

Key Stage 4 Long Term Planning

Year 9

Faculty Area: Biology Single Science

Year 9	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Syllabus	AQA Biology - Collins - Chapter 1 - Cell Biology		AQA Biology - Collins - Chapter 2 - Photosynthesis		AQA Biology - Collins - Chapter 3 Moving and Changing Materials	
Connections to prior learning	<p>3.8.1 Movement Explore how the skeletal system and muscular system in a chicken wing work together to cause movement The parts of the human skeleton work as a system for support, protection, movement and the production of new blood cells. Antagonistic pairs of muscles create movement when one contracts and the other relaxes.</p> <p>3.8.2 Cells Identify the principal features of a cheek cell and describe their functions Multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes. There are many types of cell. Each has a different structure or feature so it can do a specific job. Use a light microscope to observe and draw cells. Both plant and animal cells have a cell membrane, nucleus, cytoplasm and mitochondria. Plant cells also have a cell wall, chloroplasts and usually a permanent vacuole.</p> <p>3.9.3 Respiration Use data from investigating fermentation with yeast to explore respiration Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable. Yeast fermentation is used in brewing and breadmaking.</p>		<p>3.9.4 Photosynthesis Use lab tests on variegated leaves to show that chlorophyll is essential for photosynthesis Plants and algae do not eat, but use energy from light, together with carbon dioxide and water to make glucose (food) through photosynthesis. They either use the glucose as an energy source, to build new tissue, or store it for later use. Plants have specially-adapted organs that allow them to obtain resources needed for photosynthesis. Iodine is used to test for the presence of starch.</p> <p>3.9.2 Plant reproduction Use models to evaluate the features of various types of seed dispersal Plants have adaptations to disperse seeds using wind, water or animals. Plants reproduce sexually to produce seeds, which are formed following fertilisation in the ovary. Flowers contain the plant's reproductive organs. Pollen can be carried by the wind, pollinating insects or other animals.</p>		<p>3.8.3 Breathing Investigate a claim linking height to lung volume In gas exchange, oxygen and carbon dioxide move between alveoli and the blood. Oxygen is transported to cells for aerobic respiration and carbon dioxide, a waste product of respiration, is removed from the body. Breathing occurs through the action of muscles in the ribcage and diaphragm. The amount of oxygen required by body cells determines the rate of breathing.</p> <p>3.8.4 Digestion Evaluate how well a model represents key features of the digestive system The body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells' energy, growth and maintenance. Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes. Iron is a mineral important for red blood cells. Calcium is a mineral needed for strong teeth and bones. Vitamins and minerals are needed in small amounts to keep the body healthy.</p>	
Knowledge	Animal and plant cells Cell specialisation Cell differentiation Stem cells Eukaryotic cells		Photosynthesis Plant organs and Plant tissues. Plant transport systems Increasing food production Diffusion		Active transport Principles of organisation The human digestive system Properties of enzymes The circulatory system	

