



## Year 11 Curriculum Overview

**Rationale: The Year 11 curriculum is designed to give students an introduction to global challenges. Students will explore a range of modules including Powering the Earth, Chemical Processes and Products, Biodiversity and Disease. The nature of these modules allows students to become open thinkers, inquisitive and investigate the world around them, whilst developing skills that will prepare them for life beyond the classroom.**

*\*Science units are taught on a rotation basis between each group*

| Term/Length of Time  | Outline  | Assessment/Teacher Feedback Opportunities  | Homework and Literacy resources  |
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| Autumn<br><br><b>B6</b><br>25 lessons for combined and 32 for triple Science (including assessment and responding to feedback lessons) | <p><u>The challenges of life:</u><br/>           Students should be familiar with the role of diffusion in the movement of materials in and between cells. They should also be familiar with the human gaseous exchange system. When organisms become multicellular, highly adapted structures are needed including gaseous exchange surfaces and transport systems, enabling living processes to be performed effectively.</p> <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> <li>• explain every day and technological applications of science</li> <li>• presenting observations using appropriate methods</li> <li>• Use ratios, fractions and percentages</li> <li>• Investigating heart structure by dissection</li> <li>• Investigating factors that affect pulse rate</li> </ul> <p><u>Coordination and control – the nervous system</u></p> | <p><b>B6</b> end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework.</p> | <p>Homework is set weekly and contains a mixture of simple recall exam-style questions often followed with a more detailed application based exam style question(s).<br/>           All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher approximately once every 2 weeks</p> <p><b>Optional homework tasks and Literacy resources:</b></p> <p>SoL on science shared area, including PowerPoints, details of practical investigations, worksheets, revision resources, a range of AFL (assessment for learning) activities, research based tasks, simple model making, reports, short answer questions, newspaper style write-ups as well as homework.</p> |

