

AQA GCSE Biology - Trilogy & Separate – Year 11 Curriculum Map



YEAR 10	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Curriculum Content	<p>Composite: Know how we can avoid diseases by reducing contact with them, as well as how the body uses barriers against pathogens.</p> <p>Component 1:</p> <ul style="list-style-type: none"> Know how diseases caused by viruses, bacteria, protists and fungi are spread in animals and plants. Students should be able to explain how the spread of diseases can be reduced or prevented. <p>Component 2:</p> <ul style="list-style-type: none"> Explore different viral diseases and how they are transmitted such as Measles, HIV and Tobacco Mosaic Virus. <p>Component 3:</p> <ul style="list-style-type: none"> Explore different bacterial diseases and how they are transmitted such as salmonella and Gonorrhoea. <p>Component 4:</p> <ul style="list-style-type: none"> Explore fungal diseases and how they are transmitted such as rose black spot. <p>Component 5:</p> <ul style="list-style-type: none"> Explore a protist disease such as Malaria and how it is transmitted. <p>Component 6:</p> <ul style="list-style-type: none"> Students should be able to describe the non-specific defence systems of the human body against pathogens. Students should be able to explain the role of the immune system in the defence against disease. <p>Component 7:</p> <ul style="list-style-type: none"> Students should be able to explain how vaccination will prevent illness in an individual, and how the spread of pathogens can be reduced by immunising a large proportion of the population. <p>Component 8:</p> <ul style="list-style-type: none"> Students should be able to explain the use of antibiotics and other medicines in treating disease. <p>Component 9:</p> <ul style="list-style-type: none"> Students should be able to describe the process of discovery and development of potential new medicines, including preclinical and clinical testing. 	<p>Composite: Know that cells in the body can only survive within narrow physical and chemical limits</p> <p>Component 1:</p> <ul style="list-style-type: none"> Students should be able to explain that homeostasis is the regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes <p>Component 2:</p> <ul style="list-style-type: none"> Students should be able to explain how the structure of the nervous system is adapted to its functions. Students should be able to explain how the various structures in a reflex arc – including the sensory neurone, synapse relay neurone and motor neurone – relate to their function. Students should understand why reflex actions are important Students should be able to extract and interpret data from graphs, charts and tables, about the functioning of the nervous system. Students should be able to translate information about reaction times between numerical and graphical forms. <p>Required practical activity 6: plan and carry out an investigation into the effect of a factor on human reaction time.</p> <p>Component 3:</p> <ul style="list-style-type: none"> Students should be able to describe the principles of hormonal coordination and control by the human endocrine system. Students should be able to identify the position of the following on a diagram of the human body. <p>Component 4:</p> <ul style="list-style-type: none"> Students should be able to explain how insulin controls 	<p>Composite: Know that the number of chromosomes are halved during meiosis and then combined with new genes from the sexual partner to produce unique offspring.</p> <p>Component 1:</p> <ul style="list-style-type: none"> Students should understand that meiosis leads to non-identical cells being formed while mitosis leads to identical cells being formed. <p>Component 2:</p> <ul style="list-style-type: none"> Students should be able to explain how meiosis halves the number of chromosomes in gametes and fertilisation restores the full number of chromosomes. <p>Component 3:</p> <ul style="list-style-type: none"> Students should be able to describe the structure of DNA and define genome. <p>Component 4:</p> <ul style="list-style-type: none"> Students should be able to discuss the importance of understanding the human genome. <p>Component 5:</p> <ul style="list-style-type: none"> Students should be able to explain the terms: <ul style="list-style-type: none"> gamete chromosome gene allele dominant recessive homozygous