

<p style="text-align: center;"><b>CNCS</b>  <b>Year 10 Science: Curriculum Overview</b></p>				
<p><b>Rationale:</b> In Year 10 students will build on prior knowledge from KS3 and develop their skills in key foundation concepts in Biology ready for sitting the external examinations in term 3.1. Students will learn how to work safely in a lab and investigate scientific questions. Students will revisit and be introduced to a range of specific subject terminology, learning how to identify and discuss this appropriately. Furthermore, students will be given opportunities to develop their own personal responses to scientific problems and consider how to apply their knowledge to them</p>				
<p><b><u>A learner in Year 10 will know/ have studied:</u></b>  Key areas in all three sciences, this will build the foundation for further study in Biology. They will have worked in a lab and know the key safety rules to follow. They will have carried out key investigations to help with their understanding of the areas taught.</p>		<p><b><u>A learner in Year 10 will be able to:</u></b>  Work safety in lab and carry out investigations. They will be able to question and have begun to understand the world around them from the units studied. They will answer exam questions with confidence and skill.</p>		
Term	Outline	Assessment	Home Learning	Key Skills/ End Point
1	<p><b>B1 Cells and transport</b>  Students will</p> <ul style="list-style-type: none"> <li>compare different types of cells and microscopes and use a light microscope to view cells (Required Practical)</li> <li>describe the importance of cells becoming specialised through differentiation and the how this helps their function and describe how to prepare a sterile culture of bacteria (Required Practical) (LINKS TO B3)</li> <li>describe the stages of mitosis and where it fits in the process of the cell cycle, sources of stem cells and their uses</li> <li>describe the processes of diffusion, osmosis and active transport and examples of each type of transport in animals and plants and describe the effect of concentration of solution on osmosis in plant tissues (Required Practical)</li> <li>describe the structure of a leaf and the function of the tissues present and the process of transpiration by evaporation of water from the leaf</li> </ul>	<p><b><u>1.1 &amp; 1.2 Pit stops</u></b>  Cell Biology B1.1 (LA &amp; HA)  Cell biology B1.2 (LA &amp; HA)  Organisation B2.1 (LA &amp; HA)  Organisation B2.2 (LA &amp; HA)  Infection &amp; response B3 (LA &amp; HA)  Bioenergetics B4 (LA &amp; HA)</p> <p><b><u>1.2 End of term assessment (LA &amp; HA)</u></b></p> <p><b><u>Skills tested:</u></b></p> <p>AO1: Demonstrate knowledge and</p>	<p>Weekly content recall and application questions set on Educake</p>	<p><b>Skills:</b></p> <ul style="list-style-type: none"> <li>Recall of key knowledge through the use of low stakes testing.</li> <li>Application of knowledge to unfamiliar contexts through exam question modelling. Interpretation of diagrams used to represent key processes.</li> <li>Development of maths skills through converting units and calculating rate of photosynthesis.</li> <li>Describing and explaining of graphical data when investigating the effect of named factors on enzyme action, interpretation of data on diseases among the population and investigating the effect of named factors on rate of photosynthesis.</li> <li>Development of evaluative skills: use of stem cells to treat medical conditions; advantages and disadvantages of treatments for CHD</li> </ul>

