

**Curriculum Intent:** GCSE Biology is part of the AQA Science suite, developed with teachers to inspire and challenge students of all abilities and aspirations. On completing this courses assessments, students will gain one GCSE in Biology. This course is taught concurrently with the GCSE Chemistry and the GCSE Physics course. The content is presented in an order that tells a coherent and logical story through physics. The content covers the fundamentals of Biology and builds upon them. The ten required practicals are linked to areas of the content where it would be most appropriate to teach them to embed skills and knowledge.

**The course content in Year 10 is:**

1. Unit 1 – Cell Biology
2. Unit 2 – Organisation
3. Unit 3 – Infection and Response
4. Unit 4 – Bioenergetics

The Assessment outcomes are AO1: Demonstrate knowledge and understanding of scientific ideas, scientific techniques, and procedures. AO2: Apply knowledge and understanding of scientific ideas, scientific enquiry, techniques, and procedures. AO3: Analyse information and ideas to interpret, evaluate, make judgements, draw conclusions, develop experimental procedures, and improve experimental procedures

Year 10	HT1	HT2	HT3	HT4	HT5	HT6
<p><b>Content, Knowledge &amp; Skills</b></p>	<p><b><u>Unit 1 Cell Biology</u></b></p> <ul style="list-style-type: none"> <li>• Eukaryotic and Prokaryotic cells</li> <li>• Mitosis and meiosis</li> <li>• Stem cells in animal tissues</li> <li>• Meristem tissues in plants</li> <li>• Osmosis, diffusion and active transport</li> </ul> <p>Cells are the building blocks of life. Different types of cells have different structures which allows them to perform specific functions.</p> <p>Cells are specialised, containing sub-cellular</p>	<p><b><u>Unit 2 Organisation</u></b></p> <ul style="list-style-type: none"> <li>• Animal tissues and organisation within the human body</li> <li>• Human Digestive system</li> <li>• Testing for different nutrients</li> <li>• The heart and Blood vessels</li> <li>• The blood and Coronary Heart Disease</li> <li>• Disease interactions</li> <li>• Non-communicable disease</li> <li>• Structure of phloem and xylem tissues</li> </ul>	<p><b><u>Unit 3 Infection and response</u></b></p> <ul style="list-style-type: none"> <li>• Communicable diseases in animals and plants</li> <li>• How do bacteria and viruses cause disease inside the body through toxins</li> <li>• Viral diseases – HIV and Measles</li> <li>• Bacterial diseases – salmonella and gonorrhoea</li> <li>• Fungal diseases - athletes foot and rose black spot</li> <li>• Protist diseases – malaria</li> </ul>	<p><b><u>Unit 3 Infection and Response</u></b></p> <ul style="list-style-type: none"> <li>• Non specific human defence systems</li> <li>• Phagocytosis</li> <li>• Antibody and antitoxin production</li> </ul> <p>The human body uses barriers and its own immune system to fight of infections caused by protists, bacteria, fungi and viruses.</p> <p>Pathogens causes toxins to be produced inside the body and cause damage to organs. The body protects</p>	<p><b><u>Unit 3 Infection and Response</u></b></p> <ul style="list-style-type: none"> <li>• Vaccination</li> <li>• Development of drugs</li> <li>• How monoclonal antibodies and produced and used</li> <li>• Discovery of drugs</li> <li>• How drugs are tested before being used</li> <li>• Plant diseases</li> <li>• Plant defence responses</li> </ul> <p>Different drugs can be used to fight off infections from pathogens and the symptoms of disease.</p>	<p><b><u>Unit 4 Bioenergetics</u></b></p> <ul style="list-style-type: none"> <li>• Photosynthesis</li> <li>• Effect of light intensity on photosynthesis</li> <li>• Aerobic and anaerobic respiration</li> <li>• The uses of glucose from photosynthesis</li> <li>• The effect of exercise on metabolism</li> </ul> <p>Plants use the Sun’s energy to carry out photosynthesis. This allows the plant to make its own food. Oxygen in the Earth’s atmosphere is used to oxidise food in aerobic and</p>