heterozygous genotype phenotype Students should be able to understand the concept of probability in predicting the results of a single gene cross, but recall that most phenotype features are the result of multiple genes rather than single gene inheritance. Students should be able to use direct proportion and simple ratios to express the outcome of a genetic cross. Students should be able to complete a Punnett square diagram and extract and interpret information from genetic crosses and family trees. Students should be able to construct a genetic cross by Punnett square diagram and use it 	<p>Continued:</p> <p>Component 12:</p> <ul style="list-style-type: none"> Students should be able to describe the evidence for evolution including fossils and antibiotic resistance in bacteria. <p>Component 13:</p> <ul style="list-style-type: none"> Students should be able to extract and interpret information from charts, graphs and tables such as evolutionary trees <p>Component 14:</p> <ul style="list-style-type: none"> Students should be able to describe factors which may contribute to the extinction of a species. <p>Component 15:</p> <ul style="list-style-type: none"> Understand how mutations can cause bacteria to become resistant to antibiotics <p>Component 16:</p> <ul style="list-style-type: none"> Students should be able to use information given to show understanding of the Linnaean system. Students should be able to describe the impact of developments in biology on classification systems. Understand how scientific methods and theories develop over time. <p>Composite 4.7: Explore how humans are threatening biodiversity as well as the natural systems that support it.</p> <p>Component 1:</p> <ul style="list-style-type: none"> Students should be able to explain how a change in an abiotic factor would affect a given community given appropriate data or context. Students should be able to extract and interpret information from charts, graphs and tables relating to the effect of abiotic factors on organisms within a community. 	<p>Component 4:</p> <ul style="list-style-type: none"> Students should understand that photosynthetic organisms are the producers of biomass for life on Earth. In relation to abundance of organisms students should be able to: <ul style="list-style-type: none"> understand the terms mean, mode and median calculate arithmetic means plot and draw appropriate graphs selecting appropriate scales for the axes. Students should be able to interpret graphs used to model these cycles. <p>Required practical activity 7: 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>Component 5:</p> <ul style="list-style-type: none"> Students should: recall that many different materials cycle through the abiotic and biotic components of an ecosystem Students should be able to explain the importance of the carbon and water cycles to living organisms. Students are not expected to study the nitrogen cycle. Students should be able to explain the role of microorganisms in cycling materials through an ecosystem by returning carbon to the atmosphere as carbon dioxide and mineral ions to the soil. <p>Component 6:</p> <ul style="list-style-type: none"> Explain how waste, deforestation and global warming have an impact on biodiversity. <p>Component 7:</p> <ul style="list-style-type: none"> Understand how rapid growth in the human population and an increase in the standard of living mean that increasingly more resources are used and more waste is produced. <p>Component 8:</p> <p>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</p> <p>Component 9:</p>	<p>Component 9:</p> <ul style="list-style-type: none"> Understand the environmental implications of deforestation. <p>Component 10:</p> <ul style="list-style-type: none"> Students should be able to describe some of the biological consequences of global warming. Understand that the scientific consensus about global warming and climate change is based on systematic reviews of thousands of peer reviewed publications. <p>Component 11:</p> <ul style="list-style-type: none"> Students should be able to describe both positive and negative human interactions in an ecosystem and explain their impact on biodiversity. Scientists and concerned citizens have put in place programmes to reduce the negative effects of humans on ecosystems and biodiversity. 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>REVISION FOR EXAMS</p>