	<p><b><u>P6 Waves</u></b></p> <p>Student will be able to:</p> <ul style="list-style-type: none"> <li>- Define the difference between transverse and longitudinal wave.</li> <li>- Calculate wave speed = wavelength x frequency</li> <li>- Investigate reflection and refraction to understand the properties of a wave</li> <li>- Investigate the ripple tank practical and apply the wave equation</li> <li>- State what sound waves are and how we hear sound. (HT only)</li> <li>- State what ultrasound and how is different from normal sound. (HT only)</li> <li>- State how seismic waves are generated and the difference between S and P waves (HT only)</li> <li>- Define electromagnetic waves and identifying how the wavelength/frequency differ</li> </ul> <p>Investigate how infrared radiation can be used to measure temperature differences</p>	<p>understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.</p>		<p>and advantages and disadvantages of monoclonal antibodies.</p> <ul style="list-style-type: none"> <li>• Development of practical skills during the RP activities; taking measurements, recording results, assessing risks.</li> </ul> <p><b>End point:</b></p> <ul style="list-style-type: none"> <li>• Students are able to recall key knowledge and apply this knowledge to exam questions from different areas.</li> <li>• Students can interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts.</li> <li>• Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate medical treatments.</li> </ul> <p><b>Skills:</b></p> <ul style="list-style-type: none"> <li>• Recall of key knowledge through the use of low stakes testing.</li> <li>• Application of knowledge to unfamiliar contexts through exam question modelling. Interpretation of diagrams used to represent key processed.</li> </ul>
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	<p><b><u>C7 Organic Chemistry</u></b> Students will investigate the variety of carbon compounds. This will branch into organic compounds studying compounds that are living, or once living.</p> <ul style="list-style-type: none"> <li>Define fossil fuel</li> <li>State the stages of crude oil formation</li> <li>Describe the process of crude oil formation</li> <li>State the uses of crude oil</li> <li>Describe the process of fractional distillation</li> <li>Discuss some of the properties of hydrocarbons and their uses</li> <li>Apply the knowledge to exam style questions</li> <li>Recall what is hydrocarbons</li> <li>State the general formula for alkanes</li> <li>Understand how to draw alkanes and name them</li> <li>To know how alkenes react with oxygen.</li> <li>To describe the reactions and conditions for addition of hydrogen, water and halogens to alkenes.</li> <li>To draw displayed formula of alkenes and the products of their addition reactions.</li> </ul> <p><b>B5 Homeostasis and response</b> Students will</p> <ul style="list-style-type: none"> <li>Describe homeostasis is the maintenance of internal conditions of the body, the sequence of a reflex arc and the function of reflex actions the structure of the CNS and describe how to investigate the effect of a named factor on reaction time (Required Practical)</li> <li>Describe the structure of the brain and explain why treating brain injury is difficult and how the brain can be studied</li> <li>Describe the structures and functions of the eye, explain how the pupil is involved in adapting to changing light levels, how the lens is involved in accommodation to focus on objects of</li> </ul>			<p>Students are able to recall key knowledge and apply this knowledge to exam questions from different areas.</p> <p>Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts.</p> <p>Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided</p>

	<p>different distances and how eye defects can be corrected using lenses</p> <ul style="list-style-type: none"> <li>Describe the ways our body responds to high or low temperatures in terms of: hairs on skin, blood vessels, sweat production, shivering</li> <li>Describe the location of the following organs in the endocrine system and their functions: pituitary gland, adrenal glands, ovaries, testes, thyroid gland, pancreas</li> <li>Describe the role of hormones</li> <li>Describe the impact of insulin and glucagon on blood glucose levels and the causes of Type 1 and 2 diabetes</li> <li>Describe the role of the kidney and ADH in producing water and maintaining water levels</li> <li>Describe the role of hormones involved in the menstrual cycle and their specific functions as well as how they interact with each other</li> <li>Describe methods of contraception, including role of hormones in oral contraceptives and how hormones can be used to treat infertility and the stages of IVF</li> <li>Describe the roles of thyroxine and adrenaline</li> <li>State examples of tropism in plants and how auxin is involved in phototropism and geotropism and the role of ethane and gibberellin</li> <li>Investigate how light/gravity affects the growth of seedlings (Required Practical)</li> <li></li> </ul> <p><b><u>C5 Energy changes</u></b></p> <p>Student will be able to:</p> <ul style="list-style-type: none"> <li>Describe the energy transfer during exothermic and endothermic</li> <li>Investigate a variable that affects temperature change</li> <li>Describe a chemical using energy profile diagram</li> <li>Calculate the bond energy and determining endothermic / exothermic reactions (HT only)</li> </ul>			
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	<ul style="list-style-type: none"> <li>Describe how hydrogen fuel cells and simple cells are made. (HT only)</li> </ul> <p>Compare the advantages and disadvantages of hydrogen fuel cells. (HT only)</p> <p><b><u>C8 Chemical Analysis</u></b></p> <p>Student will be able to:</p> <ul style="list-style-type: none"> <li>Describe pure and impure substances</li> <li>Describe the purpose of formulations</li> <li>Investigate the process of chromatography and interpret the results using <math>R_f</math> values</li> <li>Describe the chemical tests to identify common gases (<math>H_2</math>, <math>CO_2</math>, <math>Cl_2</math>, <math>O_2</math>)</li> <li>Describe the flame tests to identify metal ions</li> <li>Describe the tests to identify metal hydroxides</li> <li>Describe the tests to identify carbonates, sulfates and halides</li> <li>Investigate the identification of an unknown substance and analyse the results</li> </ul> <p>Describe the process of flame emission spectroscopy</p> <p><b><u>C9 Chemistry of the atmosphere</u></b></p> <p>Students will discover Earth's atmosphere and how it is forever changing. Students will study the complex problems we face and the possible solutions to them.</p>			
<b>2</b>	<p><b><u>P5a Forces</u></b></p> <p>Students will analyse forces in a variety of machines and instruments. They will be able to describe how these machines are used in modern life.</p>	<p><b><u>2.1 &amp; 2.2 Pit stops</u></b></p> <p>Ecology Pitstop B5.1 (LA &amp; HA)</p> <p>Ecology Pitstop B5.2 (LA &amp; HA)</p> <p>Ecology Pitstop B6.1 (LA &amp; HA)</p>	<p>Weekly content recall and application questions set on Educake</p>	<p><b>Skills:</b></p> <ul style="list-style-type: none"> <li>Recall of key knowledge through the use of low stakes testing.</li> <li>Application of knowledge to unfamiliar contexts through exam question modelling. Interpretation of diagrams used to represent the reflex arc.</li> </ul>

