

SB3: **Genetics** (Paper 1)

Lesson	Objectives Tracker Sheet	Date covered	I know this well	I need to do more work on this
SB3a Sexual and asexual reproduction	B3.1 Explain some of the advantages and disadvantages of asexual reproduction, including the lack of need to find a mate, a rapid reproductive cycle, but no variation in the population.			
	B3.2 Explain some of the advantages and disadvantages of sexual reproduction, including variation in the population, but the requirement to find a mate.			
SB3b Meiosis	B3.3 Explain the role of meiotic cell division, including the production of four daughter cells, each with half the number of chromosomes, and that this results in the formation of genetically different haploid gametes. The stages of meiosis are not required.			
	B3.5 Describe the genome as the entire DNA of an organism and a gene as a section of a DNA molecule that codes for a specific protein			
SB3ci DNA	B3.4 Describe DNA as a polymer made up of: (a) two strands coiled to form a double helix (b) strands linked by a series of complementary base pairs joined together by weak hydrogen bonds.			
SB3cii DNA extraction	B3.6 Investigate how to extract DNA from fruit			
SB3d Protein synthesis	H B3.7 Explain how the order of bases in a section of DNA decides the order of amino acids in the protein and that these fold to produce specifically shaped proteins such as enzymes.			
	H B3.8 Describe the stages of protein synthesis, including transcription and translation: a RNA polymerase binds to non-coding DNA located in front of a gene b RNA polymerase produces a complementary mRNA strand from the coding			

	DNA of the gene c the attachment of the mRNA to the ribosome d the coding by triplets of bases (codons) in the mRNA for specific amino acids e the transfer of amino acids to the ribosome by tRNA f the linking of amino acids to form polypeptides.			
SB3e Genetic variants and phenotypes	H B3.9 Describe how genetic variants in the non-coding DNA of a gene can affect phenotype by influencing the binding of RNA polymerase and altering the quantity of protein produced.			
	H B3.10 Describe how genetic variants in the coding DNA of a gene can affect phenotype by altering the sequence of amino acids and therefore the activity of the protein produced.			
SB3f Mendel	B3.11 Describe the work of Mendel in discovering the basis of genetics and recognise the difficulties of understanding inheritance before the mechanism was discovered.			
SB3g Alleles	B3.12 Explain why these are differences in the inherited characteristics as a result of alleles.			
	B3.13 Explain the terms: dominant, recessive, homozygous, heterozygous, genotype, phenotype and zygote.			
	B3.14 Explain monohybrid inheritance using genetic diagrams.			
SB3h Inheritance	B3.14 Explain monohybrid inheritance using Punnett squares and family pedigrees.			
	B3.15 Describe how the sex of offspring is determined at fertilisation, using genetic diagrams.			
	B3.16 Calculate and analyse outcomes (using probabilities, ratios and percentages) from monohybrid crosses and pedigree analysis or dominant and recessive traits.			

SB3i Multiple and missing alleles	B3.17 Describe the inheritance of the ABO blood groups with reference to codominance and multiple alleles.			
	H B3.18 Explain how sex-linked genetic disorders are inherited.			
SB3j Gene mutation	B3.19 State that most phenotypic features are the result of multiple genes rather than single gene inheritance.			
	B3.20 Describe the causes of variation that influence phenotype including: (a) genetic variation – different characteristics as a result of mutation and sexual reproduction.			
	B3.21 Discuss the outcomes of the Human Genome Project and its potential applications within medicine.			
	B3.22 State that there is usually extensive genetic variation within a population of a species and that these arise through mutations			
	B3.23 State that most genetic mutations have no effect on the phenotype, some mutations have a small effect on the phenotype and, rarely, a single mutation will significantly affect the phenotype.			
SB3k Variation	B3.20 Describe the causes of variation that influence phenotype including: (a) genetic variation – different characteristics as a result of mutation and sexual reproduction (b) environmental variation – different characteristics caused by an organism's environment (acquired characteristics)			