

Curriculum Area: GCSE Combined Science (Trilogy) Biology and GCSE Biology

Knutsford Academy Curriculum Map



Year 10

	Autumn1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Organisation and the digestive system / Cell division Organisation and the digestive system Substantive knowledge headlines: <ul style="list-style-type: none"> the fundamental units of living organisms are cells, which may be part of highly adapted structures including tissues, organs, and organ systems, enabling life processes to be performed more effectively carbohydrates, proteins, nucleic acids, and lipids as key biological molecules enzymes and factors affecting the rate of enzymatic reactions Disciplinary knowledge headlines: <ul style="list-style-type: none"> carry out experiments appropriately having due regard for the correct manipulation of apparatus, and health and safety considerations use scientific theories and explanations and hypothesis on how pH affects amylase activity translate numeric data into graphical form Link to knowledge from previous units: <ul style="list-style-type: none"> KS3 Cells KS3 Digestive system Link to knowledge in future units: <ul style="list-style-type: none"> GCSE- The rate and extent if chemical change (Chemistry) A Level Biology – Biological molecules, Exchange Math skills: <ul style="list-style-type: none"> carry out rate calculations for chemical reactions Cell division Substantive knowledge headlines: <ul style="list-style-type: none"> the nucleus of a cell contains chromosomes, made of DNA molecules, and each chromosome carries many genes the stages of the cell cycle, including mitosis stem cells in animals and meristems in plants Disciplinary knowledge headlines: <ul style="list-style-type: none"> use models and analogies to develop explanations of how cells divide evaluate the practical risks and benefits, as well as social and ethical issues, of the use of stem cells in medical research and treatments. Link to knowledge from previous units: <ul style="list-style-type: none"> KS3 Cells KS3 Variation Link to knowledge in future units: <ul style="list-style-type: none"> GCSE – Reproduction (Biology) A-Level Biology – Cell Structure, Genetic Diversity 	Communicable diseases / Human defences and vaccination Communicable diseases Substantive knowledge headlines: <ul style="list-style-type: none"> communicable diseases including sexually transmitted infections in humans (including HIV/AIDs) bacteria, viruses, and fungi as pathogens in animals and plants Disciplinary knowledge headlines: <ul style="list-style-type: none"> describe and explain specified examples of the technological applications of science Link to knowledge from previous units: <ul style="list-style-type: none"> KS3 - Cells Link to knowledge in future units: <ul style="list-style-type: none"> GCSE Biology – Non-communicable diseases. A-Level Biology – Cell recognition and the immune system. Human defences and vaccination Substantive knowledge headlines: <ul style="list-style-type: none"> body defences against pathogens and the role of the immune system against disease reducing and preventing the spread of infectious diseases in animals and plants the process of discovery and development of new medicines the impact of lifestyle factors on the incidence of non-communicable diseases. Disciplinary knowledge headlines: <ul style="list-style-type: none"> understand that the results of testing and trials are published only after scrutiny by peer review evaluate the global use of vaccination in the prevention of disease appreciate the power of monoclonal antibodies and consider any ethical issues (Triple Science only) evaluate the advantages and disadvantages of monoclonal antibodies (Triple Science only). Link to knowledge from previous units: <ul style="list-style-type: none"> KS3 - Cells Link to knowledge in future units: <ul style="list-style-type: none"> GCSE Biology – Non-communicable diseases A-Level Biology – Cell recognition and the immune system. 	Non-communicable diseases Substantive knowledge headlines: <ul style="list-style-type: none"> the relationship between health and non-communicable diseases risk factors linked to an increased rate of a disease Disciplinary knowledge headlines: <ul style="list-style-type: none"> evaluate methods of treatment bearing in mind the benefits and risks associated with the treatment interpret data about risk factors for specified diseases. Link to knowledge from previous units: <ul style="list-style-type: none"> KS3 – Cells KS3 - Organisms Link to knowledge in future units: <ul style="list-style-type: none"> GCSE Biology – Variation and evolution. A-Level Biology – Mass transport. Math skills: <ul style="list-style-type: none"> translate disease incidence information between graphical and numerical forms, construct and interpret frequency tables and diagrams, bar charts and histograms, and use a scatter diagram to identify a correlation between two variables understand the principles of sampling as applied to scientific data, including epidemiological data. 	