MOOR PARK HIGH SCHOOL: CURRICULUM

	<p>Microscopy Culturing microorganisms Chromosomes Mitosis and the cell cycle Stem cells</p>		<p>The heart and blood vessels How the lungs are adapted for efficient gas exchange. Exchange surfaces- Plants and minerals Coronary heart disease Blood Health issues and Effect of lifestyle on non-communicable diseases Cancers (malignant tumours)</p>
Skills	<p>Required Practical: Microscopy AT 7 - use of appropriate apparatus, techniques and magnification, including microscopes Required Practical: Microbiology AT 1 use of appropriate apparatus to make and record a range of measurements accurately including length and area AT 3 use of appropriate apparatus and techniques for the observation and measurement of biological changes and/or processes AT 4 safe and ethical use of living organisms (plants or animals) to measure physiological function and responses to the environment AT 8 the use of appropriate techniques and qualitative reagents to identify biological molecules and processes in more complex and problem-solving contexts including continuous sampling in an investigation Make observations of biological specimens and producing labelled scientific drawings Prepare slides of onion epidermis, rhubarb epidermis, cheek cells, spirogyra, moss etc. Make labelled drawings Plan investigations, make observations and analyse data Model plant and animal cells. Use bio viewers.</p>	<p>Required Practical: Photosynthesis AT 1 use of appropriate apparatus to make and record a range of measurements accurately, including time and volume of a gas AT 3 use of appropriate apparatus and techniques for the observation and measurement of biological changes and/or processes AT 4 safe and ethical use of living organisms (plants or animals) to measure physiological functions and responses to the environment AT 5 measurement of rates of reaction by a variety of methods including the production of gas Draw the arrangement of stomata and guard cells Using models. Plan investigations, make observations and analyse data Evaluate the use of models to represent blocked arteries</p>	<p>Required Practical: Osmosis AT 1 use of appropriate apparatus to measure and record a range of measurements accurately including length, mass and volume of liquid AT 3 use of appropriate apparatus and techniques for the observation and measurement of biological changes and/or processes AT 5 measurement of rate of reaction by a variety of methods including an uptake of water Required Practical: Food Tests AT 2 safe use of appropriate heating devices and techniques including the use of a Bunsen burner and a water bath Required Practical: Enzymes AT 1 use of appropriate apparatus to make and record a range of measurements accurately including time, temperature, volume of liquids and pH AT 2 safe use of appropriate heating devices and techniques including use of a Bunsen burner and water bath or electric heater AT 5 measurement of rates of reaction by a variety of methods including using colour change of an indicator Analyse data about cancer from cancer research site. Critically evaluate models Plan investigations, make observations and analyse data Make predictions and identify variables. Draw conclusions and give explanations for the results.. Plot and interpret graphs about enzyme activity .</p>
Assessment	End of unit test for Chapter 1 - Cell Biology	End of unit test for Chapter 2 - Photosynthesis	End of unit test for Chapter 3 - Moving and Changing Materials
Homework	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions

MOOR PARK HIGH SCHOOL: CURRICULUM

<p>Cultural enrichment including Trips, Visits, Experiences, Extra-curricular</p>	<p align="center"><u>School and University Network</u> Trip 1-Health and Medicine Trip 2-Law and Business Trip 3-Media and Higher Education</p>		
<p>Literacy</p>	<p>Use of command words and Science subject specific vocabulary Drawing an animal and a plant cell on mini white boards. Students spot the difference between the two. Complete a card sort to match the organelle to the function. Construct a table to compare animal to plant cells. Make a plant or animal cell model. Write a job description for a newspaper for each type of specialised cell Students circulate to complete a summary table on uses, pros and cons. Students prepare and present their arguments in favour of or against the use of embryonic stem cells Produce a mind map to summarise diffusion and exchange surfaces. Keywords: Active transport, Adult stem cell, Cell differentiation, Cell membrane, Chloroplast, Chromosomes, Concentration gradient, Diffusion, Embryonic stem cell, Eukaryotic cell, Magnification, Meristematic cells, Mitochondria, Mitosis, Organelle, Osmosis, Plasmid, Prokaryotic cell, Resolution, Specialised cells, Stem cell, Surface area, Surface area to volume ratio (SA:V), Therapeutic cloning, Vacuole:</p>	<p>Use of command words and Science subject specific vocabulary Label a diagram of a plant with names and functions of organs. Produce a comparison table Research where active transport occurs in plants and humans and label these on diagrams with notes. Observe a computer simulation of active transport. Keywords: Amylase, Aorta, Artery: Benign tumour, Bile, Blood, Cancer, Capillary, Cell, Communicable disease, Coronary heart disease, Enzymes, Heart, Lipase, Lock and key hypothesis, Malignant tumour, Meristem tissue, Non-communicable disease, Organs, Organ systems, Palisade mesophyll, Phloem, Protease, Pulmonary artery, Pulmonary vein, Rate of reaction, Risk factor, Spongy mesophyll, Statins, Stent, Translocation, Transpiration, Vein, Xylem.</p>	<p>Use of command words and Science subject specific vocabulary Produce a flow diagram showing organisation in large organisms and relate to size. Describe the pathway of an egg sandwich from mouth to anus. Tell it as a story. Watch computer simulations to help make notes and explain the properties of enzymes. Role play – What happens to food as it moves along the digestive system? Label a diagram of the heart and colour to show oxygenated and deoxygenated blood. Research the work of Galen and William Harvey and Produce a table to compare the structure of the vessels and relate to their function. Carry out research using textbooks and the internet and write a report on the effects of diet, stress, smoking, alcohol and exercise on health, to include risk factors for specific diseases. Keywords: Antibiotics, Clinical drug testing, Communicable disease, Double blind trial, Gonorrhoea, Human Immunodeficiency Virus (HIV), Malaria, Measles, *Monoclonal antibodies, Non-communicable disease, Non-specific defence, Pathogens, Placebo, Preclinical drug testing, Rose black spot, Salmonella, Side effects, Tobacco Mosaic Virus (TMV) ,Vaccination, White blood cell.</p>
<p>Numeracy</p>	<p>Calculate the real sizes of cells and structures. differences in magnification and resolution. Use a microscope with graticule to measure cells and calculate their real size. Preparation of inoculating plates Calculate the number of bacteria in a population after a certain time given the mean division time. Calculate cross sectional area of colonies.</p>	<p>Calculate stomatal density using data provided or from direct observations. Estimate the size of the cells. Calculate surface area: volume ratios for different sized objects or using data about organisms.</p>	<p>Collect, present and analyse data about health risks and diseases, looking for correlations. Measure height and weight to calculate BMI. Calculate BMI and evaluate the use of this type of measurement Calculate the rate of gas production using data obtained. Calculate rates of reaction using raw data and graphs</p>
<p>CIAG</p>	<p>What workplace skills does biology develop? Analysis: Students need analysis in any job which</p>	<p>What workplace skills does biology develop? Analysis: Students need analysis in any job which</p>	<p>What workplace skills does biology develop? Analysis: Students need analysis in any job which</p>

