

DOMINANT-RECESSIVE INHERITANCE
(OR COMPLETE DOMINANCE)

- ◆ Of the pair of genes/alleles for a characteristic, one may be dominant (or more strongly inherited in the offspring), and the other may be recessive (or less strongly inherited in the offspring).
- ◆ Dominant genes/alleles are shown by capital letters (e.g. B, T).
- ◆ Recessive genes/alleles are shown by small letters (e.g. b, t).

◆ Example 1 – Eye Colour

Dad has purebred brown eyes (BB) and Mum has purebred blue eyes (bb). The Punnet Square below shows the possible eye colours inherited by the children.

	B	B
b	Bb	Bb
b	Bb	Bb

Possible genotypes of children – all Bb

Possible phenotypes of children – all brown-eyed children

◆ Example 2 – Eye Colour

Dad has heterozygous brown eyes (Bb) and Mum has blue eyes (bb). The possible eye colours of the children will be ...

	B	b
b	Bb	bb
b	Bb	bb

Possible genotypes = 2Bb : 2bb
= 1Bb : 1bb

Possible phenotypes = 2 brown : 2 blue
= 1 brown : 1 blue

This means that about ½ of the children will be brown-eyed and the other ½ will be blue-eyed.

TEST-CROSS

If an individual has a dominant phenotype, it is not known what the exact genotype is. For example with the phenotype of brown eye colour, the genotype could be BB or Bb. To find out the genotype of a dominant phenotype, one must cross the individual with the dominant phenotype (e.g. BB or Bb) with an individual with the recessive phenotype (e.g. bb). If the offspring all have the dominant phenotype (e.g. brown eyes), then the parent was pure-bred (e.g. BB). If the offspring have any with the recessive phenotype, then the parent was hybrid (e.g. Bb).

MONOHYBRID CROSS

- ◆ If both parents are hybrid or heterozygous for brown eye colour (both are Bb), the possible eye colours of the children are ...

	B	b
B	BB	Bb
b	Bb	bb

Possible genotypes = 1 BB : 2 Bb : 1 bb

Possible phenotypes = 3 brown : 1 blue

This means that $\frac{3}{4}$ of the children will be brown-eyed, and $\frac{1}{4}$ will be blue-eyed.

DIHYBRID CROSS

- ◆ A dihybrid cross is a cross between parents who are both hybrid for 2 characteristics.

Refer to the diagram of the dihybrid cross in your textbook. Take note of the ratio 9:3:3:1.