

# Year 10: Combined Biology

**Curriculum Intent:** Year 10 Biology tackles more complex ideas and concepts in the subject. It builds on the key knowledge from years 7,8 and 9 to link together all the areas of the subject. The learning journey goes from the microscopic; looking at cell level systems and processes within cells such as mitosis, through organism and community level systems, to larger scale global issues facing the world of biology. Procedural knowledge and practical skills are developed further, building on experience with microscopy, osmosis and active transport experiments and sampling. The curriculum in year 10 aims to bring everything together so that students have a complete understanding of the Biology aspect of the Combined Science course.



	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
<b>Key ideas and Sequence of Learning</b>	<p><b>Module B1- Cell-level systems</b></p> <ul style="list-style-type: none"> <li>• Electron microscopy</li> <li>• PAG B1: Microscopy</li> <li>• Aerobic and anaerobic respiration</li> <li>• Photosynthesis, including experiments.</li> <li>• Factors affecting Photosynthesis, including limiting factors.</li> </ul> <p><b>Module B2 – Scaling up</b></p> <ul style="list-style-type: none"> <li>• Review diffusion and osmosis</li> <li>• Active transport</li> <li>• Mitosis</li> <li>• Cell differentiation.</li> <li>• Stem cells</li> </ul>	<p><b>Module B2: Scaling up level systems</b></p> <ul style="list-style-type: none"> <li>• Transport systems in plants</li> <li>• Transpiration stream</li> <li>• Factors affecting transpiration</li> </ul> <p><b>Module 3 – Organism level systems</b></p> <ul style="list-style-type: none"> <li>• Nervous system recap</li> <li>• Hormones and negative feedback recap</li> <li>• Menstrual cycle</li> <li>• Controlling reproduction</li> <li>• Using hormones to treat infertility</li> </ul> <p><b>Module B5- Genes, inheritance and selection</b></p> <ul style="list-style-type: none"> <li>• Recap reproduction and mitosis</li> </ul>	<p><b>Module B6 – Global Challenges</b></p> <ul style="list-style-type: none"> <li>• Genetic engineering in agriculture</li> <li>• Producing GE organisms</li> <li>• Biotech in farming</li> <li>• Plant disease</li> <li>• Prevention and treatment of disease</li> <li>• New Medicines</li> <li>• Modern advances in medicine 1 &amp; 2</li> </ul>	<p><b>Module 4 – Community level systems</b></p> <ul style="list-style-type: none"> <li>• Nutrient cycling</li> <li>• Carbon cycle</li> </ul> <p><b>Module B6 – Global Challenges</b></p> <ul style="list-style-type: none"> <li>• Sampling techniques 1 &amp; 2</li> <li>• Loss of Biodiversity</li> <li>• Increasing Biodiversity</li> <li>• Maintaining biodiversity</li> </ul>	<p>Students sit their EoY exams.</p> <p>Students will complete practical investigations.</p> <p>Students will review their PPE exam papers.</p>	<p><u><b>Separate Science Students</b></u></p> <p><b>Module B6 – Global Challenges</b></p> <ul style="list-style-type: none"> <li>• Decomposition</li> <li>• Aseptic techniques</li> <li>• Plant defences</li> <li>• Monoclonal antibodies</li> </ul> <p><u><b>Combined Science Students</b></u></p> <p>Recap and reteach of modules 1 and 2: Enzymes, Photosynthesis, diffusion, osmosis and active transport</p>

