



INTEGRITY • COMMITMENT • RESPECT

ST JOHN'S  
SCHOOL

# Science

## Year 7 – 11 Curriculum rationale

### Curriculum intent:

Our science curriculum aims to provide students with a deep understanding of the natural world and the scientific method, as well as the skills and knowledge necessary **to become scientifically literate citizens**. Our curriculum is designed to prepare students for further study in science and related fields, as well as to equip them with the critical thinking and problem-solving skills necessary for success in a wide range of careers.

Literacy/Reading/Oracy opportunities: Reading textbooks and/or scientific articles. Research and Presentation work. Researching and/or debating.

	Autumn	Spring	Summer
Year 7	Forces-1 (AGP) Organisms-1 (NR)	Matter-1 (AG) Genes-1 (JB)	Electromagnetism-1 (AGP) Reactions-1 (AG)
Why?	<p><b><u>Forces-1 (AGP)</u></b> This topic is the basis of Physics. Forces looks at forces all around us by which our universe is governed. All we do every day involve forces. We might not be able to see forces, but we can experience their effects. Forces are everywhere around us, from brushing our teeth in the morning to the Moon orbiting the Earth. In this topic, students learn to recall the names of different forces, describe how forces arise and how they can change the motion of an object. They will calculate, investigate and</p>	<p><b><u>Matter-1</u></b> This topic covers the fundamentals of Chemistry and looks at the building blocks of all matter i.e. atoms and what we find inside them. It then goes onto look at elements, compounds and mixtures by which all substances consist.</p> <p><b><u>Genes-1</u></b> This topic follows on from Organisms-1 and looks at what the cell nucleus is made up of – chromosomes and genes. HUman reproduction is studied and how this</p>	<p><b><u>Electromagnetism-1</u></b> This topic looks at the basis of electromagnetism which is electricity. Electricity can be a bit of a mystery because we cannot see what is happening inside the wires, therefore, in this topic, students will learn about circuits, how they work and what happens as electrons flow through a conductor. They will look at describing how batteries and power sources work and how circuit components are used to do different jobs. Students will describe electric charge and explain how</p>

	<p>measure speed and look at how we can tell the story of a journey with a graph.</p> <p><u>Organisms-1</u> This topic starts by looking at the building blocks of living things – plant and animal cells. These can be examined with microscopes before investigating other tiny organisms which are also microscopic. Pupils will then learn about the skeleton and how it works with the muscles to enable movement.</p>	<p>brings about variation which can help organisms adapt and survive in different environments.</p>	<p>objects can become charged. They will apply their knowledge to explain electric shocks and lightning.</p> <p><u>Reactions-1</u> This topic looks at how atoms combine in elements and compounds to form new compounds and/or elements. Specifically students look at the features of chemical reactions, investigate patterns in reactions of metals and the reactions of acids.</p>
How parents / carers can support	<p>Online learning platforms such as</p> <ul style="list-style-type: none"> <li>• BBC bitesize (KS3)</li> <li>• Kerboodle</li> <li>• Seneca</li> <li>• Doodle</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Using Knowledge Organisers</li> <li>• Science Revision Guide</li> </ul>	<p>Online learning platforms such as</p> <ul style="list-style-type: none"> <li>• BBC bitesize (KS3)</li> <li>• Kerboodle</li> <li>• Seneca</li> <li>• Doodle</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Using Knowledge Organisers</li> <li>• Science Revision Guide</li> </ul>	<p>Online learning platforms such as</p> <ul style="list-style-type: none"> <li>• BBC bitesize (KS3)</li> <li>• Kerboodle</li> <li>• Seneca</li> <li>• Doodle</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Using Knowledge Organisers</li> <li>• Science Revision Guide</li> </ul>
	<b>Autumn</b>	<b>Spring</b>	<b>Summer</b>
<b>Year 8</b>	<p>Energy-1 (JB) Ecosystems-1 (NR)</p>	<p>Matter-2 (AG) Waves- 1/2 (JB)</p>	<p>Organisms-2 (JB) Earth-1 (Universe only) (NR) Electromagnetism-2 (AGP)</p>
Why?	<p><u>Energy-1</u> Pupils will learn about how chemical energy is stored in different objects. They</p>	<p><u>Matter-2</u> Building on the knowledge gained in Matter-1 about the particle model and</p>	<p><u>Organisms-2</u> Building on Organisms-1 and the basic structure of the human body, pupils will</p>

