Beths Grammar School KS4 Biology Curriculum Map – Year 9

Term GCSE OCR Biology A Gateway Science Suite	INTENT **Substantive Knowledge** This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.	IMPLEMENTATION **Disciplinary Knowledge (Skills)** This is the action taken within a particular topic in order to gain substantive knowledge.	IMPACT **Assessment opportunities** What assessments will be used to measure student progress? Evidence of how well students have learned the intended content.
Autumn Term 1A **Year 9**	**Intent** Why is this taught now? **B1.1 – Cell Structures** From KS3 Science, learners should be familiar with cells as the fundamental unit of living organisms, and with the use of light microscopes to view cells. They should also be familiar with some sub-cellular structures, and the similarities and differences between plant and animal cells. They will build on this knowledge and develop on the function of the organelles of a cell, introducing a bacterial cell too. They will also learn the different types of microscopes that are used to visualise cells and their sub-cellular structures and how to visualise them practically with a light microscope.	B1.1a - describe how light microscopes and staining can be used to view cells. B1.1b - explain how the main sub-cellular structures of eukaryotic cells (plants and animals) and prokaryotic cells are related to their functions. B1.1c - explain how electron microscopy has increased our understanding of sub-cellular structures.	• B1.1 end-of-unit test • B1 Test • Year 9 end of year exam • Year 10 trial exam • Year 11 trial exam • PAGs B1, B6 and B7 • In-class formative assessment activities e.g. recall • Homework activities
Autumn Term 1B **Year 9**	**Intent** Why is this taught now? **B1.2 Inside Cells**	B1.2a - describe DNA as a polymer. B1.2b - describe DNA as being made up of two strands forming a double helix.	• B1.1 and 1.2 end-of-unit test • B1 Test • Year 9 end of year exam • Year 10 trial exam • Year 11 trial exam

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	From KS3 Science, learners should Learners should have a simple understanding of the double helix model of DNA. Learners should be familiar with the idea of enzymes as biological catalysts. They will build on this knowledge and learn that life processes depend on biological molecules who structure is related to their function. They will learn how cells utilise the genetic material to code and make proteins. They will build on the importance of enzymes as proteins in biology and how different factors affect the rate of reactions of which they are involved in,and be able to measure this practically.	B1.2c - describe that DNA is made from four different nucleotides; each nucleotide consisting of a common sugar and phosphate group with one of four different bases attached to the sugar. B1.2d - recall a simple description of protein synthesis. B1.2e - explain simply how the structure of DNA affects the proteins made in protein synthesis. B1.2f - describe experiments that can be used to investigate enzymatic reactions. B1.2g - explain the mechanism of enzyme action.	• PAGs B2, B4 and B6 • In-class formative assessment activities e.g. recall • Homework activities
Spring Term 2A Year 9	**<u>Intent</u>** Why is this taught now? **B1.3 – Respiration** From KS3, learners should have some underpinning knowledge of respiration. This should include that respiration involves the breakdown of organic molecules to enable all the other chemical processes necessary for life. They will also have an understanding of the different biological molecules in an organism's diet and their function. Learners should be able to recall the word equation for respiration. They will build on this knowledge and learn that metabolic processes are controlled by enzymes and organic	B1.3a - describe cellular respiration as a universal chemical process, continuously occurring that supplies ATP in all living cells. B1.3b - describe cellular respiration as an exothermic reaction. B1.3c - compare the processes of aerobic respiration and anaerobic respiration. B1.3d - explain the importance of sugars in the synthesis and breakdown of carbohydrates. B1.3e - explain the importance of amino acids in the synthesis and breakdown of proteins. B1.3f - explain the importance of fatty acids and glycerol in the synthesis and breakdown of lipids.	• B1 Test • Year 9 end of year exam • Year 10 trial exam • Year 11 trial exam • PAGs B2, B4, B5 and B6 • In-class formative assessment activities e.g. recall • Homework activities

	compounds are used as fuels. They will further their understanding by looking at key biological molecules and how to identify them practically. They will also develop on their understanding of aerobic and anaerobic respiration in plants and animals and be able to compare.		
Spring Term 2B Year 9	**Intent** Why is this taught now? **B1.4 Photosynthesis** From KS3, learners should have some underpinning knowledge of photosynthesis. They should have an understanding that plants make carbohydrates in their leaves by photosynthesis and be able to recall the word equation for photosynthesis. They will build on this knowledge to understand that this is controlled by enzymes and that there are factors that affect the speed at which this happens. They will learn how we can measure this practically too.	B1.4a - describe photosynthetic organisms as the main producers of food and therefore biomass for life on Earth. B1.4b - describe the process of photosynthesis. B1.4c - describe photosynthesis as an endothermic reaction. B1.4d - describe experiments to investigate photosynthesis. B1.4e - explain the effect of temperature, light intensity, and carbon dioxide concentration on the rate of photosynthesis. B1.4f - explain the interaction of temperature, light intensity, and carbon dioxide concentration in limiting the rate of photosynthesis.	• B1 Test • Year 9 end of year exam • Year 10 trial exam • Year 11 trial exam • PAGs B4, B5 and B6 • In-class formative assessment activities e.g. recall • Homework activities
Summer Term 3A Year 9	**Intent** Why is this taught now? **B2.1 Scaling Up** From KS3, learners should be familiar with the role of diffusion in the movement of materials in and between cells. They will build on this knowledge and learn that where organisms are multicellular, there is a need for efficiency to ensure all living processes are performed	B2.1a - explain how substances are transported into and out of cells through diffusion, osmosis, and active transport. B2.1b - describe the process of mitosis in growth, including the cell cycle. B2.1c - explain the importance of cell differentiation.	• B2 Test • B2.1 end-of-unit exam • Year 10 trial exam • Year 11 trial exam • PAGs B6, B7 and B8 • In-class formative assessment activities e.g. recall • Homework activities

	effectively. They will also learn how we become multicellular through mitosis and its requirements in an organism.		
Summer Term 3B Year 9	**<u>Intent</u>** Why is this taught now? **B2.1** Continuing the work started in Summer Term 3A.	B2.1d - recall that stem cells are present in embryonic and adult animals, and meristems in plants. B2.1e - describe the functions of stem cells in embryonic and adult animals, and meristems in plants. B2.1f - describe the difference between embryonic and adult stem cells in animals.	