		<ul style="list-style-type: none"> <li>• Meiosis</li> <li>• Genetic crosses</li> <li>• Mutations</li> <li>• Natural Selection</li> <li>• Evidence of evolution</li> <li>• Classification systems</li> </ul>				
<b>Key Questions</b>	<ol style="list-style-type: none"> <li>1. What happens in cells?</li> <li>2. What is the difference between aerobic and anaerobic respiration?</li> <li>3. Which factors have an impact on the rate of photosynthesis?</li> <li>4. Which processes help to transport substances across membranes.</li> <li>5. How do cells differentiate.</li> <li>6. How does body cells multiply.</li> <li>7. What is the importance of stem cells</li> </ol>	<ol style="list-style-type: none"> <li>1. How does plant transport water?</li> <li>2. What is the role of the nervous system and the hormone system in the human body.</li> <li>3. What is the role of hormones in reproduction</li> <li>4. How does human reproduction produce variation?</li> <li>5. What evidence is there for evolution</li> <li>6. How do we organise the natural world?</li> </ol>	<ol style="list-style-type: none"> <li>1. How have Scientific developments improved the prevention of disease?</li> <li>2. How do we produce a genetically engineered organisms and how is this advantageous to the human race?</li> <li>3. How do diseases spread?</li> <li>4. How do we stop disease spreading?</li> </ol>	<ol style="list-style-type: none"> <li>1. How are nutrients recycled through the environment?</li> <li>2. How is Human activity affecting the Earth's Biodiversity?</li> </ol>		<ol style="list-style-type: none"> <li>1. What is the difference between decomposers and detritivore?</li> <li>2. What factors affect the rate of decomposition.</li> <li>3. How do plants defend themselves against communicable diseases.</li> <li>4. How are plant diseases detected in the field?</li> <li>5. What are monoclonal antibodies?</li> <li>6. How are monoclonal antibodies produced?</li> <li>7. How are monoclonal antibodies used?</li> </ol>
<b>Vocabulary</b>	<ul style="list-style-type: none"> <li>• Eukaryotic cells.</li> <li>• Prokaryotic cells</li> <li>• Nucleus</li> </ul>	<ul style="list-style-type: none"> <li>• Xylem</li> <li>• Phloem</li> <li>• Translocation</li> <li>• Vascular Bundle</li> <li>• Transpiration</li> </ul>	<ul style="list-style-type: none"> <li>• Biological control</li> <li>• Biotechnology</li> <li>• Donor organism</li> <li>• Food security</li> <li>• Foreign genes</li> </ul>	<ul style="list-style-type: none"> <li>• Abiotic factors</li> <li>• Biomass</li> <li>• Biotic factors</li> <li>• Carbon cycle</li> <li>• Community</li> </ul>		(see Year 9 Schemes Of Learning's for combined vocabulary) <ul style="list-style-type: none"> <li>• Decomposers</li> <li>• Detritivore</li> </ul>