MOOR PARK HIGH SCHOOL: CURRICULUM

	<p>requires you to process information. GPs and vets analyse their knowledge of medicine along with the symptoms they observe in the patient in front of them in order to reach a conclusion about their medical condition.</p> <p>Curiosity: Engineers must always be searching for new solutions to the technical challenges they face to improve their efficiency and overcome new and seemingly impossible obstacles. Teachers must explore new approaches to adapt to different students' needs and constantly improve their teaching.</p> <p>Drawing: As well as the obvious – such as illustrators, graphic designers and animators – many other jobs benefit from good drawing skills. Any role which requires students to present their findings or plans through diagrams benefits from good drawing skills.</p> <p>Future Morph resources aim to show students that there is a wide choice of options open to those who study sciences</p>	<p>requires you to process information. GPs and vets analyse their knowledge of medicine along with the symptoms they observe in the patient in front of them in order to reach a conclusion about their medical condition.</p> <p>Curiosity: Engineers must always be searching for new solutions to the technical challenges they face to improve their efficiency and overcome new and seemingly impossible obstacles. Teachers must explore new approaches to adapt to different students' needs and constantly improve their teaching.</p> <p>Drawing: As well as the obvious – such as illustrators, graphic designers and animators – many other jobs benefit from good drawing skills. Any role which requires students to present their findings or plans through diagrams benefits from good drawing skills.</p> <p>Future Morph resources aim to show students that there is a wide choice of options open to those who study sciences</p> <p>NCW STEM lessons – where can science take you?</p>	<p>requires you to process information. GPs and vets analyse their knowledge of medicine along with the symptoms they observe in the patient in front of them in order to reach a conclusion about their medical condition.</p> <p>Curiosity: Engineers must always be searching for new solutions to the technical challenges they face to improve their efficiency and overcome new and seemingly impossible obstacles. Teachers must explore new approaches to adapt to different students' needs and constantly improve their teaching.</p> <p>Drawing: As well as the obvious – such as illustrators, graphic designers and animators – many other jobs benefit from good drawing skills. Any role which requires students to present their findings or plans through diagrams benefits from good drawing skills.</p> <p>Future Morph resources aim to show students that there is a wide choice of options open to those who study sciences</p> <p>Future Morph Careers Quest-students quiz exhibitors at The Big Bang Fair about their chosen career, why they chose it and what it involves</p>
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Key Stage 4 Long Term Planning