Bioenergetics Substantive knowledge headlines: <ul style="list-style-type: none"> photosynthesis as the key process for food production and therefore biomass for life the process of photosynthesis factors affecting the rate of photosynthesis the importance of cellular respiration the processes of aerobic and anaerobic respiration. Disciplinary knowledge headlines: <ul style="list-style-type: none"> use data to relate limiting factors to the cost effectiveness of adding heat, light, or carbon dioxide to greenhouses tests to identify starch, glucose and proteins using simple qualitative reagents investigations into the effect of exercise on the body. Link to knowledge from previous units: <ul style="list-style-type: none"> KS3 Photosynthesis KS3 Gas exchange Link to knowledge in future units: <ul style="list-style-type: none"> GCSE Biology – organizing an ecosystem. GCSE Biology – Biodiversity and ecosystems. A-Level Biology – Photosynthesis A-Level Biology - Respiration Math skills: <ul style="list-style-type: none"> solve simple algebraic equations. 	Nerves and hormones Substantive knowledge headlines: <ul style="list-style-type: none"> principles of nervous coordination and control in humans the relationship between the structure and function of the human nervous system the relationship between structure and function in a reflex arc principles of hormonal coordination and control in humans homeostasis. Disciplinary knowledge headlines: <ul style="list-style-type: none"> evaluate the benefits and risks of procedures carried out on the brain and nervous system (Triple Science only). evaluate the advantages and disadvantages of treating organ failure by mechanical device or transplant (Triple Science only). evaluate information around the relationship between obesity and diabetes, and make recommendations considering social and ethical issues. show why issues around contraception cannot be answered by science alone understand social and ethical issues associated with IVF treatments. Link to knowledge from previous units: <ul style="list-style-type: none"> KS3 Cells KS3 Reproduction. Link to knowledge in future units: <ul style="list-style-type: none"> A-Level Biology – Response to stimuli A-Level Biology – Nervous coordination and muscles. A-Level Biology – Homeostasis Math skills: <ul style="list-style-type: none"> extract and interpret data from graphs, charts, and tables, about the functioning of the nervous system translate information about reaction times between numerical and graphical forms translate tables and bar charts of glucose, ions, and urea before and after filtration (Triple Science only) extract and interpret data from graphs showing hormone levels during the menstrual cycle. extract information and interpret data from graphs that show the effect of insulin in blood glucose levels in both people with diabetes and people without diabetes. 	Biodiversity and ecosystems Substantive knowledge headlines: <ul style="list-style-type: none"> the importance of biodiversity levels of organisation within an ecosystem positive and negative human interactions with ecosystems the importance of interactions between organisms in a community. Disciplinary knowledge headlines: <ul style="list-style-type: none"> interpret graphs used to model predator-prey cycles explain how waste, deforestation and global warming have an impact on biodiversity. understand the conflict between the need for cheap available compost to increase food production and the need to conserve peat bogs and peatlands as habitats for biodiversity and to reduce carbon dioxide emissions. evaluate the environmental implications of deforestation understand that the scientific consensus about global warming and climate change is based on systematic reviews of thousands of peer reviewed publications evaluate given information about methods that can be used to tackle problems caused by human impacts on the environment explain and evaluate the conflicting pressures on maintaining biodiversity given appropriate information. Link to knowledge from previous units: <ul style="list-style-type: none"> KS3 Plant biology Link to knowledge in future units: <ul style="list-style-type: none"> GCSE Biology – Adaptations, Interdependence, and competition GCSE Biology – Organising an ecosystem. A-Level Biology – Populations in ecosystems. Math skills: <ul style="list-style-type: none"> extract and interpret information from charts, graphs and tables relating to the interaction of organisms within a community in relation to abundance of organisms: understand the terms mean, mode and median; calculate arithmetic means; plot and draw appropriate graphs selecting appropriate scales for the axes
Assessments	Progress Point 1 Assessment	Progress Point 2 Assessment	Trial Exam (used for Progress Point 3)		Progress Point 4 Assessment	

