

## Year 7 Biology Curriculum – 2020-21

	Autumn Term		Spring Term		Summer Term	
	1	2	1	2	1	2
Key Concepts	Organisms		Interactions and interdependencies / Reproduction		Genetics and Human Reproduction	
National Curriculum Knowledge & Understanding	<p><b>The skeletal and muscular systems</b></p> <ul style="list-style-type: none"> <li>* The structure and functions of the human skeleton, to include support, protection, movement and making blood cells</li> <li>* Biomechanics the interaction between skeleton and muscles, including the measurement of force exerted by different muscles</li> <li>* The function of muscles and examples of antagonistic muscles</li> </ul>	<p><b>Cells and organisation</b></p> <ul style="list-style-type: none"> <li>* Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope</li> <li>* The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria, and chloroplasts</li> <li>* The similarities and differences between plant and animal cells</li> <li>* The role of diffusion in the movement of</li> </ul>	<p><b>Relationships in an ecosystem</b></p> <ul style="list-style-type: none"> <li>* The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops</li> <li>* The importance of plant reproduction through insect pollination in human food security</li> <li>* How organisms affect, and are affected by, their environment, including the accumulation of toxic materials.</li> </ul>	<p><b>Reproduction</b></p> <ul style="list-style-type: none"> <li>* Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.</li> </ul>	<p><b>Inheritance</b></p> <ul style="list-style-type: none"> <li>* Differences between species</li> <li>* Heredity as the process by which genetic information is transmitted from one generation to the next</li> <li>* The variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation</li> </ul>	<p><b>Reproduction</b></p> <ul style="list-style-type: none"> <li>* Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle, gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta</li> </ul>

		<p>materials in and between cells</p> <ul style="list-style-type: none"> <li>* The structural adaptations of some unicellular organisms</li> <li>* The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.</li> </ul>				
Assessment	Badger Assessment	<p>End of Unit Assessment</p> <p>Badger Assessment</p> <p>End of term Summative Assessment</p>	Badger Assessment	<p>End of Unit Assessment</p> <p>Badger Assessment</p> <p>End of term Summative Assessment</p>	Badger Assessment	<p>End of Unit Assessment</p> <p>Badger Assessment</p> <p>End of term Summative Assessment</p>
Why this? Why now?	Skeletal and muscular systems builds on aspects of KS2 where pupils have learned humans and some other animals have skeletons and muscles for support, protection and movement and	In the previous module the concept of cells has been introduced. There is a hierarchical demand, whereby pupils will learn the basic structures of cells of plant and animal cells and	From KS2 pupils can already describe the life cycles of some organisms, but they will begin to understand why life cycles are important in terms of food security. It is studied at this	Prior to KS3, pupils have been explore 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	Inheritance is studied now as pupils have previously looked at KS2 at life cycles and recognise that living things produce offspring of the same kind, but normally offspring vary and	Reproduction in humans steps up from the KS2 curriculum where human life cycle is studied, but the mechanism has not been investigated. It is studied at this point in the term as

	<p>vertebrates. It is studied early in the year as it is an opener for Cells and Organisation which requires understanding of forces as pushes and pulls. This is also taught as the first topic in year 7, but the concepts needed have previously been introduced in KS2 which teaches them the concepts of levers.</p>	<p>adaptations, which then will be applied to Reproduction. Cross curricular links will be made to the chemistry module Particle Model, which is taught as the first module in chemistry in year 7 as it shows how diffusion can take place in cells.</p>	<p>point as it lays the foundations for the topic of Reproduction and cross curricular to the chemistry module Climate in year 8, whereby human activity and the impact on climate is studied to a greater degree.</p>	<p>and incorporate aspects of learning 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 7 as they link into Inheritance as there are differences between species, and Reproduction whereby pupils can study reproduction in animals.</p>	<p>are not identical to their parents. This will underpin the science required for the next module. It will also enable pupils to understand more abstract concepts in year 8 from the topics of Inheritance and Genes such as natural selection and the use of gene banks.</p>	<p>aspects of specialised cells, principles of systems from Cells and Organisms and Inheritance have been introduced earlier in the year. Aspects of this topic will be integrated early into year 8 where pupils will learn in more detail the impact of lifestyle on the body in Gas Exchange.</p>
Skills & Characteristics	<p>Creativity will be demonstrated in this module as pupils will apply knowledge and thinking skills integral to scientific understanding by being able to explain how the</p>	<p>Resilience learning will be activated as pupils will use essential skills required to ascertain microscopy skills. They will collaboratively improve lab skills working together</p>	<p>Pupils will develop creativity as they will need to apply knowledge and logical thinking sequences integral to scientific understanding.</p>	<p>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</p>	<p>Enabling pupils to develop the 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</p>	<p>Creativity will be used to apply knowledge integral to scientific understanding in relation to the topic of reproduction.</p>

