1 recessive.

### Key Terms

<b>Dominant</b>	Allele expressed with just one copy — masks recessive
<b>Recessive</b>	Allele only expressed when two copies present
<b>Homozygous</b>	Having two identical alleles (BB or bb)
<b>Heterozygous</b>	Having two different alleles (Bb)
<b>Genotype</b>	The alleles an individual carries (e.g. Bb)
<b>Phenotype</b>	The observable characteristic produced by the genotype (e.g. brown eyes)

■ **Exam Tip:** Always draw out the FULL Punnett square — don't just write the ratio. In exams, marks are often given for showing the parental gametes (one from each parent across the top and side) and all four offspring boxes correctly filled.