



# Dallam School

Curriculum overview

Department: Biology  
Year Group: 10

Autumn		Spring		Summer	
Plant organisation (5 lessons)	Bioenergetics (10 lessons)	Infection and response (19 lessons)	Homeostasis (21 lessons)	Genes (11 lessons)	Evolution (7 lessons)
<b>Investigate the factors that impact on transpiration rates in plants</b>	<b>Investigate the factors that impact on photosynthesis in plants</b>	<b>Evaluate the use of antibiotics to treat bacterial infections</b>	<b>Investigate how different factors affect reaction times</b>	<b>Use a genetic cross to predict the probability of a child inheriting a genetic disorder</b>	<b>Explain why theories, such as evolution, change over time</b>
By the end of this topic pupils will know ( <i>key knowledge, including tier 3 vocabulary</i> )					
<ul style="list-style-type: none"> <li>➤ Plant tissues are collections of cells specialised to carry out specific functions.</li> <li>➤ Xylem tissue transports water and mineral ions from the roots to the stems and leaves.</li> <li>➤ Phloem tissue transports dissolved sugars from the leaves to the rest of the plant.</li> <li>➤ The loss of water vapour from the surface of plant leaves is transpiration.</li> </ul> <p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>➤ Palisade mesophyll</li> <li>➤ Spongy mesophyll</li> <li>➤ Xylem</li> <li>➤ Phloem</li> <li>➤ Translocation</li> <li>➤ Guard cell</li> </ul>	<ul style="list-style-type: none"> <li>➤ During photosynthesis energy is transferred from the environment to the chloroplast by light.</li> <li>➤ Cellular respiration occurs continuously in living cells.</li> <li>➤ Metabolism is the sum of all the reactions in the body.</li> </ul> <p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>➤ Glucose</li> <li>➤ Endothermic</li> <li>➤ Limiting factors</li> <li>➤ Aerobic / Anaerobic respiration</li> <li>➤ Exothermic reaction</li> <li>➤ Glycogen</li> <li>➤ respiration</li> <li>➤ Lactic acid</li> <li>➤ Oxygen debt</li> </ul>	<ul style="list-style-type: none"> <li>➤ Diseases, both communicable and non-communicable.</li> <li>➤ White blood cells defend against pathogens.</li> <li>➤ Vaccination involves introducing small amounts of dead or inactive forms of a pathogen.</li> <li>➤ New drugs are tested in the laboratory using cells, tissues, and live animals.</li> </ul> <p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>➤ Pathogens</li> <li>➤ Benign tumours</li> <li>➤ Malignant tumour cells</li> <li>➤ Tumour</li> <li>➤ Hybridomas</li> <li>➤ Placebo</li> <li>➤ Vaccine</li> </ul>	<ul style="list-style-type: none"> <li>➤ Homeostasis is the regulation of the internal conditions of a cell or organism.</li> <li>➤ Compared to the nervous system, the effects of hormones are often slower.</li> <li>➤ The loss of water and mineral ions is carefully balanced by the body. The kidneys are important for this, it is maintained by the hormone ADH.</li> </ul> <p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>➤ Receptors</li> <li>➤ Effectors</li> <li>➤ Neurones</li> <li>➤ Sensory neurones</li> <li>➤ Motor neurones</li> <li>➤ Reflexes</li> <li>➤ Endocrine system</li> <li>➤ Pituitary gland</li> <li>➤ Auxin</li> </ul>	<ul style="list-style-type: none"> <li>➤ In asexual reproduction, there is no fusion of gametes and only one parent, leading to genetically identical offspring.</li> <li>➤ Sexual reproduction involves the joining (fusion) of male and female gametes formed by meiosis.</li> <li>➤ DNA is made up of two strands forming a double helix.</li> </ul> <p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>➤ Recessive</li> <li>➤ Dominant</li> <li>➤ Phenotype</li> <li>➤ Genotype</li> <li>➤ Heterozygote</li> <li>➤ Homozygote</li> <li>➤ Alleles</li> <li>➤ Mutation</li> <li>➤ Meiosis</li> </ul>	<ul style="list-style-type: none"> <li>➤ Variation is the differences in the characteristics of individuals in a population.</li> <li>➤ The theory of evolution by natural selection states that all species of living things have evolved from simple life forms.</li> <li>➤ A species can interbreed to form fertile offspring.</li> <li>➤ Fossils are the remains of organisms from millions of years ago</li> </ul> <p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>➤ Natural selection</li> <li>➤ Mutation</li> <li>➤ Selective breeding</li> <li>➤ Tissue culture</li> <li>➤ Speciation</li> <li>➤ Extinction</li> </ul>

