# MOOR PARK HIGH SCHOOL: CURRICULUM

# Long Term Planning

## Year 9

Curriculum Area: Biology

| Year 10 | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
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| **Syllabus** | AQA Biology<br>ARK Curriculum<br>3.1 Growth and Difference | | AQA Biology<br>ARK Curriculum<br>3.2 Human Interaction | | AQA Biology<br>ARK Curriculum<br>Chapter 3.3 Genetics | |
| **Links to prior learning** | Pupils should know the organelles in plant and animal cells and be able to explain their functions. They should also be able to identify features of specialised cells and<br>Pupils should know that bacteria reproduce asexually, producing clones. They should also be able to identify that the new cell would be identical to the parent cell. "<br>Understand the difference between unicellular and multicellular organisms.<br>Pupils should be confident with the meanings of Competition, biotic and abiotic factors<br>Pupils should be able to use the new information from the osmosis theory lesson to make predictions.<br>Pupils should understand the idea that diffusion is a passive process, down a concentration gradient.<br>Pupils should be clear on the difference between sexual and asexual reproduction and the offspring produced in each case. They should also be clear on | | Pupils should be confident with constructing and interpreting food chains and food webs. They should know definitions of: producer, primary consumer, secondary consumer, predator, prey, herbivore, carnivore, omnivore, ecosystem, community, population, habitat<br>Be aware of the term pollution and know that it is 'a bad thing', although they may not be able to scientifically explain why. They will be aware of various recycling schemes (reduce, reuse, recycle) and know that this is to try to reduce pollution.<br>Most pupils should have at least a basic awareness of global warming and be able to explain simply how human activities are contributing.<br>Pupils should be secure in their knowledge of food chains and the order/direction of energy transfer. They should have seen pyramids of numbers in B1.3<br>Pupils should also be aware of the life processes from KS2 (MRS GREN). | | Sperm, egg and pollen cells are all specialised cells called gametes<br>Variation can be caused by inherited (genetic) factors, environmental factors or a combination of the two<br>Inherited variation is caused by the fusing of gametes in sexual reproduction and by random mutations in DNA<br>Cells reproduce by sexual or asexual reproduction (B1.2).<br>Most animal cells differentiate at any early stage.<br>Stem cells are cells that are capable of differentiating into specific cell types.<br>The DNA inherited that causes a characteristic is called the genotype.<br>Animals are members of the same species if they can breed to produce fertile offspring.<br>Eukaryotic and prokaryotic cells<br>Genotype and Phenotype<br>Tissues and Organs<br>Enzymes speeds up chemical reactions in the body | |

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| | the difference between DNA, genes and chromosomes.<br>Pupils should be confident with healthy living choices (generally around balanced diets, exercise and energy requirements).<br>Pupils should be secure in their structure/function relationships of specialised cells. | Many pupils will be aware of food shortages and famines in various parts of the world but be unable to explain this scientifically or the causes. | |
| **Knowledge** | Eukaryotic and Prokaryotic Cells<br>Aseptic Technique<br>Growth of Bacteria<br>Microscopes<br>Observing Cells<br>Diffusion<br>Diffusion in Living Things<br>Osmosis<br>Osmosis Investigation<br>Active Transport<br>Cell Division<br>Cancer<br>Stem Cells | Biodiversity<br>How Humans affect Biodiversity<br>How Humans can Preserve Biodiverity<br>The Effect of Pollution on Biodiversity<br>Global Warming<br>"Taking it Further: Pyramids of Biomass<br>"Talking it Further: Farming and Biotechnology<br>"Taking it Further: Food Security | The Cell Cycle<br>Meiosis<br>Evaluating types of reproduction<br>The development of gene theory<br>Determining our characteristics: DNA, proteins and the environment<br>Determining our characteristics: Genes and Alleles<br>Using punnett squares to predict characteristics<br>Probability<br>Inherited disorders<br>Sex determination<br>Taking it further: DNA<br>Taking it further: Proteins |
| **Skills** | Understanding the features and preparing a slide.<br>Practice preparing an uncontaminated culture using the aseptic technique -<br>Suggest a hypothesis to explain given observations or data.<br>Obtain a clear image using a light microscope.<br>Required practical activity 1: use a light microscope to observe, draw and label a selection of plant and animal cells Prepare a slide with cells for viewing under the light microscope. | Required practical activity 9: measure the population size of a common species in a habitat.<br>Use sampling techniques to investigate the effect of a factor on the distribution of this species.<br>Explain why data is needed to answer scientific questions, and why it may be uncertain, incomplete or not available.<br>Recognise that scientific methods and theories change over time<br>Describe and evaluate, with the help of data, methods that can be used to tackle problems caused by human impacts on the environment." | Recognise that scientific methods and theories change over time<br>Extraction of DNA from fruit<br>Safe use of equipment to separate mixtures using filtration<br>Explain that there are hazards associated with science-based technologies which have to be considered alongside the benefits. |

