

Long Term Planning

Year 9

Curriculum Area: Biology

| Year 9 | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
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| Syllabus | AQA Biology ARK Curriculum 3.1 Growth and Difference | | AQA Biology ARK Curriculum 3.2 Human Interaction | | AQA Biology ARK Curriculum Chapter 3.3 Genetics | |
| Links to prior learning | <p>Identify organelles in plant and animal cells and be able to explain their functions.</p> <p>Identify features of specialised cells</p> <p>Bacteria reproduce asexually, producing clones.</p> <p>Identify that the new cell would be identical to the parent cell.</p> <p>Difference between unicellular and multicellular organisms.</p> <p>Be confident with the meanings of Competition, biotic and abiotic factors</p> <p>Diffusion is a passive process, down a concentration gradient.</p> <p>Difference between sexual and asexual reproduction and the offspring produced in each case.</p> <p>Aware of the difference between DNA, genes and chromosomes.</p> <p>Healthy living choices (generally around balanced diets, exercise and energy requirements).</p> <p>structure/function relationships of specialised cells.</p> | | <p>Construct and interpret food chains and food webs.</p> <p>definitions of: producer, primary consumer, secondary consumer, predator, prey, herbivore, carnivore, omnivore, ecosystem, community, population, habitat</p> <p>Aware of the term pollution and know that it is 'a bad thing'</p> <p>Aware of various recycling schemes (reduce, reuse, recycle) and know that this is to try to reduce pollution.</p> <p>Basic awareness of global warming and be able to explain simply how human activities are contributing.</p> <p>Secure in their knowledge of food chains and the order/direction of energy transfer.</p> <p>Pyramids of numbers</p> <p>Aware of the life processes from KS2 (MRS GREN).</p> <p>Aware of food shortages and famines in various parts of the world</p> | | <p>Sperm, egg and pollen cells are all specialised cells called gametes</p> <p>Variation can be caused by inherited (genetic) factors, environmental factors or a combination of the two</p> <p>Inherited variation is caused by the fusing of gametes in sexual reproduction and by random mutations in DNA</p> <p>Cells reproduce by sexual or asexual reproduction</p> <p>Most animal cells differentiate at any early stage.</p> <p>Stem cells are cells that are capable of differentiating into specific cell types.</p> <p>The DNA inherited that causes a characteristic is called the genotype.</p> <p>Animals are members of the same species if they can breed to produce fertile offspring.</p> <p>Eukaryotic and prokaryotic cells</p> <p>Genotype and Phenotype</p> <p>Tissues and Organs</p> <p>Enzymes speeds up chemical reactions in the body</p> | |

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| Knowledge | <p>Eukaryotic and Prokaryotic Cells</p> <p>Aseptic Technique</p> <p>Growth of Bacteria</p> <p>Microscopes</p> <p>Observing Cells</p> <p>Diffusion</p> <p>Diffusion in Living Things</p> <p>Osmosis</p> <p>Osmosis Investigation</p> <p>Active Transport</p> <p>Cell Division</p> <p>Cancer</p> <p>Stem Cells</p> | <p>Biodiversity</p> <p>How Humans affect Biodiversity</p> <p>How Humans can Preserve Biodiversity</p> <p>The Effect of Pollution on Biodiversity</p> <p>Global Warming</p> <p>"Single Science Content: Pyramids of Biomass</p> <p>"Talking it Further: Farming and Biotechnology</p> <p>"Single Science Content: Food Security</p> | <p>The Cell Cycle</p> <p>Meiosis</p> <p>Evaluating types of reproduction</p> <p>The development of gene theory</p> <p>Determining our characteristics: DNA, proteins and the environment</p> <p>Determining our characteristics: Genes and Alleles</p> <p>Using punnett squares to predict characteristics</p> <p>Probability</p> <p>Inherited disorders</p> <p>Sex determination</p> <p>Single Science Content: DNA</p> <p>Single Science Content: Proteins</p> |
| Skills | <p>Understanding the features and preparing a slide. using the aseptic technique -</p> <p>Suggest a hypothesis to explain given observations or data.</p> <p>Obtain a clear image using a light microscope.</p> <p>use a light microscope to observe, draw and label a selection of plant and animal cells</p> <p>Prepare a slide with cells for viewing under the light microscope.</p> <p>investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.</p> <p>Identify in a given context:</p> <p>the independent variable as the one that is changed or selected by the investigator</p> <p>the dependent variable that is measured for each change in the independent variable</p> <p>Measure mass accurately.</p> | <p>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.</p> <p>Explain why data is needed to answer scientific questions, and why it may be uncertain, incomplete or not available.</p> <p>Recognise that scientific methods and theories change over time</p> <p>Describe and evaluate, with the help of data, methods that can be used to tackle problems caused by human impacts on the environment."</p> <p>Outline a simple ethical argument about the rights and wrongs of a new development, discovery or technology</p> | <p>Recognise that scientific methods and theories change over time</p> <p>Extraction of DNA from fruit</p> <p>Safe use of equipment to separate mixtures using filtration</p> <p>Explain that there are hazards associated with science-based technologies which have to be considered alongside the benefits.</p> |

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| | Identify and assess risks to health related to lifestyle habits and the risk of disease. Suggest sensible precautions to reduce risk. | | |
| 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 Analysis / Evaluation of investigations Extended answer questions | | |
| Cultural enrichment including Trips, Visits, Experiences, Extra-curricular | <p>During the course of the academic year, Year 9 students will attend the University of Central Lancashire. This visit will enable students to:</p> <p>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.</p> <p>Hands-On Learning: Through interactive workshops and laboratory sessions, students will apply theoretical knowledge in practical settings, fostering a deeper comprehension of scientific principles.</p> <p>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.</p> <p>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.</p> <p>This experience aims to ignite a passion for science, encourage critical thinking, and support the academic growth of our students.</p> | | |
| Literacy | Keywords that students may find difficult: 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 medium, inoculating loop, Image, object, magnification, scale, sub-cellular, resolution | Keywords that students may find difficult: Producer, consumer, predator, prey, energy transfer, herbivore, carnivore, Biodiversity, habitat, ecosystem, abundance, quadrat, transect, species, Pollution, resources, deforestation, Biodiversity, Population, Resources. Sewage, fertilisers, leaching, contamination, indicator species. Global warming, climate change, emissions, greenhouse gas. biomass, trophic level, efficiency, thermoregulation, | Keywords that students may find difficult: 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. |

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| | <p>Image, object, magnification, scale, sub-cellular, resolution, Diffusion, concentration, gradient, passive, permeable, surface area to volume ratio</p> <p>Adaptation, diffusion, passive, surface area to volume ratio, Osmosis, dilute, concentrated, hypotonic, hypertonic, isotonic, partially permeable membrane</p> <p>Osmosis, dilute, concentrated, variables, hypotonic, hypertonic, Active transport, concentration gradient, passive, dilute, concentrated</p> <p>Cell division, mitosis, chromosome, daughter cells, Cancer, risk factor, malignant, benign, Stem cell, embryonic, bone marrow, meristem, differentiation,</p> | <p>Intensive farming, quota, biotechnology, efficiency, food security, famine</p> | |
| Numeracy | <p>Use percentages</p> <p>calculate percentage increase and decrease.</p> <p>Change the subject of an equation.</p> | <p>Understand the principles of sampling as applied to scientific data "</p> | <p>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.</p> <p>Use percentages - calculating % time spent in different stages of the cell cycle"</p> <p>Use ratios</p> <p>Use fractions</p> <p>Understand simple probability</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> | | |