YEAR 10 BIOLOGY CURRICULUM PROGRESSION OVERVIEW

Students should have a basic understanding of the following biological principles and be able to apply them:

- The human digestive system which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide
- The two essential reactions for life on Earth are photosynthesis and respiration.
- Pathogens are microorganisms such as viruses and bacteria that cause infectious diseases in animals and plants
- The Sun is a source of energy that passes through ecosystems. Materials including carbon and water are continually recycled by the living world, being released through respiration of animals, plants and decomposing microorganisms and taken up by plants in photosynthesis.
- All molecules are recycled between the living world and the environment to sustain life from section How materials are cycled.
- Biodiversity is the variety of all the different species of organisms on earth, or within an ecosystem.

Students should be able to recall and use this knowledge in questions that link different areas of the specification to develop coherent arguments and explanations.

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Topic	**4.2.1** Principles of organisation **4.2.2.1** The human digestive system	**4.2.2.2 to 4.2.7** Organisations **4.2.3** Plant organs	**4.3.1.1 to 4.3.1.8** Diseases **4.3.1.9** Drugs	**4.4.1** Photosynthesis **4.4.2** Respiration	**4.7.1.1** Ecology **4.7.2 to 4.7.2.2** Ecology	**4.7.3.1 to 4.7.3.6** Biodiversity
Core Knowledge/ **Threshold Concept**	**4.2.1** Cells are the basic building blocks of all living organisms. The role and function of tissues, organs and organ systems. **4.2.2.1** Enzymes catalyse specific reactions in living organisms due to the shape of their active site. Students should be able to use the 'lock and key theory' as a simplified	**4.2.2.2 to 4.2.7** Students should know the structure and functioning of the human heart and lungs, including how lungs are adapted for gaseous exchange. **4.2.3** The leaf is a plant organ. Knowledge limited to epidermis, palisade and spongy mesophyll, xylem and phloem, and guard cells surrounding stomata.	**4.3.1.1 to 4.3.1.8** Pathogens such as viruses and bacteria cause infectious diseases in animals and plants. They depend on their host and produce toxins that damage tissues and make us feel ill. **4.3.1.9** The body's natural defence system can be enhanced by the use of vaccinations. Antibiotics have been developed which have	**4.4.1**Plants harness the Sun's energy in photosynthesis in order to make food. **4.4.2** Both animals and plants use this oxygen to oxidise food in a process called aerobic respiration which transfers the energy that the organism needs to perform its functions.	**4.7.1.1** An ecosystem is the interaction of a community of living organisms (biotic) with the non-living (abiotic) parts of their environment. **4.7.2 to 4.7.2.2** The Sun is a source of energy that passes through ecosystems. Materials including carbon and water are continually recycled by the living world.	**4.7.3.1 to 4.7.3.6** Biodiversity is the variety of all the different species of organisms on earth, or within an ecosystem. Levels of carbon dioxide and methane in the atmosphere are increasing, and contribute to 'global warming'.

	model to explain enzyme action.		proved successful against bacteria.			
Why this learning now?	This section assumes and builds on knowledge of tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food.	Increasing depth and understanding of the KS3 hierarchical organisation of multicellular organisms: from cells to tissues to organs systems to organisms.	Building on previous KS3 teaching on the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.	Pupils will apply their knowledge gained in KS3 of the reactants and products of, photosynthesis, including the word equation for Photosynthesis.	This unit has been placed specifically to take advantage of plant growth in the summer months. KS3 understanding of the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae	Increasing detail and examples of KS3 understanding of how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.
Assessment Opportunities:	➢ Recall starter activities (crucial knowledge) ➢ AFL in lessons ➢ End of topic tests & exam questions (develop exam skills) ➢ Required practical activity 4: use qualitative reagents to test for a range of carbohydrates, lipids and proteins. ➢ Required practical activity 5: investigate the effect of pH on the rate of reaction of amylase enzyme. ➢ Required practical activity 9: measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species.					
	➢ Standardised block test (Oct) with synoptic content.	➢ Re-test for underperforming students (Nov)	➢ Standardised block test (Jan) with synoptic content.	Re-test for underperforming students (Feb/Mar)	➢ Standardised block test (Apr) with synoptic content. ➢ Re-test for underperforming students (Feb)	➢ Full Mock Paper 1 Exam (Jun)
Learning at Home	Staff use a variety of resources including: ➢ Exam questions ➢ Online learning (SENECA, MyGCSEScience, YouTube, etc.) ➢ Recall activities (quizzes, revision tasks, etc.)					

