

National curriculum or specification coverage

- 3.1 Biological molecules
- 3.2 Cells
- 3.3 Organisms exchange substances with their environment
- 3.4 Genetic information, variation and relationships between organisms
- 3.5 Energy transfers in and between organisms (part)
- 3.6 Organisms respond to changes in their internal and external environments (part)

Date	Exams/ Assessments	Learning Intentions		Core Task/Assessments
31/08/26		3.2.1 Cells - Describe the structure and function of eukaryotic cell organelles: cell-surface membrane, nucleus, mitochondria, chloroplasts, Golgi apparatus, ribosomes, rough and smooth endoplasmic reticulum, cell wall, lysosomes and vacuole. - Explain how eukaryotic cells in multicellular organisms become specialised for specific functions. - Describe the structure of prokaryotic cells and viruses, and compare them with eukaryotic cells. - Explain the principles, uses and limitations of optical, transmission electron and scanning electron microscopes. - Apply the formula: magnification = image size ÷ real size. - Describe the principles of cell fractionation and ultracentrifugation to separate cell components. Cells test	3.1.2/3 Biological Molecules - Define monomers and polymers, using monosaccharides, amino acids and nucleotides as examples. - Explain condensation and hydrolysis reactions, including formation of disaccharides (sucrose, lactose and maltose). - Compare α- and β-glucose and their roles in glycogen and cellulose. - Carry out Benedict's and iodine tests for sugars and starch. - Describe the structure and function of triglycerides and phospholipids, and identify saturated and unsaturated fatty acids. - Outline the properties of proteins.	Cells test Carbohydrates test Enzymes test
07/09/26				
14/09/26				
21/09/26				
28/09/26				
05/10/26				
12/10/26				
19/10/26		3.2.2 Cells	3.1.4 Proteins - Describe amino acid structure and protein formation. - Explain how hydrogen, ionic and disulfide bonds determine protein structure and function. - Carry out the Biuret test and relate protein structure to function.	

Year 12 Long Term Scheme of Learning 2026-2027

Subject: Biology

		- Explain mitosis as a controlled process and how uncontrolled division can lead to tumours and cancer; understand that many cancer treatments target cell division. - Describe binary fission. Required Practical 2: Prepare stained root tip squashes and calculate the mitotic index.	- Explain enzyme action, including the induced-fit model and activation energy. - Investigate the effects of enzyme concentration, substrate concentration and inhibitors on enzyme activity. - Required Practical 1: Investigate a factor affecting enzyme activity and determine the initial rate using a tangent. - Enzymes test	
26/10/26	HALF TERM			
02/11/26		3.2.3 Transport - Describe the structure of cell-surface and organelle membranes using the fluid mosaic model. - Explain the roles of phospholipids, proteins, glycoproteins, glycolipids and cholesterol in membrane structure. - Explain transport across membranes by: - simple and facilitated diffusion - osmosis (water potential) - active transport (ATP and carrier proteins) - co-transport (e.g. sodium and glucose uptake in the ileum) - Explain how surface area, channel/carrier proteins, and concentration or water potential gradients affect membrane transport. - Describe adaptations of specialised cells for efficient transport. Required Practical 3: Produce a dilution series and calibration curve to determine the water potential of plant tissue. Required Practical 4: Investigate the effect of a named variable on cell-surface membrane permeability.	3.1.5 DNA - Describe the structure of DNA and RNA, including nucleotide composition and phosphodiester bond formation. - Explain the DNA double helix, complementary base pairing and RNA as a single polynucleotide chain. - Describe semi-conservative DNA replication and the enzymes involved. - Explain the structure, properties and role of ATP, including ATPase and ATP synthase. - Describe the properties of water and the role of hydrogen bonding. - Explain the importance of inorganic ions in cells and body fluids. 3.2.4 Immunity - Explain how cell-surface proteins enable recognition of pathogens, foreign cells, abnormal cells and toxins. - Define antigens and explain the effects of antigen variability. - Describe phagocytosis and pathogen destruction by lysozymes. - Explain T- and B-lymphocyte responses and antibody structure and function. - Compare active and passive immunity, including vaccination and herd immunity. - Describe the structure and replication of HIV in helper T cells. - Explain why antibiotics are ineffective against viruses. - Evaluate the uses and ethics of monoclonal antibodies, including ELISA. 3.3.1/2 Gas Exchange	Transport test DNA test Immunity test
09/11/26				
16/11/26	Y12			
23/11/26	Y12			
30/11/26				
07/12/26				
14/12/26				