	<p><b>C3 Quantitative Chemistry</b> Students will use quantitative analysis skills to determine the purity of chemical samples. These observations will allow students to classify these reactions based on patterns and predictions on their behaviour</p> <p><b>B6 Inheritance, variation and evolution</b> Students will</p> <ul style="list-style-type: none"> <li>Describe the differences between sexual and asexual reproduction and the advantages and disadvantages of sexual and asexual reproduction</li> <li>Describe the stages of the cell cycle and the specific stages of meiosis</li> <li>Describe the structure of DNA</li> <li>Describe the structure of a protein and the possible effects of a mutation</li> <li>State the definitions of key terminology: gamete, chromosome, gene, allele, dominant, recessive, homozygous, heterozygous, genotype, phenotype</li> <li>Complete a punnet square diagram to predict characteristics of offspring and describe the inheritance of cystic fibrosis, polydactyly and gender</li> <li>Describe the causes of Variation and the processes of natural selection, selective breeding and genetic engineering <a href="#">(LINKS TO B7)</a></li> <li>Describe methods of cloning in plants and animals; adult cell cloning steps</li> <li>Compare Darwin and Lamarck's theories</li> <li>Describe the process of speciation</li> <li>Describe Mendel's role in our understanding of genetics</li> <li>Describe how fossils are evidence of evolution and how they are fossils may be formed</li> <li>Describe the factors leading to extinction</li> </ul>	<p>Ecology Pitstop B6.2 (LA &amp; HA) Ecology Pitstop B7.1 (LA &amp; HA) Ecology Pitstop B7.2 (LA &amp; HA)</p> <p><b><u>2.2 End of term assessment (LA &amp; HA)</u></b></p> <p>Paper 2 Biology Mock; Using the most recent secure paper. Knowledge coverage: B5 Homeostasis &amp; Response B6 inheritance, variation &amp; evolution B7 Ecology</p> <p><b><u>Skills tested:</u></b></p> <p>AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry,</p>		<ul style="list-style-type: none"> <li>Development of maths skills through converting units and calculating mean reaction times and calculating rate of decay, energy transfers between organisms and coverage of organisms in a certain habitat.</li> <li></li> <li>Describing and explaining of graphical data when investigating hormone levels/levels of substances in blood/urine. Interpretation of charts/diagrams to understand links between organisms and investigating factors affecting communities, predator-prey cycles, processes in the carbon cycle and statistics involving food security.</li> <li>Development of evaluative skills: advantages and disadvantages of mechanical devices/transplants to treat organ failure; evaluating the risks associated with IVF; benefits and concerns of GM crops; evaluating theories and understanding why they develop over time and the use of peat bogs to produce compost, implications of deforestation, farming and waste management, ethical implications of intensive farming.</li> <li>Development of practical skills during the RP activities; taking measurements, recording results, assessing risks.</li> </ul>
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	<ul style="list-style-type: none"> <li>Describe how antibiotic resistant bacteria develop <b>LINKS TO B3</b> and the advice Doctors should give to reduce rate of development of antibiotic resistance</li> <li>Describe the three-domain system and the hierarchy of the classification system</li> <li></li> </ul>	<p>techniques and procedures.</p> <p>AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.</p>		<p><b>End point:</b></p> <ul style="list-style-type: none"> <li>Students are able to recall key knowledge and apply this knowledge to exam questions from different areas.</li> <li>Students can interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts.</li> <li>Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate various theories/treatments/processes.</li> </ul>
	-			<p>Students are able to recall key knowledge and apply this knowledge to exam questions from different areas.</p> <p>Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts.</p> <p>Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided</p>
	<p><b><u>P5 Forces</u></b></p> <p>Students will analyse forces in a variety of machines and instruments. They will be able to describe how these machines are used in modern life.</p> <ul style="list-style-type: none"> <li>Define the terms scalar and vector</li> <li>Identify examples of scalar and vector quantities</li> <li>Calculate distance vs displacement</li> </ul>			<p>Students are able to recall key knowledge and apply this knowledge to exam questions from different areas.</p> <p>Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts.</p>