Year 10 SYLLABUS:

Curriculum Area: Biology Single Science

Year 10	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Syllabus	AQA Biology Collins - Chapter 4 Health Matters		AQA Biology Collins - Chapter 5 Coordination and Control		AQA Biology Collins - Chapter 6 Genetics	
Connections to prior learning	<p>3.8.2 Cells</p> <p>Identify the principal features of a cheek cell and describe their functions</p> <p>Know Apply</p> <p>Multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes.</p> <p>There are many types of cell. Each has a different structure or feature so it can do a specific job.</p> <p>Skill</p> <p>Use a light microscope to observe and draw cells.</p> <p>Vitamins and minerals are needed in small amounts to keep the body healthy.</p>		<p>3.10.2 Human reproduction</p> <p>Relate advice to pregnant women to ideas about transfer of substances to the embryo</p> <p>The menstrual cycle prepares the female for pregnancy and stops if the egg is fertilised by a sperm.</p> <p>The developing foetus relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances.</p> <p>The menstrual cycle lasts approximately 28 days.</p> <p>If an egg is fertilised it settles into the uterus lining.</p>		<p>3.10.1 Variation</p> <p>Graph data relating to variation and explain how it may lead to the survival of a species</p> <p>There is variation between individuals of the same species. Some variation is inherited, some is caused by the environment and some is a combination.</p> <p>Variation between individuals is important for the survival of a species, helping it to avoid extinction in an always changing environment.</p> <p>3.10.4 Inheritance</p> <p>Model the inheritance of a specific trait and explore the variation in the offspring produced</p> <p>Inherited characteristics are the result of genetic information, in the form of sections of DNA called genes, being transferred from parents to offspring during reproduction.</p> <p>Chromosomes are long pieces of DNA which contain many genes. Gametes, carrying half the total number of chromosomes of each parent, combine during fertilisation.</p> <p>The DNA of every individual is different, except for identical twins.</p> <p>There is more than one version of each gene eg different blood groups.</p>	
Knowledge	<p>Communicable diseases</p> <p>Culturing microorganisms</p> <p>Viral, bacterial and fungal diseases in humans</p> <p>Protist diseases</p> <p>Human defence systems</p> <p>Vaccination</p> <p>Antibiotics</p> <p>Painkillers</p> <p>Discovery and development of drugs</p>		<p>Introduction to homeostasis</p> <p>Structure and function of the nervous system.</p> <p>The brain.</p> <p>The eye</p> <p>Control of body temperature</p> <p>Human endocrine system</p> <p>Control of blood glucose concentration</p> <p>Water and nitrogen balance</p>		<p>Genetics</p> <p>Sexual and asexual reproduction.</p> <p>Meiosis.</p> <p>Advantages and disadvantages of sexual and asexual reproduction</p> <p>Sex determination.</p> <p>DNA.</p> <p>protein synthesis. Genetic inheritance and inherited</p>	