Year 12 Long Term Scheme of Learning 2026-2027

Subject: Biology

			- Explain the relationship between surface area to volume ratio and exchange. - Describe adaptations of larger organisms, including specialised exchange surfaces and transport systems, to maintain efficient exchange.	
21/12/26	CHRISTMAS HOLIDAY			
28/12/26				
04/01/27		3.4.1/2/3 DNA and protein synthesis	- Describe specific adaptations of fish, insects and plants - Describe adaptations of the lungs, + process of ventilation - Interpret data about ventilation, inking to disease when appropriate - Gas exchange test	Protein synthesis test Gas exchange test
11/01/27		- Compare DNA in prokaryotes and eukaryotes - Define gene, locus, triplet code, codon, anticodon, chromosome, intron, exon, genome - Function of triplet code, how to read codon charts - Importance of degeneracy, non overlapping - The structure of molecules of messenger RNA (mRNA) and of transfer RNA (tRNA) - Detailed process of transcription, splicing, translation, modification - Describe transcription as the production of mRNA from DNA. The role of RNA polymerase in joining mRNA nucleotides - Be able to interpret data from experimental work investigating the role of nucleic acids - Understand that gene mutations involve a change in the base sequence of chromosomes, and can have a variety of effects - Mutations in the number of chromosomes can arise spontaneously by chromosome non-disjunction during meiosis - Explain why meiosis produces daughter cells that are genetically different from each other - Describe the process of meiosis (1 to 4 haploid, 2 divisions, independent assortment, crossing over, random fertilisation, random mutation)	- Describe specific actions of digestive enzymes (eg endopeptidases) - Describe mechanisms of absorbing digested food, eg - co-transport mechanisms for the absorption of amino acids and of monosaccharides - the role of micelles in the absorption of lipids - Digestive system test	
18/01/27				
25/01/27				
01/02/27				
08/02/27				
15/02/27	HALF TERM			
22/02/27		3.4.5/6/7 Diversity	3.3.4.1 Mass transport in animals	Diversity test
01/03/27		- Define genetic diversity and explain its role in natural selection. - Explain the principles of natural, directional and stabilising selection, and how they produce anatomical, physiological and behavioural adaptations. - Interpret unfamiliar data to explain selection and evolution.	- Describe the general pattern of blood circulation in a mammal. Names are required only of the coronary arteries and of the blood vessels entering and leaving the heart, lungs and kidneys - Describe the gross structure of the human heart. Pressure and volume changes and associated valve movements during the cardiac	
08/03/27				
15/03/27				
22/03/27				

Year 12 Long Term Scheme of Learning 2026-2027

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		• Required Practical 6: Use aseptic techniques to investigate the effects of antimicrobial substances on microbial growth. • Define a species and explain the importance of courtship behaviour. • Describe phylogenetic classification, taxonomic hierarchy (domain to species) and binomial nomenclature. • Explain how DNA, mRNA, amino acid sequences and immunological evidence are used to classify organisms and measure diversity. • Calculate species richness and diversity indices. • Apply sampling methods and interpret standard deviations. • Diversity test	cycle that maintain a unidirectional flow of blood • Describe the structure of arteries, arterioles and veins in relation to their function • Describe the structure of capillaries and the importance of capillary beds as exchange surfaces. The formation of tissue fluid and its return to the circulatory system	
29/03/27	SPRING BREAK			
05/04/27				
12/04/27		3.3.4.1 Mass transport in plants	• Evaluate conflicting evidence associated with risk factors affecting cardiovascular disease • Recognise correlations and causal relationships • Required practical 5: Dissection of animal or plant gas exchange system or mass transport system or of organ within such a system • Describe the structure of haemoglobin • Explain the O₂ dissociation curve • Explain the Bohr effect • Many animals are adapted to their environment by possessing different types of haemoglobin with different oxygen transport properties • Mass transport in animals test	Mass transport test
19/04/27	Y12	• Describe the structure and function of xylem and phloem		
26/04/27		• Describe evidence related to the mass flow hypothesis for the mechanism of translocation in plants. The use of tracers and ringing experiments to investigate transport in plants.		
03/05/27				
10/05/27		• Evaluate that evidence, and use to form a conclusion		
17/05/27		• Revision		
24/05/27				
31/05/27	HALF TERM			
07/06/27		3.7.2.4 Populations	3.7.2.4 Populations	
14/06/27		• Anglesey Prep – The use of sampling techniques such as quadrats, and transects to measure the abundance and distribution of organisms in different areas. • Write up Required Practical 12	• Anglesey Prep – The use of sampling techniques such as quadrats, and transects to measure the abundance and distribution of organisms in different areas. • Write up Required Practical 12	
21/06/27				
28/06/27				
05/07/27				
12/07/27				