	<ul style="list-style-type: none"> <li>Identify contact and non-contact forces</li> <li>Understand that forces act in pairs</li> </ul> <p>Success criteria:</p> <ul style="list-style-type: none"> <li>Define mass and weight</li> <li>Explain why weight changes, but mass doesn't on different planets</li> <li>Recall and apply the weight equation</li> <li>Define the term resultant force</li> <li>Calculate resultant forces in a straight line</li> <li>Define the term work done</li> <li>Recall and apply the work done equation and relevant units</li> <li>Describe the effect of work being done to an object</li> <li>Define stopping distance;</li> <li>Explain how stopping distance is affected by thinking distance and braking distance in relation to forces;</li> <li>Interpret distance versus speed graphs</li> </ul>			Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided
				<p>Students are able to recall key knowledge and apply this knowledge to exam questions from different areas.</p> <p>Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts.</p> <p>Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided</p>
	<p><b>C6 The Rate and extent of chemical change</b></p> <p><b>Students will</b></p> <ul style="list-style-type: none"> <li>- Recap states of matter</li> <li>- Calculate the mean rate of reaction</li> <li>- Draw and interpret rate of reaction graphs</li> <li>- State the factors which increase the rate of reaction</li> </ul>			



	<ul style="list-style-type: none"> <li>- Describe how the factors affect the rate of reaction</li> <li>- Explain how the factors affect the rate of reaction</li> <li>- Describe how to carry out the practical</li> <li>- Understand the apparatus, method and variables in the practical</li> <li>- Obtain a set of results</li> <li>- Describe the concentration affects the rate of reaction</li> <li>- Explain how concentration affects the rate of reaction</li> <li>- Investigate the effect of a catalyst and define the activation energy.</li> <li>- Students should be able to explain catalytic action in terms of activation energy.</li> <li>- <b>Identify</b> reversible reactions</li> <li>- <b>Describe</b> what a reversible reaction is and the energy changes in a reversible reaction</li> </ul>			
<b>3</b>	<p><b>B7 Ecology</b> Students will</p> <ul style="list-style-type: none"> <li>• Describe the resources animals and plants compete for, the factors affect communities, the levels of organisation in an ecosystem: organism, population, community, ecosystem, and the difference between biotic and abiotic factors and examples of each</li> <li>• Describe the adaptations of organisms to allow them to survive in a particular environment e.g. cold, hot and that extremophiles are organisms that live in extreme conditions</li> <li>• Describe how the abundance of organisms can be estimated/investigated using quadrats (Required Practical)</li> <li>• Describe the processes that occur in the carbon cycle, including: photosynthesis, respiration, decay and combustion, the processes in the water cycle, including evaporation and precipitation and the conditions required for decomposition</li> <li>• Investigate how the rate of decay of milk can be investigated (Required Practical)</li> </ul>	<p><b>3.1 &amp; 3.2 Pit stops</b> These will reflect the needs of pupils based on gap analysis of mocks and the revision programme in place</p> <p><b>3.2 End of term assessment</b> Pupils will sit external examinations in Biology</p> <p><b>Skills tested:</b> AO1: Demonstrate knowledge and understanding of: scientific ideas;</p>	Exam practice booklets and content recall questions	<p>Students are able to recall key knowledge and apply this knowledge to exam questions from different areas.</p> <p>Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts.</p> <p>Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided</p>

