

Year 8 Biology Curriculum – 2020-21

	Autumn Term		Spring Term		Summer Term	
	1	2	1	2	1	2
Key Concepts	Organisms	Ecosystems	Genes	Organisms	Ecosystems	Genes
National Curriculum Knowledge & Understanding	<p>Movement: The skeletal and muscular systems</p> <ul style="list-style-type: none"> * The structure and functions of the human skeleton, to include support, protection, movement and making blood cells * Biomechanics the interaction between skeleton and muscles, including the measurement of force exerted by different muscles * The function of muscles and examples of antagonistic muscles <p>Cells: Cells and organisation</p>	<p>Relationships in an ecosystem</p> <ul style="list-style-type: none"> * The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops * The importance of plant reproduction through insect pollination in human food security * How organisms affect, and are affected by, their environment, including the accumulation of toxic materials. <p>Plant Reproduction</p>	<p>Variation: Inheritance</p> <ul style="list-style-type: none"> * The variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation <p>Reproduction</p> <ul style="list-style-type: none"> * Reproduction in humans, the menstrual cycle, gametes, fertilisation, gestation, and birth, to include the effect of maternal lifestyle on the foetus through the placenta 	<p>Breathing: Gas exchange systems</p> <ul style="list-style-type: none"> * The structure and functions of the gas exchange system in humans, including adaptations to function * The mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume * The impact of exercise, asthma and smoking on the human gas exchange system * The role of leaf stomata in gas exchange in plants. 	<p>Photosynthesis</p> <ul style="list-style-type: none"> * The reactants in, and products of, photosynthesis, and a word summary for photosynthesis The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere * The adaptations of leaves for photosynthesis. 	<p>Inheritance</p> <ul style="list-style-type: none"> * Heredity as the process by which genetic information is transmitted from one generation to the next * The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection * Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce.

	<ul style="list-style-type: none"> * The role of diffusion in the movement of materials in and between cells * The structural adaptations of some unicellular organisms * The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. 	<ul style="list-style-type: none"> * Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. 		<ul style="list-style-type: none"> * The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. 		<p>Genes</p> <ul style="list-style-type: none"> * A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model * The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. *The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.
Assessment	<p>End of Unit Assessment</p> <p>Badger Assessment</p>	<p>End of Unit Assessment</p> <p>Badger Assessment</p>	<p>End of Unit Assessment</p> <p>Badger Assessment</p>	<p>End of Unit Assessment</p> <p>Badger Assessment</p>	<p>End of Unit Assessment</p> <p>Badger Assessment</p>	<p>End of Unit Assessment</p> <p>Badger Assessment</p>
Why this? Why now?	<p>Skeletal and muscular systems builds on aspects of KS2 where pupils learned humans</p>	<p>From KS2 pupils can already describe the life cycles of some organisms, but they</p>	<p>Inheritance is studied now as pupils have previously studied at KS2 at life cycles</p>	<p>This topic is conveyed later in the year as it incorporates several themes</p>	<p>This unit of work builds on earlier concepts from Cellular Respiration in year 7 as it</p>	<p>Following on from KS2 where pupils identified how animals and plants are adapted to suit</p>

