



Curriculum Map

Subject: Biology

Year group: 10 & 11

Timings are broad as classes they vary depending on how many teachers the class has.

The colours denote: **Higher tier only content**

Separate science only content

Time period	Topic 3 Year 10 (Autumn Term)	Topic 4 Year 10 (Spring Term)	Topic 5 Year 10 (Summer Term)	Topic 6 Year 11 (Autumn Term)	Topic 7 Year 11 (Spring Term)
Content Declarative Knowledge – ‘Know What’	<u>Biology 4- Bioenergetics</u> -Photosynthesis & factors that affect the rate of photosynthesis -Aerobic respiration -Anaerobic respiration -Fermentation -Response to exercise -Metabolism	<u>Biology 3- Infection & Response</u> -Communicable diseases: how viral, bacterial, fungal and protist diseases are spread, with specific examples of named diseases, their symptoms and treatment. -Human defense systems: non specific defense and the role of white blood cells against pathogens -Vaccination and its role in the prevention of illness -Antibiotics and painkillers: An understanding of the use of antibiotics and why they won't kill viruses -Discovery and development of drugs: Sources of drugs and how clinical trials are	<u>Biology 7 - Ecology</u> -Adaptations, interdependence and competition -Organisation of an ecosystem -How materials are cycled -Biodiversity and the effect of human interaction on ecosystems -Waste management -Land use -Deforestation -Global warming -Maintaining biodiversity	<u>Biology 5 - Homeostasis & response</u> -Homeostasis and the conditions that must be maintained -Structure and function of the nervous system -Structure and functions of the brain -Imaging techniques to identify brain function and disorders -Structure and function of the eye -Accommodation and eyesight problems -Control of body temperature -Structure and function of the human endocrine system -Control of blood glucose concentration -Maintaining water and nitrogen balance in the body -Hormones in human reproduction -Contraception	<u>Biology 6 - Inheritance, Variation & Evolution</u> -Sexual and asexual reproduction -Advantages and disadvantages of sexual and asexual reproduction -Meiosis -DNA and the genome -DNA Structure -Genetic Inheritance -Inherited disorders -Sex determination -Variation -Evolution -Selective breeding -Genetic engineering -Cloning -Theory of evolution -Speciation -The understanding of genetics -Evidence for evolution -Fossils -Extinction -Antibiotic resistant bacteria



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		<p>conducted to test for toxicity, efficacy and dose.</p> <p>-Monoclonal antibodies: Production using mice lymphocytes and tumour cells and uses of monoclonal antibodies for diagnosis. research and treatment of disease.</p> <p>-Plant diseases: identification of diseases caused by viruses, bacteria, fungi and insects as well as mineral ion deficiencies</p> <p>-Plant defense mechanisms: physical, chemical and mechanical responses</p>		<p>-Uses of hormones to treat infertility</p> <p>-Negative feedback</p> <p>-Control and coordination of plant hormones and their uses in agriculture and horticulture</p>	<p>-Classification of living organisms</p>
<p>Skills</p> <p><i>Procedural Knowledge – ‘Know How’</i></p>	<p>-Use scientific theories and explanations to develop hypotheses on how light intensity affects the rate of photosynthesis.</p> <p>-Plan experiments to test hypotheses.</p> <p>- Recognise the need for multiple repeats</p> <p>- Make and record observations</p> <p>- Translate numeric data into graphical form.</p> <p>-Understand and use inverse proportion: the inverse square law and light intensity in the context of photosynthesis.</p>	<p>-Evaluate medical treatments.</p> <p>-Consider ethical issues relating to biology topics.</p> <p>-Extract and interpret information from charts, graphs and tables</p> <p>- Use appropriate apparatus to record length and area.</p> <p>-Use appropriate apparatus and techniques to observe and measure the process of bacterial growth.</p> <p>-Safe and ethical use of bacteria</p> <p>-Use of appropriate techniques and qualitative reagents in</p>	<p>Evaluation</p> <p>-Extract and interpret information from charts, graphs and tables.</p> <p>-Evaluate the environmental implications of human choices.</p> <p>Practical experiments</p> <p>1. Use sampling techniques to investigate the effect of a factor on the distribution of this species. Record first hand observations of organisms.</p>	<p>-Use appropriate apparatus to record time.</p> <p>-Selecting appropriate apparatus and techniques to measure the process of reaction time.</p> <p>-Safe and ethical use of humans to measure physiological function of reaction time and responses to a chosen factor.</p> <p>-Translate information between numerical and graphical forms.</p> <p>-Use appropriate apparatus to record length and time.</p> <p>- Selecting appropriate apparatus and techniques to measure</p>	<p>-Consider ethical issues relating to biology topics and medical treatments.</p> <p>-Extract and interpret information from charts, graphs and tables</p> <p>-Understand how scientific methods and theories develop over time</p>