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|  | <p>Students should have a concept of the hierarchy of multicellular organisms from cells to tissues to organs to systems to organisms.</p> <p>The human nervous system is an important part of how the body communicates with itself and also receives information from its surroundings.</p> <p><b>Understanding the structure of the eye allows us to explain some eye defects.</b></p> <p><b>Investigating brain function has limitations.</b></p> <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> <li>• communicating the scientific rationale for investigations, methods used, findings and reasoned conclusions</li> <li>• explain everyday and technological applications of science</li> <li>• evaluate risks both in practical science and the wider societal context</li> <li>• Investigation of eye structure by dissection</li> <li>• Research into a study of brain injury</li> </ul> <p><u>Coordination and control – the endocrine system</u></p> <p>Students should be aware of a number of hormones including adrenaline and insulin.</p> <p>Hormones are chemical messengers. In animals, hormones are transported around the body in the blood and affect target tissues and organs. Hormones have a variety of roles in the human body, including controlling reproduction. Plant hormones are chemicals that regulate plant growth and development. They can be used in agriculture to control the rate of growth.</p> |  | <p>The Sciences offer many opportunities to develop and extend students' literacy skills. There is a large amount of new, subject-specific vocabulary, and so each unit includes a PLC (Personnel Learning checklist) which students will engage with throughout the unit. Students will use texts to find out information for themselves, using the functional layout of such texts, including index, contents and glossary sections of text books used in class, and also at home in an online format. Students will also review and connect information within topics.</p> <p>Useful websites:</p> <p><a href="http://www.bbcbitesize.co.uk">www.bbcbitesize.co.uk</a></p> <p><a href="http://www.senecalearning.com">www.senecalearning.com</a></p> <p><a href="https://www.physicsandmathstutor.com/">https://www.physicsandmathstutor.com/</a></p> <p><a href="https://www.footprints-science.co.uk/">https://www.footprints-science.co.uk/</a></p> <p><a href="https://www.youtube.com/@Freesciencelessons">https://www.youtube.com/@Freesciencelessons</a></p> |
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|  | <p><b>Understanding the effects of plant hormones gives commercial use values.</b></p> <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> <li>• Construct and interpret frequency tables and diagrams, bar charts and histograms</li> <li>• Translate information between graphical and numeric form</li> <li>• Research into hormonal treatments for infertility</li> </ul> <p><u>Maintaining internal environments</u></p> <p>Students will build on the knowledge and understanding gained in coordination and control when considering the topics in this section.</p> <p>Homeostasis is crucial to the regulation of internal environments and enables organisms to adapt to change, both internally and externally. <b>Internal temperature</b>, blood sugar levels and <b>osmotic balance are regulated by a number of organs and systems working together.</b></p> <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> <li>• use scientific vocabulary, terminology and definitions</li> <li>• translating data from one form to another</li> </ul> <p>Students should be familiar with the idea of a food webs. They should also recognise that organisms affect their environment and are affected by it.</p> <p>Microorganisms play an important role in the continuous cycling of chemicals in ecosystems. Biotic and abiotic factors interact in an ecosystem and have an effect on communities.</p> |  |  |
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|  | <p>Living organisms form populations of single species, communities of many species and are part of ecosystems. Living organisms are interdependent and show adaptations to their environment. Feeding relationships reflect the stability of an ecosystem.</p> <p><b>The efficiency of biomass through the ecosystem decreases at each stage.</b></p> <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> <li>• Use ratios, fractions and percentages</li> <li>• Construct and interpret frequency tables and diagrams, bar charts and histograms</li> <li>• translating data from one form to another</li> </ul> <p><u>Inheritance</u></p> <p>Students should be familiar with the process by which genetic information is passed from one generation to the next. They should recognise a simple model of chromosomes, genes and DNA.</p> <p>Inheritance relies on genetic information being passed from one generation to the next, whether sexually or asexually. The characteristics of a living organism are influenced by genes and its interaction with the environment.</p> |  |  |
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|  | <p><b>Changes to the genetic information may affect characteristics.</b><br/> <b>The understanding of genetics has changed over time.</b></p> <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> <li>• understand how scientific methods and theories develop over time</li> <li>• discuss ethical issues arising from developments in science</li> <li>• Use ratios, fractions and percentages</li> <li>• Understand simple probability</li> <li>• Translate information between graphical and numeric form</li> </ul> <p><u>Natural selection and evolution</u></p> <p>Students should appreciate that changes in the environment can leave some individuals, or even some entire species, unable to compete and reproduce leading to extinction. Variations and changes in the environment drive the process of natural selection, leading to changes in the characteristics of populations. Evolution accounts for both biodiversity and how organisms are all related to varying degrees.</p> <p><b>Key individuals have played important roles in the development of our understanding of genetics.</b></p> |  |  |
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|  | <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> <li>• use models to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts</li> <li>• understand the power and limitations of science</li> <li>• make decisions based on the evaluation of evidence and arguments</li> </ul> <p><u>Monitoring and maintaining the environment</u></p> <p>Students should be familiar with B4; ecosystems and the various ways organisms interact. They should understand how biotic and abiotic factors influence communities. Students should also be familiar with the gases of the atmosphere from Key Stage 3.</p> <p>Living organisms interact with each other, the environment and with humans in many different ways. If the variety of life is to be maintained we must actively manage our interactions with the environment. We must monitor our environment, collecting and interpreting information about the natural world, to identify patterns and relate possible cause and effect.</p> <p><b>Evaluating the evidence for the impact of the environment, helps us to understand the distribution of organisms.</b></p> |  |  |
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|  | <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> <li>• Construct and interpret frequency tables and diagrams, bar charts and histograms</li> <li>• Understand the principles of sampling as applied to scientific data</li> <li>• presenting observations using appropriate methods</li> <li>• Investigation of ecological sampling methods, such as, quadrats or pitfall traps.</li> </ul> <p><u>Feeding the human race</u><br/> Students should be familiar with the content of a healthy human diet and the consequences of imbalances in a healthy daily diet. Their knowledge and understanding from topics B1, B4 and B5 will also be drawn together in this topic. This includes the organisation of DNA, what plants require enabling them to photosynthesise, interactions between species and the idea of variability within species and subsequent selection of characteristics.<br/> The human population is increasing rapidly and with this comes a need for more food. Biologists are seeking to tackle this increased demand, which will lead to an improvement in the lives of many people around the world. However, there are many things to consider in achieving this aim, not least the impact on ecosystems.<br/> <b>There is much debate surrounding the use of gene technology as a potential solution to the problem of food security.</b></p> <p><u>Skill developed:</u></p> <ul style="list-style-type: none"> <li>• understand the power and limitations of science</li> </ul> |  |  |
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|  | <ul style="list-style-type: none"> <li>• discuss ethical issues arising from developments in science</li> <li>• evaluate associated personal, social, economic and environmental implications</li> <li>• Translate information between graphical and numeric form</li> </ul> <p><u>Monitoring and maintaining health</u></p> <p>Students should be familiar with the effects of ‘recreational’ drug, the impact of exercise, asthma and smoking on the gas exchange system and the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. Diseases affect the health of populations of both humans and plants. <b>Scientists are constantly on the lookout for ways detecting and identifying plant disease.</b> The prevention of disease in plants is important so that we are able to grow healthy plants enabling us to feed ourselves and enhance our environment. The understanding of how disease is spread, how our bodies defend themselves against disease and how immunity is achieved is essential to enable us to combat potentially fatal diseases spreading throughout whole populations. Non-communicable diseases also have an impact on the health of the population. The prevention of these diseases is frequently discussed in the media, with advice being given to us on how to reduce our risk of contracting these diseases through our life-style choices and discussion of new technologies.</p> <p><b>Monoclonal antibodies have many important uses, such as potentially treating disease.</b></p> |  |  |
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|   | <p><u>Skills development:</u></p> <ul style="list-style-type: none"> <li>• Investigation into growth bacterial cultures using aseptic techniques</li> <li>• Calculate areas of triangles and rectangles, surface areas and volumes of cubes.</li> <li>• Understand the principles of sampling as applied to scientific data</li> <li>• discuss ethical issues arising from developments in science</li> </ul>   |  |  |
| <p><b>Chemistry C6</b><br/>16 lessons combined and 36 lesson triple science (including assessment and responding to feedback lessons)</p> | <p><u>Improving Processes and Products</u></p> <p>In this section students will be familiar with the advancements in industry and how it is continually looking to make products that have a better performance and are sustainable to produce. This section also explores the extraction of raw materials and their use in making new products. <b>Students should be familiar with the properties of ceramics, polymers, composites and alloys as well as the chemical process of corrosion and how to mitigate this. Students will be familiar with the Haber and Contact processes and the compromises made in these chemical industries.</b></p> <p><u>Skills</u></p> <ul style="list-style-type: none"> <li>• Evaluate associated personal, social, economic and environmental implications</li> <li>• <b>Make decisions based on the evaluation of evidence and arguments</b></li> </ul> | <p><b>C6</b> end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework.</p> | <p>Homework is set weekly and contains a mixture of simple recall exam-style questions often followed with a more detailed application based exam style question(s). All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher approximately once every 2 weeks</p> <p><b>Optional homework tasks and Literacy resources:</b></p> <p>SoL on science shared area, including PowerPoints, details of practical investigations, worksheets, revision resources, a range of AFL (assessment for learning) activities, research based tasks, simple model making, reports, short</p> |

