

Biology Year 9 Curriculum Overview 2023-24

Blue = Higher science content only

Yellow = Triple science content only

	Autumn		Spring		Summer
	Learning Cycle 1	Learning Cycle 2	Learning Cycle 3	Learning Cycle 4	Learning Cycle 5
Topic	Cell Biology. Diffusion. Tissues and organs	Heart and blood transport	Heart and blood transport continued	Plants and photosynthesis	Plants and photosynthesis continued
Critical Prior Knowledge	Y7 Cells	Y7 Respiration and ventilation - heart	Y7 Respiration and ventilation - heart	Y8 Plants and ecology and Photosynthesis	Y8 Plants and ecology and Photosynthesis
Overall Intent (Big ideas and key concepts)	The structure and function of sub cellular structures in eukaryotic and prokaryotic cells. The specialisation of cells to form tissues and organs, the use of microscopes to observe cells and the differences and similarities in eukaryotic and prokaryotic cells.	Structural adaptations for rapid gas exchange. Heart and blood vessels, components of blood,	Structural adaptations for rapid gas exchange. Heart and blood vessels, components of blood,	Structure and function of the transport and photosynthetic tissues.	Photosynthesis and the factors affecting the rate. Uses of glucose in the metabolism of plants.
Essential Knowledge milestones (What students must master)	To be able to describe the functions of the following parts of the cell: nucleus, cytoplasm, cell membrane, mitochondria, ribosomes, chloroplasts, permanent vacuole. To know that the cell wall is made of cellulose. Students know that these are eukaryotic cells and that as such they have a cell membrane, cytoplasm and genetic material enclosed in a nucleus.	To be able to describe the overall structure and function of the circulatory system and be able to name the vessels and organs involved. To be able to describe the overall structure and function of the circulatory system and be able to name the vessels and organs involved.	To be able to describe what the blood transports. To know where substances are transported from and where they are taken to. To relate the transport of materials round the body with the excretion of waste materials. To be able to recall information relating to the structure of the heart and circulatory system as well as the structure and	To know the leaf is a plant organ. To be able to name the tissues found in a leaf. To know how a leaf is adapted to its function. To know what meristem tissue is and where it is found. Recall the structure of xylem and root hair cells and can say how they are adapted to their functions. Be able to explain the process of transpiration.	Recall the word and symbol equation for photosynthesis. To understand the term endothermic reaction and apply this to photosynthesis. Explain the effects of temperature, light, CO ₂ , chlorophyll on the rate of photosynthesis. Students should be able to measure/calculate rates of photosynthesis and draw graphs.

	<p>To be able to describe bacterial cells as prokaryotic.</p> <p>To understand that bacterial cells have a cytoplasm and a cell membrane surrounded by a cell wall.</p> <p>The bacterial genetic material is not enclosed in a nucleus but is a single DNA loop. There may be many one or more small rings of DNA called plasmids.</p> <p>To describe algal cells as eukaryotic cells with a cellulose cell wall.</p> <p>To know that cells differentiate and so are specialised to carry out specific functions.</p> <p>Students can describe how sperm, nerve and muscle cells are specialised to carry out their functions.</p> <p>To know that plant cells may be specialised to carry out specific functions and to be able to relate root hair, xylem and phloem cells to their function in a tissue or an organ.</p> <p>To be able to correctly define the term diffusion.</p> <p>To be able to describe diffusion in the alveoli (details of alveolar structure are not necessary beyond the general features found at exchange surfaces ie thin/ short diffusion distance, concentration gradient maintained, large surface area.)</p>	<p>To be able to describe the overall structure and function of the circulatory system and be able to name the vessels and organs involved.</p> <p>To be able to describe the structure of the heart and the passage blood takes as it travels through it.</p> <p>To relate the structures of the heart to their functions e.g. thicker wall of left atrium.</p> <p>Extracting information from text.</p> <p>To be able to recall the overall structure and function of the circulatory system and be able to name the vessels and organs involved.</p> <p>To be able to describe the structure of veins arteries and capillaries and relate them to their function.</p> <p>To understand the importance of stents, particularly in coronary arteries.</p> <p>To be able to describe the composition of blood.</p>	<p>function of the various components of the blood.</p> <p>To be able to locate and label the main structures of the breathing system in the human body and to recall how ventilation occurs.</p> <p>To recall that lungs are specialised for exchanging materials as they have alveoli to increase their surface area.</p> <p>To relate transport of substances in the blood, diffusion of oxygen into blood and respiration as this is the section coming next</p>	<p>Be able to explain the factors that affect transpiration.</p> <p>To be able to understand the units used to measure the rate of transpiration.</p> <p>To practice drawing and interpreting graphs.</p> <p>To recall how phloem is adapted to its function.</p> <p>To know what translocation is.</p> <p>Know the symptoms of plant diseases.</p> <p>HT- Know methods of how to identify them.</p> <p>Types of plant disease to include: viral, bacterial, fungal, insects and ion deficiency.</p> <p>describe physical, chemical and mechanical plant defence responses.</p>	<p>How factors interact, explain graphs, use inverse proportion.</p> <p>Link limiting factors to economics and the use of greenhouses.</p> <p>To understand the use of Glucose in plants</p> <p>To be able to explain the link between glucose and starch.</p>
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	<p>To investigate how temperature affects the rate of diffusion through visking tubing.</p> <p>To understand that large multicellular organisms develop systems for exchanging materials and during development cells differentiate so that they can perform different functions.</p> <p>Recall how to define tissue, organ and organ system.</p> <p>Be able to give examples of tissues.</p> <p>To be able to describe the digestive system as an organ system.</p> <p>To be able to describe the function and structure of the digestive system, specifically the role of the glands, stomach, small intestine, liver and large intestine.</p> <p>To be able to correctly label a diagram of the digestive system.</p> <p>To be able to describe the structure of an organ – the stomach.</p>				
Cultural Capital		Royal Devon and Exeter Hospital – cardiac unit. Donating blood		Use of knowledge in farming and horticulture – Bickton College and arboretum. Green fingers garden centre	
Assessment points	<p>In class teacher led reviews and formative feedback – this low-risk challenge and review environment for pupils will include:</p> <ul style="list-style-type: none"> - recap recall quick starters, homework (Educake) (know) - review tasks, multiple choice and extended questions (extend) 				

	<ul style="list-style-type: none"> - in class exam style questions (apply) <p>Through rigorous, reliable and accessible assessment</p> <ul style="list-style-type: none"> - Formal assessments at the end of every unit of work (Mastery assessments – 10 question recall) across all 3 science subjects - End of learning cycle assessments (Progress check tests – a longer exam style question paper) 				
ECC Student Characteristics	Through these units we will encourage students to work hard and be resilient individuals who embrace challenge and through their creativity and endeavours become reflective learners . Mastering the key concepts of each topic before being able to build on these ideas as they are interleaved through other units later in the course.				
Connection to future learning (When is this developed / revisited)?	CSE Exchange surfaces, Disease and immunity, Cell division, Reproduction,	The delivery and use of substances needed for respiration in insects, fish and humans	The delivery and use of substances needed for respiration in insects, fish and humans Biodiversity – carbon Cycle Y11.	Y10 Respiration, principles of organisation (plants), Ecology.	Y11 ecology – competition and adaptation in plants, plant cloning. Homeostasis in plants.