	arm is designed for movement.	to produce a specimen focused correctly.		occur involving practical group work to improve lab skills and communication.	the results of their practical work.	
Aspirations & Careers	The science involved in this area correlates with:- * Physiotherapy * Occupational therapy * Radiography * Sports Science * Engineering CDI: 4, 5, 6	The science involved in this area correlates with:- * Cytology * Biotechnology * Laboratory * Botany CDI: 4, 5, 6	The science involved in this area correlates with:- * Farming and agriculture * Beekeeper * Environmental protection Conservationist CDI: 4, 5, 6	The science involved in this area correlates with:- * Gardener * Chemical engineering * Horticulture CDI: 4, 5, 6	The science involved in this area correlates with:- * Zookeeper * Geneticist * Animal breeder * Food technologist CDI: 4, 5, 6	The science involved in this area correlates with:- * Midwife * Health and Social Care * Care worker CDI: 4, 5, 6

## Year 8 Biology Curriculum – 2021-22

	Autumn Term		Spring Term		Summer Term	
	1	2	1	2	1	2
Key Concepts	Organisms		Material cycles and energy		Genetics and Evolution	
National Curriculum Knowledge & Understanding	<p><b>Gas exchange systems</b></p> <ul style="list-style-type: none"> <li>* The structure and functions of the gas exchange system in humans, including adaptations to function</li> <li>* 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</li> <li>* The impact of exercise, asthma and smoking on the human gas exchange system</li> <li>* The role of leaf stomata in gas exchange in plants.</li> </ul>	<p><b>Nutrition and digestion</b></p> <ul style="list-style-type: none"> <li>* Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed</li> <li>* Calculations of energy requirements in a healthy daily diet</li> <li>* The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</li> <li>* The tissues and organs of the human digestive system, including adaptations to</li> </ul>	<p><b>Cellular respiration</b></p> <ul style="list-style-type: none"> <li>* Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life</li> <li>* A word summary for aerobic respiration</li> <li>* The process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration</li> </ul>	<p><b>Photosynthesis</b></p> <ul style="list-style-type: none"> <li>* The reactants in, and products of, photosynthesis, and a word summary for photosynthesis</li> <li>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</li> <li>* The adaptations of leaves for photosynthesis.</li> </ul>	<p><b>Inheritance</b></p> <ul style="list-style-type: none"> <li>* Heredity as the process by which genetic information is transmitted from one generation to the next</li> <li>* The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection</li> <li>* Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce.</li> </ul>	<p><b>Genes</b></p> <ul style="list-style-type: none"> <li>* 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</li> <li>* The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.</li> <li>*The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.</li> </ul>

	<ul style="list-style-type: none"> <li>* The effects of recreational drugs (including substance misuse) on behaviour, health and life processes.</li> </ul>	<ul style="list-style-type: none"> <li>function and how the digestive system digests food (enzymes simply as biological catalysts)</li> <li>* The importance of bacteria in the human digestive system</li> <li>* Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots</li> </ul>	<ul style="list-style-type: none"> <li>* The differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism</li> </ul>			
Assessment	Badger Assessment	End of Unit Assessment  Badger Assessment  End of term Summative Assessment	Badger Assessment	End of Unit Assessment  Badger Assessment  End of term Summative Assessment	Badger Assessment	End of Unit Assessment  Badger Assessment  End of term Summative Assessment

Why this? Why now?	This topic is conveyed early in the year as it incorporates several themes from year 7, 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.	Nutrition and digestion systems will develop chained learning to form linked sequences across the curriculum, which is why it is studied at this point. It begins at KS2 where pupils describe the ways in which nutrients transported within humans whereas now, they will learn the purpose of these nutrients and the constituents of a balanced diet. This links back to the earlier topic in year 8 when pupils studied lifestyle choices. It also makes connections back to Cells and Organisms as reinforcement of tissues and organs. It also will lay foundations as to the origin of food	In the previous module pupils considered food as a chemical energy store. Now they will study the processes whereby this energy is released. It will incorporate aspects of the topic Gas Exchange Systems as pupils need to have prior understanding as to where and how oxygen is transported into the blood and Particle Model linking in diffusion and conservation of material. Pupils have already been introduced to word equations in Year 7 during Metals and non-metal topic allowing pupils to identify reactants and products of respiration and the construction of the equation.	This unit of work builds on earlier concepts from Cellular Respiration as it explains how plants obtain glucose for respiration. Prior to this it encompasses aspects of Gas Exchange systems studied at the beginning of the year. It is also studied before the chemistry unit of Climate so pupils understand the principles behind aspects of the carbon cycle. Furthermore, links will be forged in terms of human impact in the environment as pupils will have background knowledge as to why plants are fundamental to the maintenance of the atmosphere.	Following on from KS2 where pupils identified how animals and plants are adapted to suit their environment and that adaptation may lead to evolution, and in year 7, whereby the mechanism of inheritance takes place in the Reproduction module. This topic also relies on understanding of disruption to food webs studied 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	The science in this final module draws on understanding from the previous 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. Cross curricular links from early in the year 8 Chemistry module Atoms, elements and Compounds can be interwoven as pupils will understand
-----------------------	--	---	--	---	--	--