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		<p>problem-solving contexts.</p> <ul style="list-style-type: none"> -Develop hypotheses -Plan experiments to make observations, test hypotheses and explore phenomena. 		<p>the growth of shoots or roots.</p> <ul style="list-style-type: none"> -Safe and ethical use of plants to measure physiological function of growth in response to light or gravity. -Observations of biological specimens to produce labelled scientific drawings. -Plan experiments to make observations to explore the phenomena of plant responses. -Apply knowledge of a range of techniques, apparatus and materials appropriate to the experiment. -Make and record observations and measurements using length and biological drawings. -Suggest improvements and further investigations. -Present observations as tables, graphs or drawings. 	
<p>Key Questions</p>	<ul style="list-style-type: none"> -Why are plants green? -How can we maximise yields of crops? -How is energy released from glucose? -What effect does exercise have on the body? 	<ul style="list-style-type: none"> -What is a pathogen? - What are the different types of pathogen? - How does your body protect you from disease? - How do vaccinations work? -Should we all be vaccinated? 	<ol style="list-style-type: none"> 1.what are adaptations? 2.what are the key parts of an ecosystem and how do they interact? 3.How are populations affecting biodiversity? 4.How are materials like water, carbon and nitrogen cycled? 	<ul style="list-style-type: none"> -How does the human body maintain internal conditions? -How do humans respond to external stimuli? -How do humans thermoregulate? -How do hormones coordinate the menstrual cycle? 	<ul style="list-style-type: none"> -How are mitosis and meiosis different? -What is DNA and how does it give us different characteristics that we inherit from our parents? -What is natural selection? -What is the evidence for evolution?



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		<ul style="list-style-type: none"> - What processes must drugs go through before they are deemed safe to use? - What are monoclonal antibodies and how can they be used for medical treatments? 		<ul style="list-style-type: none"> -How can hormones be used to treat fertility issues? -What is osmoregulation? -How do plants respond to external stimuli? 	<ul style="list-style-type: none"> -What is the fossil record? -What is extinction and what might cause it?
Assessment	<ul style="list-style-type: none"> -Required Practical Assessed Exam Questions -Assessed Exam Question -End of Topic Test 		<ul style="list-style-type: none"> 1.Required practical 7 - Using sampling techniques to measure a population assessed questions 2.End of topic test 	<ul style="list-style-type: none"> -Mid Topic Test -Required Practical Assessed Exam Questions (Reaction Times and Plant responses) -End of Topic Test 	<ul style="list-style-type: none"> -Assessed Exam Questions -Mid-topic test -End of topic test
Literacy/ Numeracy/ SMSC/Character	<p>Literacy</p> <ul style="list-style-type: none"> -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Plan experiments or devise procedures to make observations -Development of comprehension skills through research using a variety of sources. <p>Numeracy</p> <ul style="list-style-type: none"> -Calculating means -Calculating rates - Translating numerical data into graphical forms <p>SMSC</p> <ul style="list-style-type: none"> -Safe and ethical use of humans and living organisms in scientific investigations <p>Character</p>		<p>Literacy;</p> <ul style="list-style-type: none"> use of third tier terminology <p>Numeracy;</p> <ul style="list-style-type: none"> Calculate the efficiency of biomass transfer between trophic levels. <p>SMSC;</p> <ul style="list-style-type: none"> Group discussion - Is deforestation destroying our ecosystems? <p>Character; Tolerance</p> <ul style="list-style-type: none"> - aware of opinion in group discussion and to tolerate others ideas and opinions. 	<p>Literacy</p> <ul style="list-style-type: none"> -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Plan experiments or devise procedures to make observations -Development of comprehension skills through research using a variety of sources. <p>Numeracy</p> <ul style="list-style-type: none"> -Calculating means -Translating numerical data into graphical forms <p>SMSC</p> <ul style="list-style-type: none"> -Safe and ethical use of humans and living organisms in scientific investigations -Discussion of ethical issues surrounding kidney transplants 	<p>Literacy</p> <ul style="list-style-type: none"> -Appropriate use of tier three vocabulary. -Develop extended answers through practice of 6 mark questions. -Development of comprehension skills through research using a variety of sources. <p>Numeracy</p> <ul style="list-style-type: none"> -Analysis of data linked to variation -Interpretations of punnet squares - ratios and percentages <p>SMSC</p> <ul style="list-style-type: none"> -Evaluating the use of genetic engineering and discussion of the ethical issues surrounding its use - Discussion surrounding which species conservation efforts should focus on



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	<p>-Confidence - Building confidence in practical skills with the completion of a required practical.</p> <p>-Resilience & Initiative - Resolving difficulties in practical techniques</p>			<p>-Discussion of ethical issues surrounding fertility treatments and IVF</p> <p>Character</p> <p>-Tolerance - Showing tolerance towards others views considering fertility treatments</p> <p>-Confidence - Building confidence in practical skills with the completion of two/three required practicals.</p> <p>-Resilience & Initiative - Resolving difficulties in practical techniques</p>	<p>- Evaluating the use of selective breeding and discussion of the ethical issue surrounding its use</p> <p>-Discussion surrounding scientific theories and religious beliefs</p> <p>Character</p> <p>-Tolerance -Showing tolerance towards others views considering genetic engineering and selective breeding</p> <p>-Integrity - Demonstrating sensitivity when considering the effect of genetic disorders.</p>
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