MOOR PARK HIGH SCHOOL: CURRICULUM

	<p>Production and uses of MABs Plant disease Plant defence responses</p>	<p>Kidney function ADH Kidney failure Hormones in human reproduction Contraception The use of hormones to treat infertility. The Impact of environmental change advantages and disadvantages of fertility treatment, Negative feedback. Control and coordination Use of plant hormones.</p>	<p>disorders. The understanding of genetics Genetic engineering Examples of genetic engineering. Cloning.</p>
<p>Skills</p>	<p>Evaluate risks when growing microbial cultures. Interpret graphs Carry out research and explain application of science and personal and social implications related to diseases. Plan investigations, make observations and analyse data Investigate the effect of disinfectants or antibiotics on bacterial growth Role play: Pharmacist/patient giving recommendation based on symptoms (cards prepared or students' own ideas). Draw a flow diagram to describe how MABs are produced. Make observations and hypotheses about plant defences.</p>	<p>Required practical: Reaction Time AT 1 use of appropriate apparatus to make and record a range of measurements accurately including length AT 3 use of appropriate apparatus and techniques for the observation and measurement of biological changes and/or processes AT 4 safe and ethical use of a living organisms (plants or animals) to measure physiological functions and responses to the environment Required Practical: Plant Responses AT 1 use of appropriate apparatus to make and record a range of measurements including length and time AT 3 use of appropriate apparatus and techniques for the observation and measurement of biological changes and/or processes AT 4 safe and ethical use of living organisms (plants and animals) to measure physiological functions and responses to the environment Use a model to explain control systems Plan and manage a variety of stimuli to illustrate body responses.. Carry out a controlled investigation, present and analyse the results. Investigate the effect of exercise on body temperature and/or sweating. Dissection of pig's kidney Analyse urine samples and identify who each one came from. Give reasons for the conclusions.</p>	<p>Use bio-viewers, video clips or images to show chromosomes and meiosis. Use a Punnett square and a genetic cross diagram to illustrate the inheritance of sex; evaluate the chance of producing a male or female. Extract DNA from fruits such as onions or kiwi fruit. Use a model to identify mutations in the base sequence. Interpret genetic diagrams of Mendel's experiments.</p>
<p>Assessment</p>	<p>End of unit test for Chapter 4 - Health Matters</p>	<p>End of unit test for Chapter 5 - Coordination and Control</p>	<p>End of unit test for Chapter 6 - Genetics</p>

MOOR PARK HIGH SCHOOL: CURRICULUM

Homework	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions
Cultural enrichment including Trips, Visits, Experiences, Extra-curricular	<u>School and University Network</u> Trip 1- Magnets and Motors Trip 2- Life on Mars		
Literacy	<p>Use of command words and Science subject specific vocabulary</p> <p>Construct a table comparing fungi, virus, bacteria and protists to include size, site of reproduction and effects in the body.</p> <p>Prepare advice leaflet for a doctors' surgery explaining how people can reduce their chances of catching diseases.</p> <p>Write a report on the investigation.</p> <p>Discuss the best way to present the results.</p> <p>Interpret graphs showing bacterial population growth</p> <p>Small group project using ICT, researching to find out about the symptoms, mode of transmission, prevention and treatment for measles, HIV and AIDS, salmonella and gonorrhoea.</p> <p>Role play – Aid workers visit a remote village to help educate residents on preventing malaria infection</p> <p>Interpret data about vaccination rates and reported cases of diseases, eg whooping cough.</p> <p>Observe, report and interpret results</p> <p>Evaluate the advantages and disadvantages of MABs.</p> <p>Design a 'super plant' – combining a range of defences.</p> <p>Keywords:</p> <p>Aerobic respiration, Anaerobic respiration, Cellular respiration, Inverse proportion, Inverse square law, Limiting factor, Metabolism, Oxygen debt, Photosynthesis Communicable Culturing microorganisms Viral, bacterial, fungal, Protist diseases Vaccination Antibiotics</p>	<p>Use of command words and Science subject specific vocabulary</p> <p>Draw a flow diagram to show the main components of a control system and label with the function of each component.</p> <p>Required practical write up.</p> <p>Evaluate medical research methods.</p> <p>Investigate how exercise affects body temperature and/or sweating and report on the findings.</p> <p>Compare the actions of the endocrine system with the nervous system.</p> <p>Compare Type 1 and Type 2 diabetes and present the information in a suitable format.</p> <p>Discuss a moral dilemma</p> <p>Discuss considerations in terms of cost as to how kidney patients should be treated – lifetime dialysis, transplant, shortage of kidneys, buying kidneys from healthy people and prioritising lists for surgery.</p> <p>Research cost of dialysis and transplants.</p> <p>Produce arguments for and against the options.</p> <p>Produce a report for a teen magazine on the advantages and disadvantages of different types of contraceptives.</p> <p>Research the process of IVF and produce a leaflet for a doctor's surgery to describe the main stages involved in IVF treatment.</p> <p>Keywords:</p> <p>Abstinence, *Accommodation, Adrenaline, *Antidiuretic hormone (ADH), Contraception, Coordination centres, *Deamination, *Dialysis, Effectors, *Ethene, Follicle stimulating hormone (FSH), *Geotropism/Gravitropism, Gibberellins, Gland, Glucagon, Homeostasis, *Hyperopia, In Vitro Fertilisation (IVF), Luteinising hormone (LH),</p>	<p>Use of command words and Science subject specific vocabulary</p> <p>Produce a poster to compare mitosis and meiosis.</p> <p>Research organisms that can reproduce both sexually and asexually and produce an illustrated report.</p> <p>Debate: research and discuss 'DNA profiling' for health.</p> <p>Role play – choices for parents of a cystic fibrosis sufferer who would like another child.</p> <p>Produce a leaflet for a doctor's surgery to explain how human insulin is produced by bacteria and discuss the advantages of this over porcine insulin</p> <p>Produce short, headline paragraphs to represent the views of organic farmers, Food-Aid organisers, GM Research scientists and students.</p> <p>Keywords:</p> <p>*Adult cell cloning, Allele, Amino acids, Archaea, Asexual reproduction, Binomial system, Charles Darwin, Chromosome, Classification, *Coding DNA, *Complementary, *Cuttings, Cystic fibrosis, DNA, Dominant, Embryo screening, *Embryo transplants, Evolution, Evolutionary tree, Extinction, Family tree, Fertilisation, Fossil, Gametes, Gene, Genetic engineering, Genome, GM crops, Heterozygous, Homozygous, Inbreeding, Linnaean system, Meiosis, Mitosis, MRSA, Natural selection, *Non-coding DNA, *Nucleotide, Phenotype, Polydactyly, *Protein synthesis, Punnett square, Recessive, Ribosomes, Selective breeding, Sex chromosomes, Sexual reproduction, *Speciation, Species, Three-domain system, *Tissue culture, Variation, Vector</p>