	<p>and some other animals have skeletons and muscles for support, protection and movement and vertebrates. It is studied at this point as pupils already understand systems from year 7 when they studied Cells and Organisation. However, now they will build on this and use knowledge of forces, pushes, and pulls also from year 7. In Cells and Organisation, pupils will build on prior knowledge when they studied cells but will now learn that organisms can be unicellular. Cross curricular links will be made to the chemistry module Particle Model, which is taught as</p>	<p>will begin to understand why life cycles are important in terms of food security. It is studied at this point as it lays the foundations for the topic of Reproduction in plants and cross curricular to the chemistry module Climate in year 8 which is taught later, whereby human activity and the impact on climate is studied to a greater degree. Prior to KS3, pupils have explored the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. This topic will build on this and incorporate aspects of learning</p>	<p>and recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. This will underpin the science required for the next module of Reproduction in humans. It will also enable pupils to understand more abstract concepts later in year 8 from the topics of Inheritance and Genes such as natural selection and the use of gene banks. Reproduction in humans steps up from the KS2 curriculum where human life cycle is studied, but the mechanism has not been investigated. It is</p>	<p>from year 7 and 8, from Cells and Organisms, where pupils define tissues, organs and systems and from reproduction where they have looked at the effects of lifestyle choices on a foetus. This is now stepped up to incorporate how these lifestyle factors impact on life processes such as gas exchange. The early use of the pressure model to introduce the physical concept of pressure will act as an introducer to more detailed study of pressure that will follow on later in the physics scheme of learning. This must be studied prior to Photosynthesis so pupils can conceptualise that</p>	<p>explains how plants obtain glucose for respiration. Prior to this it encompasses aspects of Gas Exchange systems studied in the previous term. It is also studied after the chemistry unit of Climate, so pupils understand biological principles behind aspects of the carbon cycle.</p>	<p>their environment and that adaptation may lead to evolution, and in year 8, whereby the mechanism of inheritance takes place in the Reproduction module. This topic also relies on understanding of disruption to food webs studied prior in the Relationships in Ecosystems module. Pupils now have studied the underlying principles to build on more abstract ideas such as how extinction may occur in some species but not all. This is ideally placed before the Genes topic, where pupils will discover why gene banks are necessary. The</p>
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	<p>the first module in chemistry in year 7 as it shows how diffusion can take place in cells.</p>	<p>from Cells and Organisation and Relationships in an Ecosystem such as types of specialised cells and why pollination is so important in the life cycle of plants. These will be followed up later in year 8 as they link into Inheritance as there are differences between species which is explained in this topic.</p>	<p>studied at this point in the term as aspects of specialised cells, principles of systems from Cells and Organisms and Inheritance have been introduced earlier in the year.</p>	<p>plants do not breathe but have organs for gas exchange, enabling the study of Cellular respiration and Photosynthesis.</p>		<p>science in this final module draws on understanding from the previous Cells and Organisation module earlier in year 8, where pupils studied chromosomes; the Inheritance module also studied earlier on in year 8 as the process by which genetic information is transmitted from one generation to the next was determined. Cross curricular links from early in the year 8 Chemistry module Atoms, Elements and Compounds can be interwoven as pupils will understand polymers, which can be linked to the structure of DNA.</p>
Skills & Characteristics	Creativity will be demonstrated in	Pupils will develop creativity as they	Enabling pupils to develop the	Pupils will demonstrate	This unit will actively develop	Collaboration in this topic will be

	<p>this module as pupils will apply knowledge and thinking skills integral to scientific understanding by being able to explain how the arm is designed for movement.</p>	<p>will need to apply knowledge and logical thinking sequences integral to scientific understanding. Creativity will be demonstrated in this module as pupils will be able to apply knowledge and thinking skills integral to scientific understanding to seed formation and dispersal. Collaboration will occur involving practical group work to improve lab skills and communication.</p>	<p>essential skills of become resilient learners as they will look at practical results. Creativity will be used to apply knowledge integral to scientific understanding to the results of their practical work. Creativity will be used to apply knowledge integral to scientific understanding in relation to the topic of reproduction.</p>	<p>collaboration as they work together carrying out practical work improving their skills and communication techniques. They will also show resilience in their learning by looking at the results of practical work.</p>	<p>resilience, collaboration, and creative minds, as pupils will explore photosynthesis during practical sessions, while working collaboratively to set up and carry out experiments. Finally, they will apply knowledge and thinking skills in succession to explain the practical results.</p>	<p>developed as pupils may use the art of debate and then creativity to explain ideas about evolution and inheritance. Pupils will empathise with scientists who have demonstrated resilience in their own practical work and harness this to their own resilience when learning.</p>
<p>Aspirations & Careers</p>	<p>The science involved in this area correlates with:- * Physiotherapy * Occupational therapy * Radiography * Sports Science * Engineering</p>	<p>The science involved in this area correlates with:- * Farming and agriculture * Beekeeper * Environmental protection Conservationist</p>	<p>The science involved in this area correlates with:- * Zookeeper * Geneticist * Animal breeder * Food technologist * Midwife</p>	<p>The science involved in this area correlates with:- * Health care * Social work * Asthma nurse</p>	<p>The science involved in this area correlates with:- * Research scientist * School teacher</p>	<p>The science involved in this area correlates with:- * Zoologist * Biochemist * Archaeologist</p>