<ul style="list-style-type: none"> <li>• Cytoplasm</li> <li>• Cell membrane</li> <li>• Mitochondria</li> <li>• Chloroplast</li> <li>• Flagellum</li> <li>• Plasmid</li> <li>• Resolution</li> <li>• Magnification</li> <li>• Electron Microscope</li> <li>• Metabolic rate</li> <li>• Aerobic respiration.</li> <li>• Exothermic</li> <li>• Polymer</li> <li>• Monomer</li> <li>• Anaerobic respiration.</li> <li>• Fermentation</li> <li>• Chlorophyll</li> <li>• Endothermic</li> <li>• Limiting factors</li> <li>• Light Intensity</li> <li>• Diffusion</li> <li>• Osmosis</li> <li>• Concentration gradient</li> <li>• Water potential</li> <li>• Turgid</li> <li>• Plasmolysis</li> <li>• Flaccid</li> <li>• Lysis</li> <li>• Crenated</li> <li>• Cell cycle</li> <li>• DNA replication</li> <li>• Mitosis</li> <li>• Chromosomes</li> </ul>	<ul style="list-style-type: none"> <li>• Transpiration stream.</li> <li>• Stomata</li> <li>• Potometer.</li> <li>• Humidity</li> <li>• Stimulus</li> <li>• Receptors</li> <li>• Effectors</li> <li>• Sensory neurones</li> <li>• Motor neurones</li> <li>• Relay neurons</li> <li>• Endocrine glands</li> <li>• Target organs</li> <li>• Hypothalamus</li> <li>• Thyroid Gland</li> <li>• Thyroxine.</li> <li>• Homeostasis.</li> <li>• Adrenaline</li> <li>• Ovulation</li> <li>• Follicle-stimulating hormone</li> <li>• Oestrogen</li> <li>• Luteinising hormone</li> <li>• Progesterone</li> <li>• Contraception</li> <li>• Fertility</li> <li>• In Vitro Fertilisation</li> <li>• Dominant allele</li> <li>• Environmental variation</li> <li>• Fertilisation</li> <li>• Gametes</li> <li>• Sex cells</li> <li>• Genetic cross</li> </ul>	<ul style="list-style-type: none"> <li>• Gene pool</li> <li>• Genetic engineering</li> <li>• Host organism</li> <li>• Hydroponics</li> <li>• Intensive farming</li> <li>• Ligase enzymes</li> <li>• Organic farming</li> <li>• Restriction enzymes</li> <li>• Selective breeding</li> <li>• Sticky ends</li> <li>• Sustainable food production</li> <li>• Zone of inhibition</li> <li>• Vector</li> <li>• Antigens</li> <li>• Antiseptic</li> <li>• Antivirals</li> <li>• Aseptic technique</li> <li>• Clinical trial</li> <li>• Communicable disease</li> <li>• Contagious</li> <li>• Diagnosis</li> <li>• Disease</li> <li>• Droplet infection</li> <li>• Immunity</li> <li>• Incidence of a disease</li> <li>• Incubation period</li> <li>• Lymphocytes</li> <li>• Antitoxins</li> <li>• Monoclonal antibodies</li> <li>• Pathogen</li> <li>• Phagocytes</li> <li>• Placebo</li> <li>• Sterile</li> </ul>	<ul style="list-style-type: none"> <li>• Competition</li> <li>• Consumers</li> <li>• Decomposers</li> <li>• Detritivores</li> <li>• Ecosystem</li> <li>• Egestion</li> <li>• Excretion</li> <li>• Habitat</li> <li>• Interdependence</li> <li>• Mutualism</li> <li>• Parasitism</li> <li>• Population</li> <li>• Predation</li> <li>• Producers</li> <li>• Pyramid of biomass</li> <li>• Trophic level</li> <li>• Biodiversity</li> <li>• Capture-recapture</li> <li>• Conservation</li> <li>• Deforestation</li> <li>• Ecotourism</li> <li>• Endangered species</li> <li>• Extinct</li> <li>• Habitat</li> <li>• Identification key</li> <li>• Indicator species</li> <li>• Non-random sampling</li> <li>• Random sampling</li> <li>• Sample</li> <li>• Seed bank</li> </ul>	<ul style="list-style-type: none"> <li>• Physical defences</li> <li>• Chemical defences</li> <li>• Cuticle</li> <li>• Cell Wall</li> <li>• Insecticides</li> <li>• Antibacterial</li> <li>• Antifungal</li> <li>• Cyanide</li> <li>• Cutinases</li> <li>• Pyrethrins</li> <li>• Diagnosis</li> <li>• DNA analysis</li> <li>• Antigens</li> <li>• Monoclonal antibodies</li> <li>• Genetically modified</li> <li>• Hybridomas</li> <li>• Myelomas</li> <li>• Lymphocytes</li> <li>• Immune response</li> <li>• Antibodies</li> <li>• Pregnancy test</li> <li>• Antivirals</li> <li>• Antibiotics</li> <li>• Zone of inhibition</li> <li>• Aseptic technique</li> <li>• Sterile</li> <li>• Autoclave</li> </ul>
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<b>Practical Skills</b>	PAG B1: Microscopy PAG B4: Photosynthesis		<ul style="list-style-type: none"> <li>• PAG B5: Microbiology</li> </ul>	<ul style="list-style-type: none"> <li>• B2 PAG - Sampling</li> </ul>		<ul style="list-style-type: none"> <li>• PAG B7: Microbiology</li> </ul>