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|  | <ul style="list-style-type: none"> <li>• <b>Evaluate methods and suggest possible improvements and further investigations</b></li> <li>• Use scientific vocabulary, terminology and definitions</li> </ul> <p><u>Organic Chemistry</u></p> <p>Students will be familiar with crude oil and how this is separated in the fractional distillation process and then cracked to make more useful products.</p> <p><b>Students will be familiar with 4 main groups in organic chemistry; alkanes, alkenes, alcohols and carboxylic acids as well as addition and condensation polymers. They will learn the displayed formula, properties and reactions of these groups.</b></p> <p><u>Skills</u></p> <ul style="list-style-type: none"> <li>• <b>Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects</b></li> <li>• Use scientific vocabulary, terminology and definitions</li> <li>• Discuss ethical issues arising from developments in science</li> </ul> <p><u>Interpreting and Interacting with Earth Systems</u></p> <p>Students will deepen their knowledge and understanding of the structure of materials and the improvement of chemical processes which has increased our ability to interpret and understand chemical and earth systems. Understanding how we interact with them is very important to our survival as a species. This section starts with the history of the atmosphere and moves on to how human activity could be</p> |  | <p>answer questions, newspaper style write-ups as well as homework.</p> <p>The Sciences offer many opportunities to develop and extend students' literacy skills. There is a large amount of new, subject-specific vocabulary, and so each unit includes a PLC (Personnel Learning checklist) which students will engage with throughout the unit. Students will use texts to find out information for themselves, using the functional layout of such texts, including index, contents and glossary sections of text books used in class, and also at home in an online format. Students will also review and connect information within topics.</p> <p>Useful websites:<br/> <a href="http://www.bbcbitesize.co.uk">www.bbcbitesize.co.uk</a><br/> <a href="http://www.senecalearning.com">www.senecalearning.com</a><br/> <a href="https://www.physicsandmathstutor.com/">https://www.physicsandmathstutor.com/</a><br/> <a href="https://www.footprints-science.co.uk/">https://www.footprints-science.co.uk/</a><br/> <a href="https://www.youtube.com/@Freesciencelessons">https://www.youtube.com/@Freesciencelessons</a></p> |
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|  | <p>affecting its composition and the impact of human activity on the climate.</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> <li>• Construct and interpret frequency tables and diagrams, bar charts and histograms</li> <li>• Translate information between graphical and numeric form</li> <li>• Interpreting observations and other data</li> <li>• Discuss ethical issues arising from developments in science</li> <li>• Explain every day and technological applications of science</li> </ul>  |   |  |
| <p><b>P6 (Triple P8)</b><br/>12 lessons combined and 17 lessons triple science (including assessment and responding to feedback lessons)</p> | <p><u>Physics on the Move</u><br/>Pupils should be familiar with how forces affect motion of objects. Learners will use their knowledge of forces and motion to develop their ideas about how objects are affected by external factors. They will develop a better understanding of these external factors to be able to understand how the design of objects such as cars may be modified to operate more safely.</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> <li>• plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena</li> <li>• translating data from one form to another</li> <li>• carrying out and representing mathematical and statistical analysis</li> <li>• being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility</li> </ul> | <p><b>P6 (P8)</b> end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework.</p> | <p>Homework is set weekly and contains a mixture of simple recall exam-style questions often followed with a more detailed application based exam style question(s).<br/>All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher approximately once every 2 weeks</p> <p><b>Optional homework tasks and Literacy resources:</b></p> <p>SoL on science shared area, including PowerPoints, details of practical investigations, worksheets, revision resources, a range of AFL (assessment for learning) activities, research based tasks, simple model making, reports, short</p> |