	<p>The science involved in this area correlates with:-</p> <ul style="list-style-type: none">* Cytology* Biotechnology* Laboratory* Botany		<ul style="list-style-type: none">* Health and Social Care* Care worker			
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Year 9 Biology Curriculum – 2021-22

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	Autumn Term		Spring Term		Summer Term	
	1	2	1	2	1	2
Key Concepts	New Technology		Turning Points in Biology		Turning Points in Biology	Detection
National Curriculum Knowledge & Understanding	<p style="text-align: center;">Genetics</p> <p>In this topic pupils will learn more about genes and how they determine our characteristics. They will look at the ways in which our current knowledge of genes can help us to calculate the probability of inheriting genetic disorders. They will see how selective breeding, genetic engineering and cloning can help us to produce more desirable organisms but also how technology is</p>	<p style="text-align: center;">Biotechnology</p> <p>In this topic pupils will learn about how enzymes are not just useful in the digestive system, but how they also have a role in biotechnology. It applies concepts learned from prior modules and enlightens pupils to how these can be incorporated into modern day applications and careers to improve our lives and the health of our planet. Pupils will select, plan and carry out the most</p>	<p style="text-align: center;">Cells and Systems</p> <p>This section of biology will enhance pupils understanding of specialised cells, specifically the role of white blood cells and their role in the body. Pupils will forge links with other concepts for example how antibiotic resistance is a consequence of evolution via natural selection. This topic will continue incorporating working scientifically aspects of the curriculum, as</p>	<p style="text-align: center;">Genes and Evolution</p> <p>Pupils will continue in their mastery of biological concepts relating to DNA, Charles Darwin and ensuring biodiversity is continued. They will be able to see the importance of peer review as scientists critically analyse each other's work. Pupils will develop practical skills and extract DNA.</p>	<p style="text-align: center;">Photosynthesis</p> <p>In this topic pupils will investigate the reactants in, and products of, photosynthesis. They will make predictions using scientific knowledge, select and plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate.</p>	<p style="text-align: center;">Working Scientifically in Careers</p> <p>In this topic pupils will make, and record observations and measurements using a range of methods for different investigations and suggest possible improvements. This will link directly to skills used within different careers for e.g. microscopy skills.</p>

	<p>enabling us to do so. Pupils have had many practical opportunities within biology. This section will enable pupils to revisit these key principles enabling them to secure skills, knowledge and to apply and answer scientific questions about the world around them by carrying out investigations into e.g Variation.</p>	<p>appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate. For example, they will plan out and investigate the effects of temperature on fermentation.</p>	<p>pupils will carry out and plan investigations to find out which antibiotic is the most effective. This topic will also be an introduction to KS4 Communicable Diseases.</p>			
Assessment	<p>Assessed project comprising of unit test, practical assessment of skills in while investigating techniques of cloning.</p>	<p>Assessed project comprising of end of unit test, practical assessment of skills in while investigating fermentation.</p>	<p>Assessed project comprising of unit test, practical assessment of skills in while investigating antibiotics.</p>	<p>Assessed project comprising of end of unit test, practical assessment of skills in while investigating DNA extraction.</p>	<p>Assessed project comprising of unit test, practical assessment of skills in while investigating photosynthesis.</p>	<p>Assessed project comprising of end of unit test, practical assessment of skills in while investigating microscopes.</p>

