



Department curriculum aim/vision: Biology Informs us as to where we come from, how we continue to interact with the environment, and where our relationship with the environment is going. Through Biology we can aspire to create a better, more sustainable world for our children.

Year 7	Enquiry Statement/Aim
<b>Term 1-2 Cells</b>	Introduction to Biology/science. Processes of life, plant and animal cells, the microscope, levels of organisation, new cells from old, specialised cells (9 lessons). The aim is to introduce and interest the students in the basics of Biology
<b>Term 3-4 Microbes</b>	What are microbes. Useful/harmful microbes. Types of microbes. Bacterial growth curve. use of agar plates and aseptic technique. Respiration in yeast/fermentation, practical investigation on this. Disease, Immunity, Vaccination (Jenner), Antibiotics (Fleming), testing antibiotics (paper practical) (10 lessons) This is a topic to stimulate interest and to introduce in depth practical work
<b>Term 5</b>	How different organisms reproduce, male/female reproductive systems, menstrual cycle, fertilisation, pregnancy, development and birth, effect of drugs on the developing fetus, the placenta, Twins. (9 lessons) The aim here is to explain the biology behind human reproduction, and to discuss puberty and to an extent contraception/having a baby.
<b>Term 6</b>	Variation, correlation, fingerprints, vertebrates and invertebrates, classification of invertebrates (we do not always complete this unit)

Year 8	Enquiry Statement/Aim
<b>Food and Digestion (Term 1-2)</b>	Balanced diet, deficiency diseases, food tests, the gut and digestion, enzymes (amylase and starch), absorption, villi and microvilli, Absorption prac. (10 lessons) The aim is to start to introduce aspects of physiology and the concept of the enzyme
<b>Respiration (Term 3-4)</b>	Food and energy, measuring energy in food, the process of respiration, the respiratory system, gas exchange, inhaled and exhaled air, anaerobic respiration (7 lessons)
<b>Ecology and Human Impact (Term 5-6)</b>	Ecological definitions, Biotic/abiotic factors, adaptations, quadrat sampling, a line transect/belt transect, kite diagrams, food chains/webs, Biomass and energy transfer, bioaccumulation, decay C cycle, Human impact. There are a few difficult concepts being introduced here as well as some fairly challenging maths.



Year 9	Enquiry Statement/Aim
<b>Fit and Healthy (Term 1-2)</b>	Measuring fitness, respiration, lungs and the mechanism of breathing, gas exchange, percentage change in breathing rate, smoking, components of the diet, DCPIP, heart and circulation, bloodstream, drug and alcohol abuse, GCSE question practice-including '6 marker' type questions. The aim is to build upon certain concepts, and again to challenge in terms of maths and technical biological language. (14 lessons)
<b>Inheritance and selection (Term 3-4)</b>	Variation, continuous and discontinuous data, bar charts and histograms, chromosomes, genes, and alleles, dominant and recessive genes, diploid and haploid, homozygous and heterozygous. Mendel and genetics problems, inherited disorders, cloning. The aim here is to introduce a difficult GCSE topic so that when it is revisited in KS4 the students will be familiar with the language and concepts. (11 lessons)
<b>Photosynthesis (Term 5-6)</b>	What is p/synth, what do plants make, starch as a storage material, limiting factors, rate of p/synth, starch test, the leaf, balanced aquarium, adaptations, stomata and density calculations, potometers, photosynthesis in horticulture. Aim as for 'fit and healthy' (10 lessons)



