

3.2 Inheritance

Mr Curran · practical-science.com

1. KEY VOCABULARY

TERM	MEANING
Gene	A section of DNA that codes for one feature.
Allele	A different version of a gene.
Dominant	An allele that shows even with only one copy.
Recessive	An allele that shows only with two copies.
Genotype	The alleles an organism has.
Phenotype	The physical characteristic that you see.

2. MONOHYBRID CROSS

PUNNETT SQUARE — a monohybrid cross

Cross: Bb × Bb (B = brown, dominant · b = blue, recessive)

	B	b
B	BB	Bb
b	Bb	bb

Result: 3 brown : 1 blue (ratio 3 : 1)

KEY GENETICS TERMS

Gene — a section of DNA coding for a feature.
Allele — a version of a gene (e.g. B or b).
Dominant — shows even if only one copy (B).
Recessive — shows only with two copies (bb).
Genotype — the alleles present (e.g. Bb).
Phenotype — the feature you see (brown).
Homozygous = BB or bb · **Heterozygous** = Bb.

3. DNA, GENES & CHROMOSOMES

DNA is the molecule that carries the genetic code.

A gene is a section of DNA coding for one feature.

A chromosome is a long, coiled molecule of DNA. Humans have 23 pairs (46 in total).

4. MITOSIS vs MEIOSIS

	MITOSIS	MEIOSIS
Produces	2 cells	4 cells (gametes)
Genetically	Identical	All different
Chromosomes	Same number	Halved
Used for	Growth & repair	Making gametes

5. VARIATION, MUTATION & NATURAL SELECTION

Variation can be genetic (inherited) or environmental.

A mutation is a random change to DNA — the source of new alleles.

Natural selection: individuals best adapted to their environment are most likely to survive, reproduce and pass on their alleles. Over time the species evolves.

6. THE WHY

Why meiosis halves the chromosome number: so that when two gametes fuse at fertilisation, the normal number is restored — not doubled each generation.

Why a recessive allele can 'skip' a generation: it is hidden whenever a dominant allele is also present, but is still passed on.

7. COMMON EXAM MISTAKES

- ✗ "Genotype and phenotype are the same."
- ✓ Genotype = the alleles; phenotype = the feature you see.
- ✗ "Mitosis makes gametes."
- ✓ Meiosis makes gametes; mitosis is for growth and repair.
- ✗ "A dominant allele is the most common one."
- ✓ Dominant means it shows with one copy — not that it is common.

8. SELF-CHECK · cover & quiz

Can you...

1. Define gene, allele, genotype and phenotype?
2. Explain the link between DNA, genes and chromosomes?
3. Complete a Punnett square and give the ratio?
4. Compare mitosis and meiosis?
5. Explain the difference between genetic and environmental variation?
6. Explain how natural selection leads to evolution?