MOOR PARK HIGH SCHOOL: CURRICULUM

Long Term Planning

Year 10 Single Science

Curriculum Area: Biology

Year 10	Autumn 1	Autumn 2	Spring 1	Summer 1	Summer 2
Syllabus	AQA Biology ARK Curriculum 4.1 The Digestive System	AQA Biology ARK Curriculum 4.2 Circulation and Respiration	AQA Biology ARK Curriculum Chapter 4.3 Plant and Cycling Materials	AQA Biology ARK Curriculum 4.4 Health and Disease	AQA Biology ARK Curriculum 4.5 Ecology
Links to prior learning	The role of digestive enzyme action Absorption of nutrients in the small intestine Food tests and the concept of a balanced diet Energy Transfers Difference between heat and temperature Heating. Heat and heat capacity pH + Acids and Alkalis	Mitochondria release energy for cellular use and ribosomes to make proteins for the cell Eukaryotic cells have genetic material contained in the nucleus Plants and animals are made from eukaryotic cells Prokaryotic cells have DNA in the cytoplasm arranged in small rings called plasmids and in a larger loop Inherited Variation is caused by the fusing of gametes in sexual reproduction and by random mutations in DNA Genotype and Phenotype DNA that is passed to offspring can be randomly mutated and result in new phenotypes	Microscopy is the field of using microscopes to view samples that cannot be seen with the naked eye A stain is often used to make the organelles clearer The parts of a light microscope Total magnification = Objective lens x eyepiece lens Electron microscopes have a greater magnification and resolution than light microscopes. Most plants and algae make their own food using a process called photosynthesis The word equation for photosynthesis Leaves are the primary site of photosynthesis in plants	Health and risk factors Nutrition and the importance of a balanced diet Eukaryotic and prokaryotic cells Inherited disorders the concept of health and classify lifestyle habits as healthy or unhealthy, as well as the idea of risk factors. smoking and obesity as risk factors. the differences between eukaryotic and prokaryotic cells From primary school students should know the seven life processes. the immune system is responsible for fighting disease. aseptic technique the process of natural selection.	Basic concept of biodiversity Interdependence. and a range of examples of biotic and abiotic factors, Life Diversity and the concept of natural selection Interdependence levels of organisation in a food chain and food web Interdependence. predator-prey relationships Interdependence. basic sampling techniques How to calculate mean, median and mode from Maths Use standard form from Maths Human Interaction – how human activity affects biodiversity

MOOR PARK HIGH SCHOOL: CURRICULUM

		Causes of Variation Enzymes speeds up chemical reactions in the body The role of enzymes The lock and key theory	Plants require minerals for healthy growth e.g. nitrates and magnesium Plants can be damaged by a range of deficiency conditions. Peat is a fossil fuel. Decay or the burning of peat releases carbon dioxide into the atmosphere" The water cycle provides fresh water for plants and animals on land before draining into the sea		Interdependence. pyramids of biomass
Knowledge	The Digestive System Mechanical and Chemical Digestion Absorption in the Small Intestine Balanced Diet and Food Tests RP: Food Tests and Analysis Models of Enzyme Activity Digestive Enzymes Factors Affecting Enzyme Activity: Temperature Factors Affecting Enzyme Activity: pH RP: The effect of pH on Amylase RP: The effect of pH on Amylase Analysis	The Structure of the Lungs The Circulatory System and Structure of the Heart Heart Dissection Blood Vessels Blood Coronary Heart Disease Evaluating Methods for Treating Heart Disease Aerobic Respiration Anaerobic Respiration Response to Exercise Metabolism	Microscopes: Investigating Stomatal Density Transpiration Translocation Photosynthesis and Uses of Glucose Limiting Factors in Photosynthesis RP: The effect of light intensity on Photosynthesis Single Science Content: Plant Diseases and Defences Material Cycling – Decay, The Carbon Cycle, The Water Cycle Single Science Content: Investigating Rate of Decay Single Science Content: Biogas Generators	Staying Healthy Epidemiology: Correlation, Causation and Sampling Risk Factors: Smoking and Diet & Obesity Risk Factors: Alcohol Communicable Diseases Types of Communicable Disease Preventing the spread Human Defence Systems The Immune Response Vaccination Antibiotics Single Science Content: Culturing Microorganisms Single Science Content: Effectiveness of Antibiotics Antibiotic Resistance Development of Drugs	Organisation of an Ecosystem Biotic and Abiotic Factors Adaptations Food Chains and Food Webs Predator-Prey Relationships RP: Investigating Species Distribution RP: Investigating Species Distribution Maths: Estimating Population Size Single Science Content: Impact of Environmental Change Single Science Content: Pyramids of Biomass Single Science Content: Farming, Biotechnology and Food Security (review from B3.2 - determine how much pupils