	<p>This must be studied prior to Photosynthesis so pupils can conceptualise that plants do not breathe but have organs for gas exchange, enabling the study of Cellular respiration and Photosynthesis.</p>	<p>being chemical energy in the year 7 Physics topic of Energy, pupils have compared energy values from food labels, but now they will make calculations and link results back to lifestyle choices. The principles of enzymes will also be introduced in a simple form so that in year 9 pupils can study further aspects of enzymes such as how they are used in food production in the module Biotechnology.</p>			<p>pupils will discover why gene banks are necessary.</p>	<p>polymers, which can be linked to the structure of DNA.</p>
--	---	---	--	--	---	---

Skills & Characteristics	<p>Pupils will demonstrate 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>Pupils will work collaboratively on practical work as they explore the role of enzymes in digestion. They will then use creative thinking skills to apply knowledge to their findings.</p>	<p>Pupils will display creativity in their learning, applying scientific understanding of respiration to food production. They will work collaboratively during practical work.</p>	<p>This unit will actively develop 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>Collaboration in this topic will be developed as pupils may use the art of debate and then creativity to explain ideas about evolution and inheritance.</p>	<p>Pupils will empathise with scientists who have demonstrated resilience in their own practical work and harness this to their own resilience when learning.</p>
Aspirations & Careers	<p>The science involved in this area correlates with:-</p> <ul style="list-style-type: none"> <li>* Health care</li> <li>* Social work</li> <li>* Asthma nurse</li> </ul> <p>CDI: 4, 5, 6</p>	<p>The science involved in this area correlates with:-</p> <ul style="list-style-type: none"> <li>* Food technologist</li> <li>* Nutritionist</li> <li>* Personal trainer</li> </ul> <p>CDI: 4, 5, 6</p>	<p>The science involved in this area correlates with:-</p> <ul style="list-style-type: none"> <li>* Personal trainer</li> <li>* Food technology</li> <li>* Microbiologist</li> </ul> <p>CDI: 4, 5, 6</p>	<p>The science involved in this area correlates with:-</p> <ul style="list-style-type: none"> <li>* Research scientist</li> <li>* School teacher</li> </ul> <p>CDI: 4, 5, 6</p>	<p>The science involved in this area correlates with:-</p> <ul style="list-style-type: none"> <li>* Geneticist</li> <li>* Genetics counsellor</li> <li>* Plant breeder</li> </ul> <p>CDI: 4, 5, 6</p>	<p>The science involved in this area correlates with:-</p> <ul style="list-style-type: none"> <li>* Zoologist</li> <li>* Biochemist</li> <li>* Archaeologist</li> </ul> <p>CDI: 4, 5, 6</p>

## Year 9 Biology Curriculum – 2022-23

	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><b>Genetics</b></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 enabling us to do</p>	<p><b>Biotechnology</b></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 appropriate types</p>	<p><b>Cells and Systems</b></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 pupils will carry out</p>	<p><b>Genes and Evolution</b></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><b>Photosynthesis</b></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><b>Working Scientifically in Careers</b></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>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>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>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	Assessed project comprising of unit test, practical assessment of skills in while investigating techniques of cloning.	Assessed project comprising of end of unit test, practical assessment of skills in while investigating fermentation.	Assessed project comprising of unit test, practical assessment of skills in while investigating antibiotics.	Assessed project comprising of end of unit test, practical assessment of skills in while investigating DNA extraction.	Assessed project comprising of unit test, practical assessment of skills in while investigating photosynthesis.	Assessed project comprising of end of unit test, practical assessment of skills in while investigating microscopes.

Why this? Why now?	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.	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.	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.	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.	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.	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.
-----------------------	---	--	---	--	---	--

Skills & Characteristics	<p><b>Resilience</b> Being able to look at practical results, identify anomalies and carrying out repeats are all essential skills to build resilience</p> <p><b>Collaboration</b> 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><b>Creativity</b> Application of knowledge and logical thinking skills are integral to scientific investigation</p>
Aspirations & Careers	<p><b>CEIAG</b> 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. CDI: 4, 5, 6, 7 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. CDI: 4, 5, 6, 7 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. CDI: 11, 12</p> <p><b>Cultural Capital</b> 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><b>Extracurricular</b> 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>