*This is the **Higher Separate** version — includes all Higher Tier content (marked ★) and all Separate Science content.*

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 × Bb → BB (25%), Bb (50%), bb (25%) → 3 dominant : 1 recessive phenotype ratio.
- Bb × bb (test cross): BB (0%), Bb (50%), bb (50%) → 1 dominant : 1 recessive.
- ★ **HT** Co-dominance: both alleles expressed equally in the phenotype of heterozygotes. E.g. ABO blood groups (I■ and I■ are co-dominant).

Key Terms

Dominant	Allele expressed with just one copy — masks recessive
Recessive	Allele only expressed when two copies present
Homozygous	Having two identical alleles (BB or bb)
Heterozygous	Having two different alleles (Bb)
Genotype	The alleles an individual carries (e.g. Bb)
Phenotype	The observable characteristic produced by the genotype (e.g. brown eyes)
Co-dominance	Both alleles expressed equally in heterozygotes — neither is dominant

■ **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.