<p>structures including the nucleus, cell membrane, cell wall, mitochondria, chloroplasts and plasmids.</p> <p>Electron and light microscopes can be used to view cells and their sub-cellular structures.</p> <p>These characteristics are determined by genes. For an organism to undergo growth, the process of mitosis must be undertaken, to produce two genetically identical cells.</p> <p>Therapeutic cloning can be used as medical treatment as stem cells retain the ability to differentiate into specialised cells.</p> <p>Mechanisms such as osmosis, diffusion and active transport are used within animals and plants to transport substances across organisms.</p> <p>Damage to DNA coding for proteins related to the cell cycle can lead to cancer.</p>	<ul style="list-style-type: none"> <li>• Transpiration and translocation</li> </ul> <p>The human digestive system breaks down nutrients from food into dissolved materials ready for absorption. These include glucose, amino acids and lipids.</p> <p>The respiratory system and circulatory system work together to provide cells with glucose and oxygen, and to remove carbon dioxide from the body.</p> <p>When there is damage to these systems, the organ systems do not function correctly and can lead to fatal consequences. In this section of the course, lifestyle choices which lead to diseases such as coronary heart disease and cancer is also discussed.</p> <p>Plants are adapted to provide the materials needed for photosynthesis.</p> <p>The transport systems within a plant are dependent on environmental conditions.</p>	<p>Pathogens cause communicable disease within plants and animals, and can be prevented using a wide range of methods.</p> <p>Treatments of diseases depends on the cause of disease. Certain methods may not be effective in treating other disease.</p> <p>There may be fatal consequences of leaving a disease untreated, such as HIV, which can lead to AIDS.</p>	<p>itself from these toxins through the use of phagocytes and production of antibodies and antitoxins.</p> <p>Antibodies are specific to one type of antigen, and can be used to prevent disease.</p>	<p>Vaccination, through the use of monoclonal antibodies, can be used to prevent disease on a large scale.</p> <p>Plants have chemical, physical and mechanical methods of preventing disease caused by pathogens.</p>	<p>anaerobic respiration, to transfer energy needed for the organisms reactions.</p> <p>Photosynthesis can be limited by factors such as temperature, light intensity, carbon dioxide concentration and the amount of chlorophyll in plants.</p> <p>Exercise affects an organism and how much energy can be transferred. When there is a lack of oxygen, lactic acid in animal cells, and ethanol and carbon dioxide in plant cells is produced as a by product of anaerobic respiration.</p> <p>We can use the by products of anaerobic respiration in manufacturing to produce bread and alcoholic drinks.</p>
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<b>Key Vocabulary</b>	Eukaryotic, prokaryotic, organelles, cell membrane, cell wall, chloroplasts, mitochondria, plasmids, glucose, oxygen, carbon dioxide, respiration, breathing, osmosis, diffusion, active transport, cancer, mutations, cell division, mitosis, meiosis, differentiation, stem cells, specialisation, function, structure, adaptations, root hair cells, alveoli,	Small intestine, large intestine, digestion, enzymes, reagents, Biuret, Benedicts, active site, positive, starch, amylase, glucose, protein, amino acids, lipids, disease, deficiency, nutrient, circulatory system, respiratory system, heart, lungs, blood, red blood cells, white blood cells, platelets, clotting, cholesterol, disease, arteries, veins, capillaries, glucose, diffusion, alveoli, concentration gradient, rate, oxygen, carbon dioxide, artificial, treatment, stents, statins, transplant, atherosclerosis, respiration, fatigue, energy, diet, smoking, alcohol, incidence, mortality, xylem, phloem, transpiration, translocation, transpiration stream, roots, surface area, photosynthesis, growth,	Communicable, transmission, pathogens, viruses, protists, fungi, bacteria, toxins, antitoxins, damage, fungicides, white blood cells, immune system, vaccination, herd immunity, antibodies, antivirals, antibiotics, resistance	Antibody, antitoxins, phagocytosis, white blood cells, lymphocytes, immunity, pathogens, resistance, specificity, mutations, herd immunity, prevention, treatment, cause, Malaria, salmonella, athletes foot, Tobacco Mosaic virus, HIV, AIDS, immunosuppressant, infection,	Vaccination, monoclonal antibody, mutation, infection, resistance, strain, quarantine, immunity, clinical trial, side effects, testing, placebo, double-blind, peer review, journals, toxicity, efficacy, dosage,	Photosynthesis, limiting factor, carbon dioxide, oxygen, glucose, temperature, concentration, chloroplasts, chlorophyll, rate, sunlight, economic, respiration, aerobic, anaerobic, energy, transfer, lactic acid, ethanol, oxygen debt,