Curriculum Area: GCSE Combined Science (Trilogy) Biology and GCSE Biology

Knutsford Academy Curriculum Map



Year 11

	Autumn1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Homeostasis / Types of reproduction	Variation and evolution	Adaptations, interdependence, and competition	Organising an ecosystem	Revision and examinations	
	<p>Homeostasis Substantive knowledge headlines:</p> <ul style="list-style-type: none"> principles of hormonal coordination and control in humans homeostasis. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> describe how kidney dialysis works. Evaluate the advantages and disadvantages of treating organ failure by mechanical device or transplant. Evaluate information around the relationship between obesity and diabetes, and make recommendations taking into account social and ethical issues. <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Cells <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> A-Level Biology – Homeostasis <p>Math skills:</p> <ul style="list-style-type: none"> Construct and interpret frequency tables and diagrams, bar charts and histograms. translate information between graphical and numeric form. <p>Types of reproduction Substantive knowledge headlines:</p> <ul style="list-style-type: none"> the genome as the entire genetic material of an organism how the genome, and its interaction with the environment, influence the development of the phenotype of an organism the potential impact of genomics on medicine most phenotypic features being the result of multiple, rather than single, genes single gene inheritance and single gene crosses with dominant and recessive phenotypes sex determination in humans <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> modelling behaviour of chromosomes during meiosis interpret a diagram of DNA structure (Triple Science only) modelling insertions and deletions in chromosomes to illustrate mutations (Triple Science only) appreciate that embryo screening and gene therapy may alleviate suffering but consider the ethical issues which arise <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Reproduction GCSE Biology – Cell division <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> A-Level Biology – DNA, genes and protein synthesis. A-Level Biology – Gene expression <p>Math skills:</p> <ul style="list-style-type: none"> use direct proportion and simple ratios to express the outcome of a genetic cross complete a Punnett square diagram and extract and interpret information from genetic crosses and family trees construct a genetic cross by Punnett square diagram and use it to make predictions using the theory of probability. 	<p>Variation and evolution Substantive knowledge headlines:</p> <ul style="list-style-type: none"> genetic variation in populations of a species the process of natural selection leading to evolution the evidence for evolution developments in biology affecting classification the importance of selective breeding of plants and animals in agriculture the uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> use the theory of evolution by natural selection in an explanation explain the benefits and risks of selective breeding given appropriate information and consider related ethical issues interpret information about genetic engineering techniques and to make informed judgements about issues concerning cloning and genetic engineering, including GM crops explain the potential benefits and risks of cloning in agriculture and in medicine and that some people have ethical objections understand how scientific methods and theories develop over time interpret evolutionary trees. <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Variation <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Biology – Types of reproduction A-Level Biology – Genetic diversity A-Level Biology – Populations and evolution A-Level Biology – Recombinant DNA technology <p>Math skills:</p> <ul style="list-style-type: none"> extract and interpret information from charts, graphs, and tables such as evolutionary trees. 	<p>Adaptations, interdependence, and competition Substantive knowledge headlines:</p> <ul style="list-style-type: none"> organisms are interdependent and are adapted to their environment methods of identifying species and measuring distribution, frequency, and abundance of species within a habitat abiotic and biotic factors which affect communities. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> recording first-hand observations of organisms. <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Plant biology <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Biology – Organising an ecosystem A-Level Biology – Populations in ecosystems. <p>Math skills:</p> <ul style="list-style-type: none"> extract and interpret information from charts, graphs and tables relating to the interaction of organisms within a community extract and interpret information from charts, graphs and tables relating to the effect of abiotic factors on organisms within a community extract and interpret information from charts, graphs and tables relating to the effect of biotic factors on organisms within a community. 	<p>Organising an ecosystem Substantive knowledge headlines:</p> <ul style="list-style-type: none"> levels of organisation within an ecosystem how materials cycle through abiotic and biotic components of ecosystems the role of microorganisms (decomposers) in the cycling of materials through an ecosystem <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> interpret and explain the processes in diagrams of the carbon cycle, the water cycle evaluate given information about methods that can be used to tackle problems caused by human impacts on the environment explain and evaluate the conflicting pressures on maintaining biodiversity given appropriate information <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> GCSE Bioenergetics <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> A-Level Biology – Energy and ecosystems. A-Level Biology – Biodiversity A-Level Biology – Populations in ecosystems. <p>Math skills:</p> <ul style="list-style-type: none"> calculate rate changes in the decay of biological material translate information between numerical and graphical form plot and draw appropriate graphs selecting appropriate scales for the axes. 		
Assessments	Progress Point 1 Assessment	Trial Exam 1 (used for Progress Point 2)	Trial Exam 2 (used for Progress Point 3)			