MOOR PARK HIGH SCHOOL: CURRICULUM

	<p>Painkillers MABs disease defence</p>	<p>*Myopia, Negative feedback cycle, Oestrogen, *Phototropism, Receptors, Reflex action, Selective reabsorption, Stimuli, Target organ, Testosterone, *The brain, The central nervous system (CNS), *The eye, *Thermoregulatory centre, Thyroxine, Type 1 diabetes, Type 2 diabetes, *Vasoconstriction,</p>	
Numeracy	<p>Calculate cross-sectional areas of colonies Interpret data about vaccination rates and reported cases of diseases, eg whooping cough, MMR.</p>	<p>Measure skin temperature in different conditions. Analyse data and interpret information about sweating and temperature. Plot cooling curves. Measure heart rate and/ or blood pressure</p>	<p>Use a Punnett square and a genetic cross diagram to illustrate the inheritance of sex; evaluate the chance of producing a male or female.. Interpret genetic diagrams of Mendel's experiments</p>
CIAG	<p>What workplace skills does biology develop?</p> <p>Analysis: Students need analysis in any job which requires you to process information. GPs and vets analyse their knowledge of medicine along with the symptoms they observe in the patient in front of them in order to reach a conclusion about their medical condition.</p> <p>Curiosity: Engineers must always be searching for new solutions to the technical challenges they face to improve their efficiency and overcome new and seemingly impossible obstacles. Teachers must explore new approaches to adapt to different students' needs and constantly improve their teaching.</p> <p>Drawing: As well as the obvious – such as illustrators, graphic designers and animators – many other jobs benefit from good drawing skills. Any role which requires students to present their findings or plans through diagrams benefits from good drawing skills.</p> <p>Future Morph resources aim to show students that there is a wide choice of options open to those who study sciences</p>	<p>What workplace skills does biology develop?</p> <p>Analysis: Students need analysis in any job which requires you to process information. GPs and vets analyse their knowledge of medicine along with the symptoms they observe in the patient in front of them in order to reach a conclusion about their medical condition.</p> <p>Curiosity: Engineers must always be searching for new solutions to the technical challenges they face to improve their efficiency and overcome new and seemingly impossible obstacles. Teachers must explore new approaches to adapt to different students' needs and constantly improve their teaching.</p> <p>Drawing: As well as the obvious – such as illustrators, graphic designers and animators – many other jobs benefit from good drawing skills. Any role which requires students to present their findings or plans through diagrams benefits from good drawing skills.</p> <p>Future Morph resources aim to show students that there is a wide choice of options open to those who study sciences NCW STEM lessons – where can science take you?</p>	<p>What workplace skills does biology develop?</p> <p>Analysis: Students need analysis in any job which requires you to process information. GPs and vets analyse their knowledge of medicine along with the symptoms they observe in the patient in front of them in order to reach a conclusion about their medical condition.</p> <p>Curiosity: Engineers must always be searching for new solutions to the technical challenges they face to improve their efficiency and overcome new and seemingly impossible obstacles. Teachers must explore new approaches to adapt to different students' needs and constantly improve their teaching.</p> <p>Drawing: As well as the obvious – such as illustrators, graphic designers and animators – many other jobs benefit from good drawing skills. Any role which requires students to present their findings or plans through diagrams benefits from good drawing skills.</p> <p>Future Morph resources aim to show students that there is a wide choice of options open to those who study sciences Careers in Physics Lesson-Step Up resources</p>