<p>Why this? Why now?</p>	<p>Pupils have prior understanding of Variation in terms of inheritance, chromosomes, genes, and DNA from year 7 and from year 8 where pupils studied Inheritance. These can now be incorporated together to unite abstract concepts which will later be applied to the topic Genes and Evolution while bridging the gap to study genetic engineering in greater depth at KS4.</p>	<p>Pupils have previously been introduced to the concept of biotechnology in year 8 when studying respiration. However, pupils will use understanding and knowledge and apply this to build a scientific investigation where results can be analysed. They will also look at other examples of how scientists can use biotechnology to our advantage e.g how cheese and yoghurt are made.</p>	<p>This is studied at this point as previously in year 7 pupils were introduced to the concept of specialised cells and that organisms are made up of systems. Pupils will now build on this knowledge to the fact that there are other specialised cells in the body and that the body also has an immune system. While incorporating aspects of the working scientifically curriculum, pupils will understand that scientific methods and theories develop as scientists modify earlier explanations to consider new evidence and ideas.</p>	<p>This topic is placed at this point as it uses understanding from Cells and Organisation module early in year 7, where pupils studied chromosomes; the Inheritance module later on in year 7 as the process by which genetic information is transmitted from one generation to the next was determined and finally in year 8, in the Inheritance module where the consequences of variation were studied. Pupils will use specific practical skills safely to observe genetic material within a specimen.</p>	<p>Photosynthesis is a fundamental principle at KS3 and KS4 in biology and chemistry as it allows pupils to make links between cross curricular areas of the Carbon Cycle and climate change. Pupils will have opportunities to carry out a range of scientific experiments for e.g. testing a leaf for starch whereby they can apply understanding of food tests from year 8 when they studied digestion to the leaf.</p>	<p>Connections between science and careers is a thread running through from the year 7 and year 8 curriculum. The focus at this point will be applying the practical skills from a variety of topics in biology to different careers. Some of these skills will be paramount to the curriculum at KS4 and serves as a bridge between KS3 and KS4. For e.g pupils have used microscopes in year 7, but now they will investigate the different types of microscopes, how they link to forensic science, which will also incorporate knowledge of genetics from earlier on in the year.</p>
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<p>Skills & Characteristics</p>	<p>Resilience Being able to look at practical results, identify anomalies and carrying out repeats are all essential skills to build resilience</p> <p>Collaboration Lessons involve practical group work to improve lab skills and communication. Pupils understand the importance of discussion and peer review in the scientific community.</p> <p>Creativity Application of knowledge and logical thinking skills are integral to scientific investigation</p>
<p>Aspirations & Careers</p>	<p>CEIAG Medical Experience days: These events link with scientific content and bring 'real-life', everyday experiences into the classroom which specifically link to human anatomy areas in the curriculum. Careers Fairs: Provides an opportunity to students to practice presenting themselves in front of potential employers. This is also a great way for students to compare employers, and find out what area of science/ scientific skills they need to focus on in the classroom in order to be considered for future posts. Work Experience: Students are introduced to different scientific skills by work colleagues during work experience which includes; the ability to problem solve, handling/ analysing data and communicate effectively. All skills which are used daily during day – to day lessons.</p> <p>Cultural Capital Pupils are encouraged to make links between current events, like plastic pollution and biodiversity and our biology learning in the classroom. All pupils take advantage of our excellent links with the Science Ambassadors and through trips and in class activities.</p> <p>Extracurricular Stem Club: Help to inspire, attract and develop STEM talents during school. The purpose of a STEM club is to raise student's engagement and achievement in these subject area. Jeans for Genes assemblies: Brings awareness of life-altering genetic disorders which affect half a million UK children. This awareness helps bring relevance to the 'genetics' and both communicable and non-communicable topics in the curriculum. Young Health Champions: Provide students skills and knowledge to act as mentors with increased awareness of healthy lifestyles and overall 'health'. Again, this encourages students to understand the relevance for teaching health-based topics in biology.</p>