MOOR PARK HIGH SCHOOL: CURRICULUM

				Single Science Content: Monoclonal Antibodies Single Science Content: Using Monoclonal Antibodies	retain/studied and use to decide how many lessons are needed)
Skills	Students should be able to models to explain enzyme action. 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	Assessing risk Describe sensible precautions to reduce risk Prepare a slide with cells for viewing under the light microscope Explain why data is needed to answer scientific questions, and why it may be uncertain, incomplete or not available.	Observing and measuring biological changes Measurement of rates of reaction Observing and measuring biological changes Assess whether sufficient, precise measurements have been taken in an experiment. Evaluate methods with a view to determining whether or not they are valid. Interpret diagrams calculate rate changes in the decay of biological material plot and draw appropriate graphs selecting appropriate scales for the axes. Biology rate of decay RPA	Identify and assess risks to health related to lifestyle habits and the risk of disease. Suggest sensible precautions to reduce risk. Explain that reports of scientific developments in the popular media are not subject to peer review and may be oversimplified, inaccurate or biased Application of aseptic technique Investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition. Understand the importance of control experiments. Design an investigation which includes the use of a control experiment."	representative sampling techniques
Assessment	End of unit test	End of unit test	End of unit test	End of unit test	End of unit test

MOOR PARK HIGH SCHOOL: CURRICULUM

Homework	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions				
Cultural enrichment including Trips, Visits, Experiences, Extra-curricular	During the course of the academic year, Year 10 students will attend the University of Central Lancashire. This visit will enable students to: Explore Advanced Scientific Concepts: Students will have the opportunity to engage with scientific research and technology, enhancing their understanding of key topics covered in their science curriculum. Hands-On Learning: Through interactive workshops and laboratory sessions, students will apply theoretical knowledge in practical settings, fostering a deeper comprehension of scientific principles. Inspiration and Aspiration: Exposure to a university environment and interaction with university faculty and students will inspire Year 9 pupils to consider future educational and career paths in science and related fields. Curriculum Integration: The visit is designed to complement and enrich the current science curriculum, providing real-world context to classroom learning and helping students see the relevance of their studies. This experience aims to ignite a passion for science, encourage critical thinking, and support the academic growth of our students.				
Literacy	Eukaryotic, Organelle, Nucleus, Mitochondria, Cell membrane, Ribosome, Cytoplasm, Cell, Tissue, Organ, Organ System, Stomach, Epithelial tissue, Glandular tissue, Muscular tissue, Contract, Digest, Insoluble, Soluble, Mouth, Oesophagus, Stomach, Duodenum, Small intestine, Large intestine, Rectum, Pancreas, Liver, Bile, Gall bladder, Egestion, Mechanical, Chemical, Salivary glands, Secrete, Enzymes, Peristalsis, Hydrochloric Acid, Contaminated, Alkaline,	Circulatory System, Structure, Heart Dissection Vessels, Blood Coronary Heart Disease, Evaluating Methods, Aerobic Respiration Anaerobic Respiration,Exercise. Metabolism, risk, Precautions, microscope	Light microscope, Electron microscope, Magnification, Stomata, Guard cells, Stomatal density, "Transpiration stream, Xylem, Lignin, Evaporation, Rate, Concentration gradient, ,Phloem, Translocation, Vessel, Elongated, Photosynthesis, Chlorophyll, Chloroplast, Respiration Synthesis, "Photosynthesis, Limiting factors, Proportional Rate, Line of best fit, Continuous, Gradient, Rate, Inverse-square Law, Intensity, Distance, ,Photosynthesis, Limiting factors, Inverse-square	Eukaryotic, Organelle, Nucleus, Mitochondria, Cell membrane, Ribosome, Cytoplasm, Cell, Tissue, Organ, Organ System, Stomach, Epithelial tissue, Glandular tissue, Muscular tissue, Contract, Digest, Insoluble, Soluble, Mouth, Oesophagus, Stomach, Duodenum, Small intestine, Large intestine, Rectum, Pancreas, Liver, Bile, Gall bladder, Egestion, Mechanical, Chemical, Salivary glands, Secrete, Enzymes, Peristalsis, Hydrochloric Acid, Contaminated, Alkaline,	Circulatory System, Structure, Heart Dissection Vessels, Blood Coronary Heart Disease, Evaluating Methods, Aerobic Respiration Anaerobic Respiration,Exercise. Metabolism, risk, Precautions, microscope