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Plant organisation (5 lessons)	Bioenergetics (10 lessons)	Infection and response (19 lessons)	Homeostasis (21 lessons)	Genes (11 lessons)	Evolution (7 lessons)
<b>Investigate the factors that impact on transpiration rates in plants</b>	<b>Investigate the factors that impact on photosynthesis in plants</b>	<b>Evaluate the use of antibiotics to treat bacterial infections</b>	<b>Investigate how different factors affect reaction times</b>	<b>Use a genetic cross to predict the probability of a child inheriting a genetic disorder</b>	<b>Explain why theories, such as evolution, change over time</b>
They will understand ( <i>key concepts</i> )					
<ul style="list-style-type: none"> <li>➤ How to recognise examples of plant organs and state their functions.</li> <li>➤ How the structures of tissues in the leaf are related to their functions.</li> <li>➤ How the structure of xylem and phloem is adapted to their functions.</li> </ul>	<ul style="list-style-type: none"> <li>➤ How to write the balanced symbol equation for photosynthesis.</li> <li>➤ How to write the balanced symbol equation for respiration.</li> <li>➤ How to write the balanced symbol equation for anaerobic respiration in plants and microorganisms.</li> </ul>	<ul style="list-style-type: none"> <li>➤ How the spread of diseases can be reduced or prevented.</li> <li>➤ Why viral infections are often more difficult to prevent and treat than bacterial infections.</li> <li>➤ How the human body defends itself against the entry of pathogens.</li> <li>➤ Why a placebo is used during drug trialling.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Why internal conditions need to be maintained.</li> <li>➤ How information is passed along neurones and synapses.</li> <li>➤ What happens when blood glucose levels become too high or too low.</li> <li>➤ How contraceptives and fertility treatments work.</li> </ul>	<ul style="list-style-type: none"> <li>➤ How to describe the differences between sexual reproduction and asexual reproduction.</li> <li>➤ How to describe the steps involved in producing a protein inside the cell including outlining transcription and translation.</li> <li>➤ How to evaluate advantages and disadvantages of embryo screening.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Why identical twins will start to show variation.</li> <li>➤ How to describe the steps that take place during evolution by natural selection.</li> <li>➤ Why humans have used selective breeding.</li> <li>➤ How fossils are evidence for evolution by natural selection.</li> </ul>
They will know how to ( <i>key skills</i> )					
<ul style="list-style-type: none"> <li>➤ Safely use a potometer to estimate the volume of water lost by a plant.</li> <li>➤ Identify the dependent, independent and control variables in the investigation.</li> <li>➤ Calculate the number of stomata on a given area of leaf.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Describe an experiment to prove that plants carry out photosynthesis.</li> <li>➤ Describe and explain the technological applications of anaerobic respiration in the production of food and drink.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Follow the rules needed to prepare an uncontaminated culture.</li> <li>➤ Explain what is meant by exponential growth and analyse a graph showing it.</li> <li>➤ Measure the diameter of clear areas around colonies.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Recognise/draw/interpret diagrams on the nervous system.</li> <li>➤ Use models in explanations of how the synapse works.</li> <li>➤ Interpret and explain diagrams of negative feedback control.</li> <li>➤ Plan and carry out an investigation into the effect of light on plant growth.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use Punnett squares and family trees to understand genetic inheritance.</li> <li>➤ Use ratios, fractions and percentages.</li> <li>➤ Recognise/draw/interpret genetic diagrams of mitosis and meiosis.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use ratios, fractions and percentages to display data from Gregor Mendel's experiments.</li> <li>➤ Use a scatter diagram to identify a correlation between two variables e.g. area and number of species.</li> </ul>