Composite: Know how plants harness the Sun's energy in photosynthesis in order to make food.

Component 1:

- Know what the chemical symbols: CO₂, H₂O, O₂ and C₆H₁₂O₆ stand for
- Students should know photosynthesis is an endothermic reaction in which energy is transferred from the environment to the chloroplasts by light

Component 2:

- Students should be able to explain the effects of temperature, light intensity, carbon dioxide concentration, and the amount of chlorophyll on the rate of photosynthesis.
- Students should be able to: measure and calculate rates of photosynthesis, extract and interpret graphs of photosynthesis rate involving one limiting factor, plot and draw appropriate graphs selecting appropriate scale for axes, translate information between graphical and numeric form.
- Students should be able to explain graphs of photosynthesis rate involving two or three factors and decide which is the limiting factor.

- Students should understand and use inverse proportion – the inverse square law and light intensity in the context of photosynthesis.

Required practical activity 5: investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.

Component 3:

- Understand the uses of glucose from photosynthesis

Component 4:

- Students should be able to describe cellular respiration as an exothermic reaction which is continuously occurring in living cells
- Students should be able to compare the processes of aerobic and anaerobic respiration with regard to the need for oxygen, the differing products and the relative amounts of energy transferred.

Composite 5:

- Students should be able to investigate into the effect of exercise on the body.

Composite 6:

- Students should be able to explain the importance of sugars, amino acids, fatty acids and glycerol in the synthesis and breakdown of carbohydrates, proteins and lipids.

blood glucose (sugar) levels in the body

- Students should be able to compare Type 1 and Type 2 diabetes and explain how they can be treated.
- Students should be able to 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.
- Students should be able to explain how glucagon interacts with insulin in a negative feedback cycle to control blood glucose (sugar) levels in the body.

Component 5:

- Students should be able to describe the roles of hormones in human reproduction, including the menstrual cycle.
- Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.
- Students should be able to extract and interpret data from graphs showing hormone levels during the menstrual cycle.

Component 6:

- Students should be able to evaluate the different hormonal and non-hormonal methods of contraception.

Component 7:

- Students should be able to explain the use of hormones in modern reproductive technologies to treat infertility.
- Understand the developments of microscopy techniques have enabled IVF treatments to develop.
- Understand social and ethical issues associated with IVF treatments
- Evaluate from the perspective of patients and doctors the methods of treating infertility.

Component 8:

- Students should be able to explain the roles of thyroxine and adrenaline in the body.
- Explain simple diagrams of negative feedback control.

to make predictions using the theory of probability.

Component 6:

- Students should make informed judgements about the economic, social and ethical issues concerning embryo screening, given appropriate information.

Component 7:

- Students should be able to carry out a genetic cross to show sex inheritance.
- Students should understand and use direct proportion and simple ratios in genetic crosses.

Component 8:

- Students should be able to describe simply how the genome and its interaction with the environment influence the development of the phenotype of an organism
- Students should be able to: state that there is usually extensive genetic variation within a population of a species
- Recall that all variants arise from mutations and that: most have no effect on the phenotype

Component 9:

- Students should be able to describe evolution as a change in the inherited characteristics of a population over time through a process of natural selection which may result in the formation of a new species.
- Students should be able to explain how evolution occurs through natural selection of variants that give rise to phenotypes best suited to their environment.

Component 10:

- Students should be able to explain the impact of selective breeding of food plants and domesticated animals.

Explain the benefits and risks of selective breeding given appropriate information and consider related ethical issues.

Component 11:

- Students should be able to describe genetic engineering as a process which involves modifying the genome of an organism by introducing a gene from another organism to give a desired characteristic.
- Students should be able to explain the potential benefits and risks of

Component 2:

- Students should be able to explain how a change in a biotic factor might affect a given community given appropriate data or context.

- Students should be able to extract and interpret information from charts, graphs and tables relating to the effect of biotic factors on organisms within a community.

Component 3:

- Students should be able to explain how organisms are adapted to live in their natural environment, given appropriate information.

- Understand the environmental implications of deforestation.

Component 10:

- Students should be able to describe some of the biological consequences of global warming.
- Understand that the scientific consensus about global warming and climate change is based on systematic reviews of thousands of peer reviewed publications.