MOOR PARK HIGH SCHOOL: CURRICULUM

	Emulsification, Surface area, Balanced diet, Qualitative, Quantitative, Insulation, reagent, Iodine, Benedicts solution, Biuret, Emulsion, Precipitate, Catalyst, Enzyme,Active site, Complementary, Substrate, Enzyme-substrate complex, Lock and Key, Induced Fit, Carbohydrase Amylase, Protease, Lipase, Optimum, Temperature Kinetic energy, Denature, pH, Continuous sampling Water, Colorimetry, validity, colorimetry, optimal pH		Law, Rate, Intensity, Tobacco mosaic virus, Rose black spot, Virus, Fungus, Chemical Mechanical, Physical, Defence, Decay, Decomposers Microorganisms, Carbon cycle, Photosynthesis, Respiration, Decay, Precipitation, Condensation, Transpiration, Evaporation, Water, Fertiliser, Compost Manure, Decay, Decomposer, decay, anaerobic, carbon dioxide, biogas, methane	Emulsification, Surface area, Balanced diet, Qualitative, Quantitative, Insulation, reagent, Iodine, Benedicts solution, Biuret, Emulsion, Precipitate, Catalyst, Enzyme,Active site, Complementary, Substrate, Enzyme-substrate complex, Lock and Key, Induced Fit, Carbohydrase Amylase, Protease, Lipase, Optimum, Temperature Kinetic energy, Denature, pH, Continuous sampling Water, Colorimetry, validity, colorimetry, optimal pH	
Numeracy	Make order of magnitude calculations Define the terms precise, accurate and valid, and be able to use these terms in the context of data.	Explain why data is needed to answer scientific questions, and why it may be uncertain, incomplete or not available.	Observing and measuring biological changes Measurement of rates of reaction Draw a line of best fit Assess whether sufficient, precise measurements have been taken in an experiment. Determine the slope and intercept of a linear graph Interpret diagrams Calculate rate changes in the decay	Interpret pie charts Determine the resolution of an instrument Interpret graphs	Explain why data is needed to answer scientific questions, and why it may be uncertain, incomplete or not available.

MOOR PARK HIGH SCHOOL: CURRICULUM

			translate information between numerical and graphical form		
CIAG	What workplace skills does biology develop? 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. 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. 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.				

MOOR PARK HIGH SCHOOL: CURRICULUM

Key Stage 4 Long Term Planning

Year 11 Single Science

Curriculum Area: Biology

Year 11	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
Syllabus	AQA Biology Collins - Chapter 6 Genetics	AQA Biology Collins - Chapter 8 Ecology in Action		REVISION	
Connections to KS3 prior learning	Heredity as the process by which genetic information is transmitted from one generation to the next A simple model of chromosomes, genes and DNA in heredity Differences between species The variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation 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, which in turn may lead to extinction	How organisms affect, and are affected by, their environment, including the accumulation of toxic materials. The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material			
Knowledge	Genetics Proteins and mutations	Classification Communities			

MOOR PARK HIGH SCHOOL: CURRICULUM

	Sexual and asexual reproduction. Meiosis. Advantages and disadvantages of sexual and asexual reproduction Gregor mendal Sex determination. DNA. protein synthesis. Genetic inheritance and inherited disorders. The understanding of genetics Genetic engineering Examples of genetic engineering.	Biotic factors and Abiotic factors Adaptations Trophic levels and Transferring of biomass How materials are cycled Investigating decay Biodiversity Waste management Global warming Maintaining biodiversity Factors affecting food security Farming techniques Sustainable fisheries Role of biotechnology		
Skills	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.	use of appropriate apparatus to make and record a range of measurements accurately including length and area safe and ethical use of a living organism to measure physiological responses to the environment Construct food chains and identify the producer and consumers. measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species. investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change.		

MOOR PARK HIGH SCHOOL: CURRICULUM

Assessment	End of unit test for Chapter 6 - Genetics	End of unit test for Chapter 8 Ecology in Action		
Homework	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions			
Literacy	Keywords:*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	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,		
Numeracy	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	Measure height and calculate means. Present and analyse the results Analyse ecological data from quadrats and transects. Interpret population curves and explain predator – prey relationships Use quadrats and sensors; record and analyse results.		

MOOR PARK HIGH SCHOOL: CURRICULUM

		Use a transect to investigate the change in type and number of plant species across a changing habitat, eg a footpath.		
CIAG	What workplace skills does biology develop? 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. 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. 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.			