Key Vocabulary	enzyme, active site, artery, veins, capillaries, pulmonary, aorta	stomata, phloem, transpiration, mesophyll, meristem	pathogen, bacteria, fungi, protists, antibodies, placebo, monoclonal	photosynthesis, respiration, metabolism, endothermic, exothermic	abiotic, biotic, decay, extremophile, distribution, quadrats	biomass, trophic levels, biodiversity, decomposers, trophic level
Spiritual, Moral, Social and Cultural concepts covered	Spiritual: A sense of enjoyment in learning about ourselves and others and the world around us. Moral: The ability to recognise difference between right and wrong and applying it to our own lives is discussed in Ecology and Biodiversity. Social: Understand and appreciate the range of cultural influences that shape our heritage.					
Links to careers and the world of work	Staff will regularly link the learning in lessons to real-life contexts. For example, in Biology the pupils will look at the circulatory system which links to medical careers and in Ecology will perform experiments like a biologist. In Chemistry, they will look at the industrial applications of electrolysis and the work of famous scientists in developing the atomic model. Finally, in Physics the students will discuss how components are used in household items and how plugs and the National Grid function.					

YEAR 11 BIOLOGY CURRICULUM PROGRESSION OVERVIEW

Students should have a basic understanding of the following biological principles and be able to apply them:

- The human nervous system consists of the central nervous system (CNS) – the brain and spinal cord. the peripheral nervous system – nerve cells that carry information to or from the CNS.
- The endocrine system secretes hormones into the bloodstream from glands throughout the body. Hormones produce an effect on specific target organs in the body.
- Our genes are inherited from our parents, and the different combinations of these genes make us unique. Genetic inheritance controls the characteristics of all living things.
- Variation is the difference in the characteristics of individuals in a population.
- Evolution is the gradual process of change in inheritable characteristics of a population over several generations. Evolution occurs through natural selection

Students should be able to recall and use this knowledge in questions that link different areas of the specification to develop coherent arguments and explanations.

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Topic	**4.7.4 to 4.7.5** Biodiversity (separate only content) **4.5.1-4.5.2** Homeostasis response	**4.5.3 to 4.5.4** Homeostasis response	**4.6.1** Reproduction	**4.6.2 to 4.6.4** Variation and evolution	Synoptic Content & Exam Skills	Synoptic Content & Exam Skills
Core Knowledge/ **Threshold Concept**	**4.7.4 to 4.7.5** Feeding relationships are shown in food chains. Each stage is a trophic level. Biomass is a measure of the total mass of living material in each trophic level. **4.5.1-4.5.2** The nervous system includes the central and peripheral nervous systems. The	**4.5.3** Students explore the endocrine system secretes hormones into the bloodstream from glands throughout the body. Hormones produce an effect on specific target organs in the body. **4.5.4** Plant hormones are unequally distributed throughout the stems and roots, which results in parts of	**4.6.1.1-8** Students discover how meiosis produces unique offspring. The genetic material in the nucleus is composed of DNA. DNA as a polymer made from four different nucleotides: G, C, A and T. Gene mutations can lead to inherited disorders.	**4.6.2.1-2** Natural selection and selective breeding produces livestock with favoured characteristics. **4.6.3** Evolution is the change of inherited characteristics within a population over time through natural selection, which may result in the formation of a new species.	Synoptic Content & Exam Skills	Synoptic Content & Exam Skills

	sense organs, including the eye, contain receptors that are sensitive to stimuli and respond with reflex actions	the plant growing in a particular direction.		**4.6.4** Living things are classified using a system developed by Carl Linnaeus.		
Why this learning now?	This section assumes and builds on the knowledge of the organisation of multicellular organisms to cover more complex processes such as movement and memory.	Increasing depth and understanding of how cells in the body survive. The role of the hormonal system builds on and compares to the nervous system.	Building on previous teaching on the hormonal control of reproduction to cover cell division and its relevance to the health and well-being of organisms	Crucial knowledge builds to cover more conceptually difficult aspects such as speciation, an understanding of genetics and explaining the theory of evolution by natural selection	In this final term, the lessons are spent on review of key concepts and revision techniques ready for the GCSE exam.	
Assessment Opportunities:	➢ Recall starter activities (crucial knowledge) ➢ AFL in lessons ➢ End of topic tests & exam questions (develop exam skills)					
	➢ Full paper 1 mock paper	➢ End of topic assessments	➢ Mock paper consisting of paper 1 and paper 2 content.	➢ Standardised Paper 2 block test (Apr) with synoptic content.	➢ GCSE Exams	➢ GCSE Exams
Learning at Home	Staff use a variety of resources including: ➢ Exam questions ➢ MyGCSEScience ➢ Recall activities (quizzes, revision tasks, etc.)					
Key Vocabulary	Trophic level Homeostasis, cerebral cortex, cerebellum, sclera, ciliary	Endocrine, pituitary, thyroid, diabetes, pancreas, temperature, oestrogen,	Meiosis, mitosis, nucleotide, homozygous, heterozygous	Evolution, characteristic, speciation, archaea		

		phototropism, geotropism				
Spiritual, Moral, Social and Cultural concepts covered	Spiritual: A sense of enjoyment in learning about ourselves and others and the world around us. Moral: The ability to recognise difference between right and wrong and applying it to our own lives is discussed in Ecology and Biodiversity. Social: Understand and appreciate the range of cultural influences that shape our heritage.					
Links to careers and the world of work	Staff will regularly link the learning in lessons to real-life contexts. For example, in Biology the pupils will look at the circulatory system which links to medical careers and in Ecology will perform experiments like a biologist.					