			<p>genetic engineering in agriculture and in medicine and that some people have objections.</p> <ul style="list-style-type: none"> Students should be able to describe the main steps in the process of genetic engineering. 				
Prior knowledge and skills (from previous year / key stage)	<ul style="list-style-type: none"> Students will have a basic understanding of the immune system from KS3 KS4 Unit 4.1 students will have covered the structure of prokaryotic and eukaryotic cells Unit 4.2 Students will have an understanding of the systems the diseases affect 	<p>Students will be able to:</p> <ul style="list-style-type: none"> Students will have studied organs and organ systems and covered reproduction in KS3 Students will have some knowledge of enzymes and how it is important to maintain a constant internal environment. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> Students will have covered genetic and environmental variation and that genes are passed on from parents in the form of DNA. Students will have studied mitosis in some detail along with meiosis in year 10 to help with their understanding of this topic. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> Students will have studied microbes and how genetic diseases are caused by mutation. Students will have some understanding of factors that can cause mutation when looking at cancer. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> Students will have studied ecosystems in year 8 and will have looked at how biodiversity is important and how it can be affected. Students will have looked at global warming and how it affects biodiversity. Students will have looked at the carbon cycle in year 9 and how it is recycled. <p>Students will be able to:</p> <ul style="list-style-type: none"> Students will have studied ecosystems in year 8 and will have looked at how biodiversity is important and how it can be affected. Students will have looked at global warming and how it affects biodiversity. Students will have looked at the carbon cycle in year 9 and how it is recycled. 		
Core Knowledge Organiser content	<p>Structure of a bacterium Chlamydia Cholera Chlora Ash dieback HIV Tobacco Mosaic Virus</p>	<p>Homeostasis and response contains: Body temp regulation Water regulation Glucose regulation Nervous system- neurones Endocrine system – hormones involved and organs Coordination</p>	<p>Genetic diseases: Punnet squares Monohybrids Meiosis Mitosis Keywords, heterozygous, homozygous, genotype, phenotype</p>	<p>Theory of evolution: Mutation Examples of mutation Classification Linnaeus Darwins theory Process of genetic engineering Genetic modification</p>	<p>Biodiversity: Abiotic factors on organisms within a community. Biotic factors Carbon cycle Global warming</p>		
Assessment Components	<p>AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.</p>	<p>AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures</p>	<p>AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.</p>	<p>AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures</p>	<p>AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: 1a) interpret</p>	<p>AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: 1a) interpret</p>	<p>AO1: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. AO2: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures</p>

		3b) improve experimental procedures.		3b) improve experimental procedures.	1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.	1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.	3b) improve experimental procedures.
Vocabulary / Key Subject Terminology	Pathogen Communicable Non-communicable Virus Risk Factor	Glucose, Glucagon, Homeostasis, Temperature, Regulation, Hormones, Insulin, Negative feedback, Menstrual cycle, LH, FSH and Oestrogen, Coordination	Hormones, Genetic disease, inheritance, gametes, genes, genotype, phenotype, dihybrids, mitosis, meiosis, allele	Fossilisation, Evolution, antibiotic resistance, mutation, genetic engineering, modification, classification, genome	Abiotic, Biotic, Biodiversity, Carbon cycle, Global warming, Ecosystem, Nitrogen cycle	Abiotic, Biotic, Biodiversity, Carbon cycle, Global warming, Ecosystem, Nitrogen cycle	
Assessment 1	Extended written response teacher assessed	Extended written response teacher assessed	Extended written response teacher assessed	Extended written response teacher assessed	Extended written response teacher assessed	Extended written response teacher assessed	
Assessment 2	AO2 AO3 Assessment	AO2 AO3 Assessment	AO2 AO3 Assessment	AO2 AO3 Assessment	AO2 AO3 Assessment	AO2 AO3 Assessment	
Cross Curricular Links with other Faculties	Maths- Graph skills, equations, rearranging formulas English – Literacy skills, connectives, keywords and definitions	Maths- Graph skills, equations, rearranging formulas English – Literacy skills, connectives, keywords and definitions	Maths- Graph skills, equations, rearranging formulas English – Literacy skills, connectives, keywords and definitions	Maths- Graph skills, equations, rearranging formulas English – Literacy skills, connectives, keywords and definitions	Maths- Graph skills, equations, rearranging formulas English – Literacy skills, connectives, keywords and definitions	Maths- Graph skills, equations, rearranging formulas English – Literacy skills, connectives, keywords and definitions	Maths- Graph skills, equations, rearranging formulas English – Literacy skills, connectives, keywords and definitions
Extra-Curricular Offer	STEM club, Revision sessions (exam technique) University visits if possible to look at A'level courses	STEM club, Revision sessions (exam technique) University visits if possible to look at A'level courses.	STEM club, Revision sessions (exam technique) University visits if possible to look at A'level courses.	STEM club, Revision sessions (exam technique) University visits if possible to look at A'level courses.	STEM club, Revision sessions (exam technique) University visits if possible to look at A'level courses.	STEM club, Revision sessions (exam technique) University visits if possible to look at A'level courses.	STEM club, Revision sessions (exam technique) University visits if possible to look at A'level courses.
Time Allocation	9	9	9	7	7	4	7