Key Stage 4 Long Term Planning

Year 11 SYLLABUS:

Curriculum Area: Biology Single Science

Year 11	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
Syllabus	AQA Biology Collins - Chapter 7 Variation and Evolution	AQA Biology Collins - Chapter 8 Ecology in Action		Revision in preparation for GCSE exams	
Connections to prior learning	3.10.3 Evolution Review the evidence for theories about how a particular species went extinct Natural selection is a theory that explains how species evolve and why extinction occurs. Biodiversity is vital to maintaining populations. Within a species variation helps against environment changes, avoiding extinction. Within an ecosystem, having many different species ensures resources are available for other populations, like humans.	3.9 Ecosystems 3.9.1 Interdependence Use a model to investigate the impact of changes in a population of one organism on others in the ecosystem Organisms in a food web (decomposers, producers and consumers) depend on each other for nutrients. So, a change in one population leads to changes in others. The population of a species is affected by the number of its predators and prey, disease, pollution and competition between individuals for limited resources such as water and nutrients. Insects are needed to pollinate food crops.			
Knowledge	Variation. Selective breeding. Evolution. Speciation. Theory of evolution. Evidence for evolution – Fossils and Resistant bacteria. Extinction.	Classification Communities Biotic factors and Abiotic factors Distribution of organisms Adaptations Levels of organisation Producers, consumers and decomposers. Trophic levels and Pyramids of biomass How materials are cycled Decomposition Biodiversity Waste management Land use and Deforestation Global warming Maintaining biodiversity Factors affecting food security Farming techniques Sustainable fisheries			

MOOR PARK HIGH SCHOOL: CURRICULUM

		Role of biotechnology		
Skills	<p>Class survey and presentation of results. Draw a flow diagram to explain the steps involved in selective breeding. Interpret evolutionary trees. Research the work of Alfred Russel Wallace Interpret evidence relating to evolutionary theory. Role play: life without antibiotics.</p>	<p>Required Practical: Field Investigations</p> <p>AT 1 use of appropriate apparatus to make and record a range of measurements accurately including length and area</p> <p>AT 4 safe and ethical use of a living organism to measure physiological responses to the environment</p> <p>AT 6 application of appropriate sampling techniques to investigate the distribution and abundance of organisms in an ecosystem via direct use in the field</p> <p>Required Practical: Decay</p> <p>AT 1 use of appropriate apparatus to make and record a range of measurements including time and temperature</p> <p>AT 3 use of appropriate apparatus and techniques for the observation and measurement of biological changes and/or processes</p> <p>AT 5 measurement of rates of reaction by a variety of methods including a colour change of indicator</p> <p>Card sorting activity. Investigate the effect of planting density on height of seedlings.</p> <p>Construct food chains and identify the producer and consumers.</p>		
Assessment	<p>End of unit test for Chapter 7 Variation and Evolution</p>	<p>End of unit test for Chapter 8 Ecology in Action</p>		
Homework	<p>GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions</p>	<p>GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions</p>		