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|  | <p><u>Powering Earth</u><br/>Students should already be familiar with renewable and non-renewable energy sources. Consideration will be given to the use of non-renewable and renewable sources and the problems that are faced in the efficient transportation of electricity to homes and businesses. Safe use of electricity in the home is also covered in this topic.</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> <li>• understand the power and limitations of science</li> <li>• discuss ethical issues arising from developments in science</li> <li>• explain everyday and technological applications of science</li> <li>• evaluate risks both in practical science and the wider societal context</li> </ul> <p><u>Beyond Earth</u><br/>Learners should already be familiar with the bodies within our own solar system and the behaviour of satellites. In this astrophysics topic pupils will look in more detail at how we can investigate the characteristics of planets. To begin with learners will investigate bodies that are close to our own planet and consider factors that affect natural and artificial satellites. The topic then moves onto considering bodies within the universe, and will apply their knowledge of fusion processes to understand the life cycle of a star and waves to consider black body radiation. The Big Bang theory will be studied and the evidence that supports it as a scientific theory.</p> |  | <p>answer questions, newspaper style write-ups as well as homework.</p> <p>The Sciences offer many opportunities to develop and extend students' literacy skills. There is a large amount of new, subject-specific vocabulary, and so each unit includes a PLC (Personnel Learning checklist) which students will engage with throughout the unit. Students will use texts to find out information for themselves, using the functional layout of such texts, including index, contents and glossary sections of text books used in class, and also at home in an online format. Students will also review and connect information within topics.</p> <p>Useful websites:<br/> <a href="http://www.bbcbitesize.co.uk">www.bbcbitesize.co.uk</a><br/> <a href="http://www.senecalearning.com">www.senecalearning.com</a><br/> <a href="https://www.physicsandmathstutor.com/">https://www.physicsandmathstutor.com/</a><br/> <a href="https://www.footprints-science.co.uk/">https://www.footprints-science.co.uk/</a><br/> <a href="https://www.youtube.com/@Freesciencelessons">https://www.youtube.com/@Freesciencelessons</a></p> |
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|  | <u>Skills</u> <ul style="list-style-type: none"> <li>• understand how scientific methods and theories develop over time</li> <li>• make decisions based on the evaluation of evidence and arguments</li> <li>• evaluate associated personal, social, economic and environmental implications</li> </ul> |  |  |  |
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**C**ommitment, **O**ppportunity, **R**espect & **E**xcellence  
for all and in all that we do