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| | Required practical activity 3: investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.<br>Identify in a given context:<br>the independent variable as the one that is changed or selected by the investigator<br>the dependent variable that is measured for each change in the independent variable<br>Measure mass accurately.<br>Identify and assess risks to health related to lifestyle habits and the risk of disease.<br>Suggest sensible precautions to reduce risk." | Outline a simple ethical argument about the rights and wrongs of a new development, discovery or technology | |
| **Assessment** | End of unit test for Chapter 1 | End of unit test for Chapter 2 | End of unit test for Chapter 3 |
| **Homework** | GCSE past paper exam questions<br>Analysis / Evaluation of investigations<br>Extended answer questions | GCSE past paper exam questions<br>Analysis / Evaluation of investigations<br>Extended answer questions | GCSE past paper exam questions<br>Analysis / Evaluation of investigations<br>Extended answer questions |
| **Cultural enrichment including Trips, Visits, Experiences, Extra-curricular** | **School and University Network** | **School and University Network**<br>Y9 – Engineering workshop and Business workshop combined with a HE info and insights sessions | **School and University Network** |
| **Literacy** | Keywords that students may find difficult:<br>Nucleus, organelle, slide, specimen, cytoplasm, chloroplast, Eukaryotic, prokaryotic, nucleus, plasmid, organelle, mitochondria, flagellum, Aseptic, antibiotic, culture, agar medium, inoculating loop, sterilization, Aseptic, antibiotic, culture, agar | Keywords that students may find difficult:<br>Producer, consumer, predator, prey, energy transfer, herbivore, carnivore, Biodiversity, habitat, ecosystem, abundance, quadrat, transect, species, Pollution, resources, deforestation, Biodiversity, Population, Resources. Sewage, fertilisers, leaching, | Keywords that students may find difficult:<br>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 |

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| | medium, inoculating loop, Image, object, magnification, scale, sub-cellular, resolution<br>Image, object, magnification, scale, sub-cellular, resolution, Diffusion, concentration, gradient, passive, permeable, surface area to volume ratio<br>Adaptation, diffusion, passive, surface area to volume ratio, Osmosis, dilute, concentrated, hypotonic, hypertonic, isotonic, partially permeable membrane<br>Osmosis, dilute, concentrated, variables, hypotonic, hypertonic, Active transport, concentration gradient, passive, dilute, concentrated<br>Cell division, mitosis, chromosome, daughter cells, Cancer, risk factor, malignant, benign, Stem cell, embryonic, bone marrow, meristem, differentiation, | contamination, indicator species. Global warming, climate change, emissions, greenhouse gas.<br>biomass, trophic level, efficiency, thermoregulation, Intensive farming, quota, biotechnology, efficiency, food security, famine | drug testing, Rose black spot, Salmonella, Side effects, Tobacco Mosaic Virus (TMV) ,Vaccination, White blood cell. |
| **Numeracy** | Use percentages<br>calculate percentage increase and decrease.<br>Change the subject of an equation. | Understand the principles of sampling as applied to scientific data " | Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano). - Pico is introduced in the activity.<br>Use percentages - calculating % time spent in different stages of the cell cycle"<br>Use ratios<br>Use fractions<br>Understand simple probability |
| **CIAG** | What workplace skills does biology develop?<br>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.<br>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. | | |

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| | 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. |