Year 10	Enquiry Statement/Aim
<b>Cell Biology/ Organisation (Term 1-2)</b>	Cells, how structural differences between types of cells enables them to perform specific functions within the organism. Differentiation, mitosis, stem cells and stem cell technology. Transport into/out of cells, microscopy, unit conversions, magnification calculations. Growing microbes (Biology only), Enzymes, biochem of food, food tests, digestion and digestive system, circulatory system incl. heart disease, statins and transplants. So in the first two terms we progress from cells to how cells organise together in multicellular organisms in order to compensate for a reduction in SA/Vol ratio.
<b>Disease -communicable and non-communicable (Term 3)</b>	The relationship between health and disease and the interactions between different types of disease. Health. Diseases, both communicable and non-communicable, are major causes of ill health. Other factors including diet, stress and life situations may have a profound effect on both physical and mental health. Different types of disease may interact. Defects in the immune system mean that an individual is more likely to suffer from infectious diseases. Viruses living in cells can be the trigger for cancers. Immune reactions initially caused by a pathogen can trigger allergies such as skin rashes and asthma. Severe physical ill health can lead to depression and other mental illness. Viral, Protist, Fungal and Bacterial disease, Plant diseases (Biology only) Human defences and immunity, Drugs and drug discovery. Monoclonal antibodies(Biology only.) Taught in the winter term as the content is less practical based
<b>Plant Biology and Bioenergetics (Term 4)</b>	Explain how the structures of plant tissues are related to their functions. explain how the structure of root hair cells, xylem and phloem are adapted to their functions. Photosynthesis. Explain the effect of changing temperature, humidity, air movement and light intensity on the rate of transpiration. Economic considerations in crop production. Plant defence responses, Plant Hormones (Biology only), germination. This material is taught in the spring term since plant materials are more accessible in terms of practicals..
<b>Bioenergetics and Ecology (Term 5- 6)</b>	Respiration (aerobic/anaerobic), exercise, metabolism. Ecology and ecological definitions, sampling, decay and the carbon cycle,energy transfer between trophic levels (Biology only). Effect of humans on ecosystems. Again, practical reasons for teaching these topics in the summer.

Year 11	Enquiry Statement/Aim
<b>The nervous system (Term 1)</b>	Food production, food security,(Biology only) effect of humans on the ecosystem. The nervous system, structure and function of the nervous system and how it can bring about fast responses.Reflexes. The brain and the eye (Biology only).
<b>Homeostasis /genetics (Term 2)</b>	Homeostasis,negative feedback, control of blood sugar, Temperature, Excretion and water balance (kidney), kidney disease, the menstrual cycle, adrenaline and thyroxine. Sexual and asexual reproduction Advantages of sexual vs asexual reproduction (Biology only), mitosis and meiosis, DNA and genetics. DNA structure and protein synthesis (biology only), genetics problems. Mendel (Biology only)
<b>Genetics, evolution, classification and speciation (Term 3)</b>	Genetics problems, selective breeding and genetic engineering, cloning (biology only) classification and evolution, theory of evolution (biology only) evidence for evolution, speciation (Biology only).



<b>Term 4 and 5</b>	Further revision and review of prior material.
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Year 12	Enquiry Statement/Aim
<b>Term 1</b>	Cells: theory, prokaryotes and eukaryotes, stem cells and applications, magnification and microscopy, transport into and out of cells, cell cycle and control, cancer. <i>Biochemistry/Biological molecules</i>
<b>Term 2</b>	Nucleic acids, the structure of chromosomes, genomes and karyograms, protein synthesis (SL), gene/chromosome mutations, meiosis, genetics (incl. monohybrid/dihybrid, sex linkage, autosomal linkage) <i>Digestive System, Heart and circulation, Coronary Heart Disease</i>
<b>Term 3</b>	Enzymes, properties, control of metabolism, and inhibition; Gene technology-PCR, GM and genetic fingerprinting, cloning <i>DNA structure/evidence, replication, transcription, translation</i>
<b>Term 4</b>	Neurons and synapses, IAs (5 lessons in each half of the course) <i>Gene methylation, Start Photosynthesis. IAs</i>
<b>Term 5</b>	Exams, Muscle contraction, Biorad week (practical gene technology)-takes a week of lessons from both sides of the course <i>Exams, Biochemistry of respiration</i>
<b>Term 6</b>	Ecology definitions, transfer of energy, C. cycle, climate change, evolution and evidence, homology and analogy, adaptive radiation and convergent evolution, speciation (sympatric incl. polyploidy/allopatric) Classification (try to start) <i>Continue biochem of respiration. Group 4 week</i>

Year 13	Enquiry Statement/Aim
<b>Term 1</b>	Classification (incl. plant reproduction), Cladistics, Dichot keys, Transport of respiratory gases, the liver <i>Immunology, Sexual Reproduction/menstrual cycle</i>
<b>Term 2</b>	Plant science incl. transpiration, translocation, growth, auxins, photoperiodism, neonicotinoid pesticides <i>Sexual reproduction continued, Homeostasis, the kidney, blood sugar, leptin and melatonin</i>
<b>Term 3</b>	Revise! <i>Option D complete, then revise this half of the course</i>
<b>Term 4 and 5</b>	Further revision and review of prior material.