<p><b>Assessment</b></p>	<p>Explain how sub-cellular structures are related to their functions.</p> <p>Demonstrate an understanding of the scale and size of cells.</p> <p>Explain how electron microscopy has increased the understanding of sub-cellular structures</p> <p>Recognise and describe the overall stages of mitosis.</p> <p>Evaluate the risks and benefits of stem cell research, as well as the ethical and social use of stem cells in medical research and treatments.</p> <p>Explain the need for exchange surfaces, and how factors such as concentration, temperature and surface area affect the rate of transport.</p>	<p>Explain how the small intestine and lungs are adapted for exchanging materials.</p> <p>Calculate and compare surface area to volume ratios.</p> <p>Describe how substances are transported into and out of cells by osmosis, diffusion and active transport.</p> <p>Relate the knowledge of enzymes to digestion.</p> <p>Explain how the structure of blood vessels such as capillaries, arteries and veins are related to their function.</p> <p>Recognise the different components of the blood form a photograph or diagram.</p> <p>Evaluate the advantages and disadvantages of treating cardiovascular disease.</p> <p>Explain the effect of lifestyle factors including diet, alcohol and smoking</p>	<p>Describe the difference between communicable and non-communicable disease.</p> <p>Explain how diseases caused by protists, viruses, fungi and bacteria are spread in both animal and plant cells.</p> <p>Compare treatment methods used to prevent communicable disease.</p>	<p>Describe the non-specific defence mechanisms of the human body against pathogens.</p> <p>Describe how specific white blood cells fight pathogens.</p> <p>Explain how white blood cells help to defend against pathogens.</p>	<p>Explain how antibiotics and other medicines are used and how they can treat disease.</p> <p>Explain how vaccinations prevent illness.</p> <p>Explain how the spread of pathogens in a large population can be prevented through herd immunity.</p> <p>Understand how vaccination leads to long term immunity.</p> <p>Describe the process of drug discovery both traditionally and in modern times.</p> <p>Explain the processes of clinical testing and how drugs are screened to prevent side effects before use by the public.</p> <p>Understand the results of testing and trials are only published after scrutiny by peer review.</p> <p>Evaluate the advantages and disadvantages of using monoclonal antibodies as</p>	<p>Describe the process of photosynthesis.</p> <p>Identify limiting factors which may affect the rate of photosynthesis.</p> <p>Compare the processes of aerobic and anaerobic respiration.</p> <p>Describe the uses of glucose in both plant and animal cells.</p> <p>Explain how anaerobic respiration can be used in economic situations.</p> <p>Link lifestyle factors such as diet, smoking and alcohol consumption to respiration.</p>
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		<p>on the incidence of non-communicable disease.</p> <p>Describe cancer as a result of mutations.</p> <p>Explain how the structure of plants are related to their functions.</p> <p>Explain the effect of different factors on the rate of transpiration.</p>			<p>treatment to prevent disease.</p>	
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**The course content in Year 11 is:**

5. Unit 5 - Homeostasis and response
6. Unit 6 - Inheritance, variation and evolution
7. Unit 8 - Ecology.

The Assessment outcomes are AO1: Demonstrate knowledge and understanding of scientific ideas, scientific techniques, and procedures. AO2: Apply knowledge and understanding of scientific ideas, scientific enquiry, techniques, and procedures. AO3: Analyse information and ideas to interpret, evaluate, make judgements, draw conclusions, develop experimental procedures and improve experimental procedures.

