

Curriculum Map Year 10 Combined Science – Biology

Topic Name		Scientific Skills	Essential Knowledge (misconceptions or really tricky bits are underlined)	Prior Learning (KS3)	Assessment	Link to future learning
Cells and Cell Transport	Autumn HT1 (approx.9 lessons)	<p>In this topic I can:</p> <p>Plan a method to investigation how concentration affects the rate of diffusion.</p> <ul style="list-style-type: none"> WS 2.2 – plan experiments to test hypotheses. WS 2.4 – have due regard for accuracy of measurements and health and safety. WS 2.6 – make and record observations. <p>Carry out an investigation into the effect of a range of concentrations of sugar solutions on the mass of plant tissue</p> <ul style="list-style-type: none"> AT 1 – use appropriate apparatus to record mass and time. AT 3 – use appropriate apparatus and techniques to observe and measure the process of osmosis. AT 5 – measure the rate of osmosis by water uptake. WS 3.1 – present observations and other data in graphical form. WS 3.2 – translate mass data into graphical form MS 1c – use percentages and calculate percentage gain and loss of mass of plant tissue. MS 2b – find mean mass of plant tissue. MS 4a, 4b, 4c, 4d – plot, draw and interpret appropriate graphs. 	<p>In this topic I will know:</p> <ul style="list-style-type: none"> The difference between prokaryotes and eukaryotes Draw and label a plant and animal cell and describe the functions of all labelled parts. Define the terms cell specialisation and cell differentiation. Use the magnification equation and know the difference between magnification and resolution. Know the difference between light and electron microscopes. The definition for diffusion and factors that effect its rate. <u>Give examples of diffusion in fish, plants and animal lungs, digestive systems.</u> Define the term osmosis. Define the term active transport <u>and give examples of where it occurs in plants and animals.</u> Compare similarities and differences between diffusion, osmosis and active transport. 	<p>Before I start this topic, I need to know:</p> <p>The structure of plant and animal cells studied at in Year 7-9.</p> <p>How to use a microscope and the main parts to a microscope. Recall what diffusion is.</p>	<p>Knowledge and skills will be assessed by:</p> <p>The topics highlight in BLUE will be assessed in the topic booklet. This will be looking at the quality of practical work and any methods/graphs or tables produced. They may also be reassessed in the end of topic tests where appropriate.</p> <p>The topics highlighted in GREEN will be assessed through questions during the end of topic assessment.</p>	<p>Links to AS biology Links to the movement of sugar into the body when studying the role of insulin in the homeostasis topic in year 11.</p>