	<ul style="list-style-type: none"> <li>Describe the use of biogas generators in producing fuels</li> <li>How changes to temperature, levels of atmospheric gases and water availability affect distribution of organisms, that biodiversity is the variety of all different species in an ecosystem and why it is important, the role of waste management, land use, deforestation and global warming in affecting biodiversity and the ways that we can help to maintain biodiversity</li> </ul> <p>How to use trophic levels to draw pyramids of biomass, how biomass/energy is lost as you move along the food chain, what food security is and how we are threatening it globally, how farmers can increase the efficiency of food production by controlling temperature and amount of movement, how fishing can be made sustainable, how fungi are used to produce mycoprotein and how bacteria can be used to mass produce hormones like insulin <a href="#">(LINKS TO B6)</a></p> <p><b><u>P7 Magnetism and electromagnetism</u></b></p> <p>Student will be able to:</p> <ul style="list-style-type: none"> <li>Describe how a magnet works and interact</li> <li>Explain what a solenoid is and how they work</li> <li>Describe how the magnetic effect of a current can be demonstrated and draw a magnetic field pattern</li> <li>Apply Fleming's left-hand rule (HT only)</li> <li>Explain what is the motor effect (HT only)</li> <li>Describe the generator effect (HT only)</li> </ul> <p>Describe how a transformer works (HT only)</p>	<p>scientific techniques and procedures.</p> <p>AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.</p> <p>AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.</p>		
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	<p><b><u>C10 Using resources</u></b>  Student will be able to:</p> <ul style="list-style-type: none"> <li>• Describe what sustainable development is</li> <li>• Describe the difference between potable and pure water</li> <li>• Investigate ways to purify water and analyse the results</li> <li>• Discuss how we obtain potable water from waster/ground and salt water</li> <li>• Evaluate alternative methods of metal extraction (HT only)</li> <li>• Understand the stage so life cycle assessments.</li> <li>• Evaluate ways of reducing the use of limited resources</li> <li>• Investigate the conditions for rusting</li> <li>• Evaluate the composition and uses of alloy</li> <li>• Compare the differences between thermosoftening and thermosetting polymers</li> <li>• Describe the Haber process (HT and LT) and apply equilibrium to Haber process (HT only)</li> <li>• Compare the industrial production of fertilisers (NPK) in compounds</li> </ul> <p><b><u>P2 Electricity</u></b>  Students will investigate the fundamental property of electric charge and will analyse the principles behind modern circuits. Students will also discover the inner workings of the national grid and how electricity is distributed to homes and factories.</p> <ul style="list-style-type: none"> <li>• Identify problems with circuits</li> <li>• Draw common circuit symbols</li> <li>• Describe how common circuit components works</li> <li>• Recognise that potential difference depends upon</li> <li>• Describe how current can be affected by resistance</li> <li>• Investigate factors that affect resistance</li> <li>• Write up a practical method:</li> <li>• The length of a wire at constant temperature, use appropriate apparatus to measure and record length, current, potential difference and resistance.</li> <li>• Analyse results with appropriate calculations and graphs</li> </ul>			
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	<p>Students will follow a bespoke revision programme until the end of the external assessments in June</p> <p>Students will then follow a re-cap and review programme of year nine content for the last three weeks of year 10. This will allow for a rapid start in year 11 as pupils prepare for their GCSE's in Chemistry and Physics.</p> <p><b>P8: Space</b></p> <ul style="list-style-type: none"> <li>• Recall what our solar system is made up of,</li> <li>• Explain how, at the start of a star's life cycle, the dust and gas drawn together by gravity causes fusion reactions,</li> <li>• Explain that fusion reactions lead to an equilibrium between the gravitational collapse of a star and the expansion of a star due to fusion energy</li> <li>• Recognise a star has a life cycle,</li> <li>• Know the stages of the life cycle of different sized stars,</li> <li>• Explain how fusion processes lead to the formation of new elements.</li> <li>• Recall what forces keeps planets and satellites in a circular orbit,</li> <li>• Describe the similarities and distinctions between the planets, their moons, and artificial satellites,</li> <li>• Explain how gravity can lead to a change in velocity but not speed of a circular orbit,</li> <li>• Explain for a stable orbit, the radius must change if the speed changes</li> <li>• Recall the structure of waves, explain what red shift is, state what the Big Bang theory is,</li> <li>• Explain evidence of the expanding Universe,</li> <li>• Explain how red-shift provides evidence of the Big Bang theory,</li> <li>• Recall that there is still much about the Universe that isn't understood</li> </ul>			
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Visual Hexagon - space

**PITSTOP 1:**

Our solar system, The life cycle of a star, Orbital motion, natural and artificial satellites, Red-shift (physics only)

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