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<b>Introduction to ecology (9 lessons)</b>		<b>Cycling materials (3 lessons)</b>		<b>Biodiversity (6 lessons)</b>			
<b>Use a quadrat to estimate the population size of a plant species</b>		<b>Use a diagram of the carbon cycle to describe the main processes involved</b>		<b>Evaluate the impact that humans have on ecosystems and species of plants and animals</b>			
<b>Food production (Biology) (4 lessons)</b>		<b>Evaluate the use of technology in food production</b>					
By the end of this topic pupils will know ( <i>key knowledge, including tier 3 vocabulary</i> )							
<ul style="list-style-type: none"> <li>➤ An ecosystem is the interaction of a community of living organisms with the non-living (abiotic) parts of their environment.</li> <li>➤ A range of experimental methods using transects and quadrats is used by ecologists to determine the distribution and abundance of species in an ecosystem.</li> <li>➤ Organisms, including microorganisms, have features (adaptations) that enable them to survive in the conditions in which they normally live.</li> </ul> <p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>➤ Interdependence.</li> <li>➤ Quadrat</li> <li>➤ Sample size</li> <li>➤ Quantitative sampling</li> <li>➤ Transect</li> <li>➤ Competition</li> <li>➤ Adaptations</li> <li>➤ Extremophiles</li> <li>➤ Biomass</li> </ul>		<ul style="list-style-type: none"> <li>➤ Material in the living world is recycled to provide building blocks for future organisms.</li> <li>➤ Decay of dead animals and plants by microorganisms returns carbon to the atmosphere as carbon dioxide and mineral ions to the soil.</li> <li>➤ Anaerobic decay produces methane gas. Biogas generators can be used to produce methane gas as a fuel.</li> <li>➤ Factors that affect the rate of decay of organic matter are – temperature, oxygen availability, and moisture levels.</li> </ul> <p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>➤ Decomposers</li> <li>➤ Carbon cycle</li> <li>➤ Nitrogen cycle</li> <li>➤ Combustion</li> <li>➤ Respiration</li> </ul>		<ul style="list-style-type: none"> <li>➤ Biodiversity is the variety of all the different species of organisms on Earth, or within an ecosystem.</li> <li>➤ High biodiversity helps ensure the stability of ecosystems by reducing the dependence of one species on another for food and shelter.</li> <li>➤ Humans reduce the amount of land available for other animals and plants by building, quarrying, farming, and dumping waste.</li> <li>➤ The destruction of peat bogs and other areas of peat to produce garden compost reduces the area of this habitat and thus the biodiversity associated with it.</li> </ul> <p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>➤ Biodiversity</li> <li>➤ Global warming</li> <li>➤ Recycling</li> <li>➤ Greenhouse effect</li> <li>➤ Deforestation</li> </ul>		<ul style="list-style-type: none"> <li>➤ The efficiency of food production can be improved by restricting energy transfer from food animals to the environment. This can be done by limiting their movement and by controlling the temperature of their surroundings.</li> <li>➤ Fish stocks in the oceans are declining. It is important to maintain fish stocks at a level where breeding continues or certain species may disappear altogether.</li> <li>➤ Genetically modified crops could provide more food or food with an improved nutritional value.</li> </ul> <p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>➤ Sustainable</li> <li>➤ Biotechnology</li> <li>➤ Mycoprotein</li> <li>➤ Biomass</li> </ul>	

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Introduction to ecology (9 lessons)		Cycling materials (3 lessons)		Biodiversity (6 lessons)		Food production (Biology) (4 lessons)	
Use a quadrat to estimate the population size of a plant species		Use a diagram of the carbon cycle to describe the main processes involved		Evaluate the impact that humans have on ecosystems and species of plants and animals		Evaluate the use of technology in food production	
They will understand ( <i>key concepts</i> )							
<ul style="list-style-type: none"> <li>➤ How to describe what a stable community is and give an example.</li> <li>➤ How to suggest factors that plants and animals are competing for in a given habitat.</li> <li>➤ How animals are adapted to live in hot, dry, and cold habitats.</li> <li>➤ How to describe what happens to a population in a food web when another population changes.</li> </ul>		<ul style="list-style-type: none"> <li>➤ How substances change as they decay.</li> <li>➤ How to explain the links between photosynthesis, respiration, and combustion in the carbon cycle.</li> <li>➤ How to apply factors which affect the rate of decay to real life situations (e.g. compost making, preserving food).</li> </ul>		<ul style="list-style-type: none"> <li>➤ How to describe some effects of human population growth.</li> <li>➤ How to describe the processes of eutrophication and bioaccumulation.</li> <li>➤ How pesticides in water can kill top predators in food chains.</li> <li>➤ Predict and explain how an environmental change will affect the distribution of an organism.</li> </ul>		<ul style="list-style-type: none"> <li>➤ How factors affect food security.</li> <li>➤ How to list some advantages and disadvantages of free-range and factory farming of chickens.</li> <li>➤ How mycoprotein is produced.</li> <li>➤ How to compare and contrast the production of mycoprotein with intensive farming.</li> </ul>	
They will know how to ( <i>key skills</i> )							
<ul style="list-style-type: none"> <li>➤ Design a method to estimate a population using a sampling technique.</li> <li>➤ Calculate total population of a plant species.</li> <li>➤ Plot data as a line graph and explain the pattern of predator and prey populations.</li> </ul>		<ul style="list-style-type: none"> <li>➤ Write balanced symbol equations for photosynthesis, respiration, and combustion.</li> <li>➤ Calculate percentage change and rate of decay.</li> </ul>		<ul style="list-style-type: none"> <li>➤ Analyse and interpret data and information concerning human population growth.</li> <li>➤ Draw conclusions from data.</li> <li>➤ Analyse data to describe a trend in deforestation rate, and give an explanation.</li> </ul>		<ul style="list-style-type: none"> <li>➤ Present information based on research.</li> <li>➤ Use viewpoints from a range of people during a debate on farming.</li> </ul>	