Year 11	HT1	HT2	HT3	HT4	HT5	HT6
<p><b>Content, Knowledge &amp; Skills</b></p> <ul style="list-style-type: none"> <li>• Nervous system</li> <li>• Blood glucose control.</li> <li>• The brain</li> <li>• The eye</li> </ul> <p>The body has control systems that constantly monitor and adjust the composition of the blood and tissues. These control systems include receptors which sense changes and effectors that bring about changes. These systems control reproduction, body temperature, and blood glucose concentrations.</p>	<ul style="list-style-type: none"> <li>• Kidney</li> <li>• Reproduction</li> <li>• Menstrual cycle</li> <li>• Contraception</li> <li>• Infertility</li> <li>• Plant hormones.</li> </ul> <p>Continue covering control systems such as water and nitrogen concentrations which bring about changes. Hormonal coordination is particularly important in reproduction since it controls the menstrual cycle. Plants produce hormones to coordinate and control growth and responses to light (phototropism) and gravity. Plant growth hormones are used in agriculture and horticulture.</p>	<ul style="list-style-type: none"> <li>• Cell division</li> <li>• Sexual and asexual reproduction</li> <li>• Mutation</li> <li>• Variation</li> <li>• Selective breeding, genetic engineering and cloning</li> </ul> <p>The number of chromosomes are halved during meiosis and then combined with new genes from the sexual partner to produce unique offspring. Gene mutations occur continuously and on rare occasions can affect the functioning of the animal or plant. These</p>	<ul style="list-style-type: none"> <li>• Classification and speciation</li> <li>• Ecosystems and biodiversity</li> <li>• The carbon cycle and the water cycle</li> </ul> <p>Work of Mendel, Speciation. Once new varieties of plants or animals have been produced it is possible to clone individuals to produce larger numbers of identical individuals all carrying the favourable characteristic. Scientists have now discovered how to take genes from one species and introduce them in to the genome of another by a process called genetic</p>	<ul style="list-style-type: none"> <li>• Waste management, land use, deforestation and global warming</li> <li>• Adaptation and levels of organisation</li> </ul> <p>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 species live in ecosystems composed of complex communities of</p>	<ul style="list-style-type: none"> <li>• GCSE Biology Triple Content</li> <li>• Practicing Maths in Science</li> <li>• Re-visit Biology RPAs</li> </ul> <p>Application Evaluation Interpretation Problem- solving Planning and prediction</p>	

			<p>mutations may be damaging and lead to a number of genetic disorders or death. Very rarely a new mutation can be beneficial and consequently, lead to increased fitness in the individual. Variation generated by mutations and sexual reproduction is the basis for natural selection; this is how species evolve. An understanding of these processes has allowed scientists to intervene through selective breeding to produce livestock with favoured characteristics</p>	<p>engineering. Abiotic and biotic factors, adaptations of animals and plants. Levels of organisation. The water cycle Quadrats and transects. The carbon cycle.</p>	<p>animals and plants dependent on each other and that are adapted to particular conditions, both abiotic and biotic. These ecosystems provide essential services that support human life and continued development. In order to continue to benefit from these services humans need to engage with the environment in a sustainable way.</p>	
<p><b>Key Vocabulary</b></p>	<p>Nervous system, motor, relay, sensory, synapse, chemical, diffusion, glucose, glycogen, glucagon, liver, insulin, receptor, medulla, hypothalamus, cerebellum, cerebral cortex, MRI, CT-scan, cornea, sclera, retina, pupil, iris, ciliary muscles, circular muscle, radial muscle, accommodation, myopia, hyperopia</p>					

<p><b>Assessment</b></p>	<p>Explain the role of the nervous system.  Explain how mechanisms lower or raise body temperature.  Compare Type 1 and Type 2 diabetes and explain how they can be treated.</p>	<p>Describe the function of kidneys in maintaining the water balance of the body.  Explain the interactions of hormones, in the control of the menstrual cycle.  Explain the use of hormones in modern reproductive technologies to treat infertility.  Describe the effects of some plant hormones.  Know diseases spread in plants and how plants are able defend themselves.  Be able to describe the process of culturing microorganisms.</p>	<p>Understand that meiosis leads to non-identical cells being formed while mitosis leads to identical cells being formed.  Explain simply how the structure of DNA affects the protein made.  Complete a Punnett square diagram and extract and interpret information from genetic crosses and family trees and sex inheritance.  Describe and evaluate the process of genetic engineering, cloning and selective breeding.</p>	<p>Describe how species have become extinct.  Describe the impact of developments in biology on classification systems.  Evaluate the impact of environmental changes on the distribution of species in an ecosystem.  Describe the differences between the trophic levels of organisms within an ecosystem.</p>	<p>Describe biodiversity and how humans affect it.  Know how humans are effecting the earth and global resources.  Understand how materials are cycled.  Explain how temperature, water and availability of oxygen affect the rate of decay of biological material.</p>	<p>Practicing extended writing answers, especially those related to required practicals.  Opportunity to fine-tune exam skills.  Re-visit content as informed by Mock Progress Exams.  Re-visit calculations within the Biology curriculum</p>
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