<p>Plant Transport</p>	<p><i>Autumn HT2 (approx.5 lessons)</i></p>	<p>Use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included.</p> <ul style="list-style-type: none"> • AT 1 – use appropriate apparatus to record length and area. • AT 7 – use a microscope to make observations of biological specimens and produce labelled scientific drawings. • MS 1d, 3a – use estimations to judge the relative size or area of sub-cellular structures. <p>AT 7 Observation and drawing of a transverse section of leaf.</p> <p>AT 6, 7 Investigate the distribution of stomata and guard cells.</p> <ul style="list-style-type: none"> • MS 2a, 2d, 5c Process data from investigations involving stomata and transpiration rates to find arithmetic means, understand the principles of sampling and calculate surface areas and volumes. <p>AT 3, 4, 5 Measure the rate of transpiration by the uptake of water</p> <p>(HT only) Students should understand and use inverse proportion – the inverse square law and light intensity in the context of photosynthesis.</p> <p>(HT only) WS 1.4 Use data to relate limiting factors to the cost effectiveness of adding heat, light or carbon dioxide to greenhouses</p>	<p>In this topic I will know how to:</p> <ul style="list-style-type: none"> • Explain how the structure of plant tissues are related to their functions. • How the roots, stems and leaves form a plant organ system and transport substances around the plant. • Describe the processes of translocation and transpiration. • Describe the role of <u>stomata and guard cells in controlling gas exchange and water loss.</u> • <u>measure and calculate rates of photosynthesis</u> 	<p>Before I start this topic, I need to know:</p> <p>Know the basic structure of a plant in terms of stem, root and leaves.</p> <p>Know the main tissues of a plant leaf.</p> <p>Know the word equation for photosynthesis.</p>	<p>Knowledge and skills will be assessed by:</p> <p>The topics highlight in BLUE will be assessed in the topic booklet. This will be looking at the quality of practical work and any methods/graphs or tables produced. They may also be reassessed in the end of topic tests where appropriate.</p> <p>The topics highlighted in GREEN will be assessed through questions during the end of topic assessment.</p>	
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<p>Disease</p>	<p>Autumn HT2 And Spring HT3 (approx.10 lessons)</p>	<p>WS 1.4 Evaluate the global use of vaccination in the prevention of disease.</p> <p>WS 1.6 Understand that the results of testing and trials are published only after scrutiny by peer review.</p>	<p>In this topic I will know how to:</p> <ul style="list-style-type: none"> describe the relationship between health and disease and the interactions between different types of disease. describe cancer as the result of changes in cells that lead to uncontrolled growth and division. Disease is caused by viruses, bacteria, protists and fungi are spread in animals and plants. Explain how the spread of disease can be reduced or prevented. Define the term pathogen. State difference in terms of how they reproduce and cause damage between bacteria and viruses. Give examples of diseases for each of the 4 pathogens. Describe the non-specific defence systems of the human body. Explain the role of the immune system in the defence against disease. <u>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.</u> Explain the use of antibiotics and other medicines in treating disease. Describe the process of discovery and development of potential new medicines, including preclinical and clinical testing. 		<p>The topics highlight in BLUE will be assessed in the topic booklet. This will be looking at the quality of practical work and any methods/graphs or tables produced. They may also be reassessed in the end of topic tests where appropriate.</p> <p>The topics highlighted in GREEN will be assessed through questions during the end of topic assessment.</p> <p>At the end of this unit is a full syntopic test that will assess all skills gathered so far in the 'green' and 'blue' sections.</p>	
<p>The heart and blood vessels</p>	<p>Spring HT4 (approx.9 lessons)</p>	<p>Demonstrating that I can:</p> <p>WS 1.3 Evaluate methods of treatment bearing in mind the benefits and risks associated with the treatment.</p> <p>WS 1.5 Interpret data about risk factors for specified diseases.</p> <ul style="list-style-type: none"> Students should be able to use a scatter diagram to identify a correlation between two variables in terms of risk factors. 	<p>In this topic I must know:</p> <ul style="list-style-type: none"> The structure and functioning of the human heart and lungs, including how lungs are adapted for gaseous exchange. Knowledge of the blood vessels associated with the heart is limited to the aorta, vena cava, pulmonary artery, pulmonary vein and coronary arteries. 	<p>Before I start this topic, I must know:</p>	<p>Knowledge and skills will be assessed by:</p> <p>The topics highlight in BLUE will be assessed in the topic booklet. This will be looking at the quality of practical work and any methods/graphs</p>	