MOOR PARK HIGH SCHOOL: CURRICULUM

<p>Cultural enrichment including Trips, Visits, Experiences, Extra-curricular</p>	<p style="text-align: center;"><u>School and University Network</u> Trip 1-Young Scientist Centre (details to be confirmed) Trip 2-Young Scientist centre</p>			
<p>Literacy</p>	<p>Use of command words and Science subject specific vocabulary Explain the benefits and risks of selective breeding in plants and animals. Research and produce report on evolutionary theories, eg Darwin, Wallace and Lamarck. Research causes of extinction and write a report/PowerPoint presentation to present to the class. Keyword: Abiotic factors, Adaptation, *Anaerobic decay, *Apex predator, Biodiversity, *Biogas, Biotic factors, Carbon cycle, Community, Competition, *Compost, *Decomposers, *Decomposition, Deforestation, *Distribution, Ecosystem, Efficiency of biomass transfer, Extremophiles, Food chain,</p>	<p>Use of command words and Science subject specific vocabulary Evaluate method to estimate cover and modify to estimate a plant population on the school field. Compare the adaptations of herbivores, carnivores and omnivores and relate these to the food they eat. Keywords: *Food security, Global warming, *GM crops, Interdependence, Mean, Median, Microorganisms, Mode, Peatlands, Pollution, Population, Predators, Prey, *Primary consumers, Producers, *Pyramid of biomass, Quadrat, *Secondary consumers, *Sustainable, *Sustainable fisheries, *Tertiary consumers, Transect, *Trophic level, Water cycle,</p>		
<p>Numeracy</p>	<p>Measure variation in a plant species growing in different areas of school grounds Class survey of characteristics – collate results in a table and produce a display of the results in appropriate format. continuous and discontinuous variation Interpret data about antibiotic resistance.</p>	<p>Measure height and calculate means. Present and analyse the results Analyse ecological data from quadrats and transects. Interpret various types of diagrams that illustrate the distribution of organisms in a habitat. Interpret population curves and explain predator – prey relationships Use quadrats and sensors; record and analyse results. Use a transect to investigate the change in type and number of plant species across a changing habitat, eg a footpath. Interpret various types of diagrams that illustrate the distribution of organisms in a habitat.</p>		
<p>CIAG</p>	<p>What workplace skills does biology develop? Analysis: Students need analysis in any job</p>	<p>What workplace skills does biology develop? Analysis: Students need analysis in any job</p>		

MOOR PARK HIGH SCHOOL: CURRICULUM

	<p>which requires you to process information. GPs and vets analyse their knowledge of medicine along with the symptoms they observe in the patient in front of them in order to reach a conclusion about their medical condition.</p> <p>Curiosity: Engineers must always be searching for new solutions to the technical challenges they face to improve their efficiency and overcome new and seemingly impossible obstacles. Teachers must explore new approaches to adapt to different students' needs and constantly improve their teaching.</p> <p>Drawing: As well as the obvious – such as illustrators, graphic designers and animators – many other jobs benefit from good drawing skills. Any role which requires students to present their findings or plans through diagrams benefits from good drawing skills.</p> <p>Future Morph resources aim to show students that there is a wide choice of options open to those who study sciences</p> <p>Year 11: Studying science at KS5 lesson</p>	<p>which requires you to process information. GPs and vets analyse their knowledge of medicine along with the symptoms they observe in the patient in front of them in order to reach a conclusion about their medical condition.</p> <p>Curiosity: Engineers must always be searching for new solutions to the technical challenges they face to improve their efficiency and overcome new and seemingly impossible obstacles. Teachers must explore new approaches to adapt to different students' needs and constantly improve their teaching.</p> <p>Drawing: As well as the obvious – such as illustrators, graphic designers and animators – many other jobs benefit from good drawing skills. Any role which requires students to present their findings or plans through diagrams benefits from good drawing skills.</p> <p>Future Morph resources aim to show students that there is a wide choice of options open to those who study sciences</p> <p>NCW STEM lessons – where can science take you?</p>		
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