

Long Term Plan: Biology Year 10

“Science is simply the word we use to describe a method of organising our curiosity.”

The programme for years 7 – 11 has staff teaching a single class, with rotating topics/subjects. There is varied order of topics for classes to allow for the rotation of practical equipment. Students will complete a biology, chemistry and then physics topic followed by an assessment. This process will then repeat again.

Staff are to use the [Curriculum Road Map](#) in the Science Drive to ensure that they rotate at the appropriate times.

Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
One	Cells	<p>Prokaryotic compared to eukaryotic cells</p> <p>Microscopy</p> <p>The cell cycle, although details of the stages of mitosis is not required</p> <p>The use of stem cells</p>	<p>Drawing and labelling scientific diagrams</p> <p>Changing the subject of, and substituting into, simple equations with three terms</p> <p>Extended writing</p>	<p>That all animal cells look like the model animal cell often used to teach this topic, teaching must be careful that students understand that most animal cells are specialised</p> <p>That people grow as their cells get bigger as opposed to replication of cells</p>	<p>A key stage three students to study the basic structure from animal plant and bacterial cells, including the function of most organelles</p> <p>At key stage three students studied cell specialisation</p> <p>Students carried out some basic work with microscopy at key stage three</p>	<p>The cell as the fundamental unit of life is studied in both applied human biology and A-level biology</p> <p>Both of these courses also include study of mitosis</p> <p>At A-level this will be extended to look at explaining cell differentiation, comparing yourself to viruses, and also to comparing light and electron microscopy</p> <p>In the applied human biology course students</p>	<p>Students to compare stem cells extracted from bone marrow and from embryos, looking at which kind of cells these can differentiate into and considering why</p>

						will look at the cellular response to injury and stress including hypertrophy and hyperplasia	
SMSC & British Values	The ethics surrounding the use of stem cells in medical research and in the treatment of certain diseases such as dementia						
Cultural Capital	Students explore the ethical issues surrounding use stem cells, including why different people may hold different views on their use						
Career Link	As cells are fundamental to biology this unit opens doors to careers in any biological medical or ecological field						
Two	Infection and response	Pathogens and modes of transmission The function of key components of the immune system How vaccines work Antibiotics, painkillers and the development of new drugs	Interpreting data in graphical and tabular form Reading for comprehension Extended writing	That white blood cells “eat” invaders - students must refer to phagocytosis. Potential for confusion between antibody and antigen That bacteria “learn” rather than evolve to be resistant to antibiotics	Builds from the “Staying Healthy” unit at KS3, which laid the foundations of disease transmission and immune system function	The immune system and immunity forms the entirety of learning aim B, in the first unit of the Applied Human Biology course. In A-Level biology students will study Cell recognition, T-Cell and B-Cell Function, HIV and the use of monoclonal antibodies	Students could consider ideas of herd immunity and why it is important for those that can be vaccinated to be vaccinated. Students could consider how a white blood cell can tell if a cell is self or non-self Students could look at the rise of antibiotic resistant bacteria
SMSC & British Values	Staying healthy and good infection control The importance of vaccines The spread of MRSA						

Cultural Capital	A general awareness of pandemics and how they can be controlled, both in the UK and worldwide						
Career Link	Any healthcare-based career Medical research Drugs research						
Three	Homoeostasis and response (Part 1)	The definition of Homeostasis The nervous system and reflex arcs (Triple Only - The brain and eye) Negative feedback and the control of temperature, glucose and (Triple only) Water and Nitrogen	Drawing and labelling scientific diagrams Collecting recording accurate data Presenting and interpreting data in tabular and graphical form. Extended Writing	Blood sugar - students often don't identify this with glucose.	Builds from the study of nutrition and digestion in year 9, which explores how humans obtain the glucose they use for energy from their diet. Also builds from previous study of the circulatory system as a transport mechanism	Study of homeostasis and negative feedback loops is continued in greater depth in both A-Level biology and Applied Human Biology	Treatment of diabetes and comparison of type one and type two. Students can consider why negative feedback loops are suited to control of homeostasis
SMSC & British Values	Healthy diet and risk factors for diabetes How people with diabetes manage their condition						
Cultural Capital	Impact of a healthy V unhealthy lifestyle on the mental health & wellbeing of individuals and communities.						
Career Link	Dietitian Any number of careers in the medical field						
Four	Homoeostasis and response (Part 2)	Control of the menstrual cycle, including fertility treatment and hormonal contraception (Triple Only) Plant Hormones	Collecting recording accurate data Presenting and interpreting data in tabular and graphical form.	Students often confuse the three different hormones that control the menstrual cycle	Previous work at KS3 on the circulatory system as transport mechanism	Study of homeostasis and negative feedback loops is continued in greater depth in	Treatment of diabetes and comparison of type one and type two.

			Extended Writing		(Triple Only) Plant growth, and xylem and phloem.	both A-Level biology and Applied Human Biology	Students can consider why negative feedback loops are suited to control of homeostasis
SMSC & British Values	Appropriate usage of contraception, particularly hormonal options						
Cultural Capital	How different communities feel about and use hormonal contraceptives						
Career Link	Fertility Adviser Family planning adviser Farmer Botanist						
Five	Inheritance variation and evolution (Part 1)	The structure of DNA Genes and alleles; including the concepts of recessive alleles, dominant alleles, homozygous and heterozygous Sexual vs asexual reproduction Inheritance and punnet squares Inheritance of sex and genetic disorders	Calculation of simple probability Writing and interpreting tree charts Extended writing	Alleles as different genes rather than different versions of a gene Confusion between genotype and phenotype	This unit builds on the study of heredity and evolution that is completed in year 8	Study of genetics forms the basis of an entire unit of study in both A-Level biology and Applied human Biology	Sex linked traits Advantages and disadvantages of sexual be asexual reproduction and why organisms capable of both would choose a strategy
SMSC & British Values	Inherited disorders and issues around family planning						
Cultural Capital	Charles Darwin and the voyage of the beagle Historical debate around evolution						

Career Link	<p>Medical research Family planning adviser Genealogist</p>
Six	<p>Students have end of year exams and 2 weeks of work experience in this last section of the academic year.</p> <p>Revision and preparation for GCSE exams (& Consolidation of this part of the KS4 programme of study)</p> <p>Revisit to subject knowledge from across the course & use of PLC to ensure that students have a good grasp of all aspects of the specification Use of retrieval quizzes and activities to identify gaps in SK and misconceptions Support students in developing summary notes, flash cards etc to aid retrieval of key facts Ensure that students have the necessary skills for effective revision Focus on past exam questions and papers – command words and application of knowledge Practice the application of knowledge that draws upon the practical aspects of the course Timed completion of questions to support with pace through the exam paper SLOP style activities to ensure that all are prepared for the aspects of maths that will be present on the exam papers</p>