		<p>Observe and draw the heart during a dissection. Identify the 4 major blood vessels and chambers when viewing a pigs / lambs heart.</p>	<p>Knowledge of the lungs is restricted to the trachea, bronchi, alveoli and the capillary network surrounding the alveoli.</p> <p>explain how the structure of these vessels (arteries, veins and capillaries) relates to their functions.</p> <p>functions of each of these blood components</p> <p><u>Evaluate the advantages and disadvantages of treating cardiovascular diseases by drugs, mechanical devices or transplant.</u></p>		<p>or tables produced. They may also be reassessed in the end of topic tests where appropriate.</p> <p>The topics highlighted in GREEN will be assessed through questions during the end of topic assessment.</p>	
<p>Organisation, The Human Digestive System</p>	<p>Summer HT5</p>	<p>Use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include: Benedict's test for sugars; iodine test for starch; and Biuret reagent for protein.</p> <ul style="list-style-type: none"> • AT 2 – safe use of a Bunsen burner and a boiling water bath. • AT 8 – use of qualitative reagents to identify biological molecules. <p>Investigate the effect of pH on the rate of reaction of amylase enzyme.</p> <ul style="list-style-type: none"> • AT 1 – use appropriate apparatus to record the volumes of liquids, time and pH. • AT 2 – safe use of a water bath or electric heater. • AT 5 – measure the rate of reaction by the colour change of iodine indicator. • AT 8 – use of qualitative iodine reagent to identify starch by continuous sampling • WS 2.6 – make and record observations and measurements of time. • WS 3.1 – present a graph of amylase activity against pH. 	<ul style="list-style-type: none"> • Students should be able to use the 'lock and key theory' as a simplified model to explain enzyme action. • Students should be able to recall the sites of production and the action of amylase, proteases and lipases. • Students should be able to understand simple word equations but no chemical symbol equations are required. • Digestive enzymes convert food into small soluble molecules that can be absorbed into the bloodstream. • Carbohydrases break down carbohydrates to simple sugars. Amylase is a carbohydrase which breaks down starch. • Proteases break down proteins to amino acids. • Lipases break down lipids (fats) to glycerol and fatty acids. 		<p>The topics highlight in BLUE will be assessed in the topic booklet. This will be looking at the quality of practical work and any methods/graphs or tables produced. They may also be reassessed in the end of topic tests where appropriate.</p> <p>The topics highlighted in GREEN will be assessed through questions during the end of topic assessment.</p>	

		<ul style="list-style-type: none"> WS 3.2 – translate numeric data into graphical form. MS 1a, 1c – carry out rate calculations for chemical reactions. 	<ul style="list-style-type: none"> The products of digestion are used to build new carbohydrates, lipids and proteins. Some glucose is used in respiration. Bile is made in the liver and stored in the gall bladder. It is alkaline to neutralise hydrochloric acid from the stomach. It also emulsifies fat to form small droplets which increases the surface area. The alkaline conditions and large surface area increase the rate of fat breakdown by lipase. 			
Examination period and Bioenergetics	Summer HT6	<p>AT 1, 3, 4 Investigations into the effect of exercise on the body.</p> <p>Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.</p> <ul style="list-style-type: none"> AT 1 – use appropriate apparatus to record the rate of production of oxygen gas produced; and to measure and control the temperature of water in a large beaker that acts as a ‘heat shield’. AT 2 – use a thermometer to measure and control temperature of water bath. AT 3 – use appropriate apparatus and techniques to observe and measure the process of oxygen gas production. AT 4 – safe and ethical use and disposal of living pondweed to measure physiological functions and responses to light. AT 5 – measuring rate of reaction by oxygen gas production. 	<p>In this topic I must know:</p> <p>How to describe photosynthesis as an endothermic reaction in which energy is transferred from the environment to the chloroplasts by light.</p> <p>Explain the effects of temperature, light intensity, carbon dioxide concentration, and the amount of chlorophyll on the rate of photosynthesis.</p> <p>extract and interpret graphs of photosynthesis rate involving one limiting factor plot and draw appropriate graphs selecting appropriate scale for axes</p> <p>translate information between graphical and numeric form.</p> <p>Should know five ways glucose produce in photosynthesis is used in a plant.</p> <p>describe cellular respiration as an exothermic reaction which is continuously occurring in living cells</p> <p>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.</p>		<p>The topics highlight in BLUE will be assessed in the topic booklet. This will be looking at the quality of practical work and any methods/graphs or tables produced. They may also be reassessed in the end of topic tests where appropriate.</p> <p>The topics highlighted in GREEN will be assessed through questions during the end of topic assessment.</p> <p>End of Year synoptic assessment that will cover as many of the key skills and green facts as time allows.</p>	

		<p>Students should recognise the word equations for photosynthesis and respiration/</p> <p>Explain how the human body reacts to in increased demand for energy during exercise.</p> <p>explain the importance of sugars, amino acids, fatty acids and glycerol in the synthesis and breakdown of carbohydrates, proteins and lipids.</p> <p>Define the term metabolism</p>			
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