	<p>will learn how to calculate the amount of chemical potential energy in food and fuels. Pupils will then move onto how electricity can be generate and why reducing our usage and efficiency is important. Finally pupils will learn about different energy stores and how energy can be transferred but never lost.</p> <p>Ecosystems-1 Building on KS2 knowledge about food chains, pupils will learn about the feeding relationships and competition between species in an ecosystem. They then move onto learn how plants reproduce and the differences between insect and wind pollination.</p>	<p>changes of state, pupils will learn about how elements are arranged in the periodic table and for patterns within groups, including physical properties and chemical reactions of elements within the same group.</p> <p><u>Waves-1/2</u> Pupils will learn about the different types of waves and that the Sun is a source of all electromagnetic waves. They will learn how lenses can correct short and long sightedness, why coloured objects seem to change colour when the colour of light changes. They also learn about the role of the human ear in detecting sound and how sound waves travel and the role of ultrasound in modern day medicine.</p>	<p>learn how gas exchange is performed in the body as part of the respiratory system. They will also learn about the effects of drugs on the body and how the body's digestive system works – breaking down the food that we eat.</p> <p><u>Earth-1</u> Pupils will learn about the nature of our solar system and its position with our galaxy and the universe. They will learn about why the Earth experiences different daylight hours and seasons and then learn about the different phases of the moon.</p> <p><u>Electromagnetism-2</u> We have all experienced what happens when two magnets are pushed together. There are lots of magnets in our house and many of them we cannot see. In this topic, students learn how to make a magnet using electricity and about the different ways they can make it stronger. They will look at describing how electromagnetic devices like bells and loudspeakers work. Finally, they will model magnetic fields and find out about the Earth's magnetic field.</p>
<p>How parents / carers can support</p>	<p>Online learning platforms such as</p> <ul style="list-style-type: none"> <li>• BBC bitesize (KS3)</li> <li>• Kerboodle</li> <li>• Seneca</li> <li>• Doodle</li> </ul>	<p>Online learning platforms such as</p> <ul style="list-style-type: none"> <li>• BBC bitesize (KS3)</li> <li>• Kerboodle</li> <li>• Seneca</li> <li>• Doodle</li> </ul>	<p>Online learning platforms such as</p> <ul style="list-style-type: none"> <li>• BBC bitesize (KS3)</li> <li>• Kerboodle</li> <li>• Seneca</li> <li>• Doodle</li> </ul>

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	<b>Autumn</b>	<b>Spring</b>	<b>Summer</b>
<b>Year 9</b>	Ecosystems-2 (NR) Reactions-2 (AG) Forces-2 (AGP)	Forces-2 (Cont) (AGP) Energy/Cells/COA & possibly start Atomic Structure	Energy/Cells/COA/Atomic Structure
Why?	<p><b><u>Forces-2</u></b> Following on from Forces 1, in which students have learned the names of forces and their effects, Forces 2 looks in more depth how the motion of an object which experiences forces is affected. Students will use the idea of forces to describe an object as moving, stationary, accelerating or decelerating. Also, students will learn how to describe pressure and explain how it occurs. They will apply their knowledge about pressure in fluids to explain sinking and floating and their knowledge about pressure in solids to explain the pressure applied from a solid object to another solid object.</p> <p><b><u>Reactions-2</u></b> Following on from Reactions-1 pupils will learn how mass is conserved in chemical reactions. They will focus on several chemical reactions in more detail – namely combustion and thermal decomposition.</p>	<p><b><u>P1 - Energy</u></b> In our daily lives we need energy for our bodies and fuels for heating, transportation and generating electricity. Without these things, our lives would be much as they were thousands of years ago. In this topic, students will learn about the ways of calculating energy. They will find out about the ways that we generate electricity and why it's helpful to reduce the time we use appliances. Students will learn how scientists think about energy, including the idea of dissipation and they will model how energy is transferred between different stores. Finally, students will have the opportunity to evaluate renewable and non-renewable energy generation ways.</p> <p><b><u>B1 – Cells and transport</u></b> To have an understanding of the fundamental components of living organisms. To know what those cells are</p>	<p><b><u>P1 - Energy</u></b> In our daily lives we need energy for our bodies and fuels for heating, transportation and generating electricity. Without these things, our lives would be much as they were thousands of years ago. In this topic, students will learn about the ways of calculating energy. They will find out about the ways that we generate electricity and why it's helpful to reduce the time we use appliances. Students will learn how scientists think about energy, including the idea of dissipation and they will model how energy is transferred between different stores. Finally, students will have the opportunity to evaluate renewable and non-renewable energy generation ways.</p> <p><b><u>B1 – Cells and transport</u></b> To have an understanding of the fundamental components of living organisms. To know what those cells are</p>

	<p>They will learn about how atoms are rearranged in chemical reaction through the breaking of chemical bonds and new bond being formed. By looking at bond breaking and formation in more detail they will learn about Energy Level Diagrams and how this dictates whether a reaction is exothermic or endothermic.</p> <p><b><u>Ecosystems-2</u></b> Following on from Ecosystems-1 pupils will learn about how we get energy from our food so it can be used for movement, growth and repair. They will then move onto anaerobic respiration and how microbes can be used in the bread and beer industry. Finally, photosynthesis is studied how the structure of a leaf is designed to aid this and which minerals are needed for healthy plant growth.</p>	<p>comprised of and how their structure relates to their function. To understand what is meant by a concentration gradient and to understand why living organisms must transport substances.</p> <p><u>C9 – Chemistry of the Atmosphere</u> This topic looks at what air is and how the atmosphere has changed over time. The air all around us contains oxygen which is vital for life but where did it come from? How is oxygen used to burn fuels and how combustion of fuels produces gases that pollute our atmosphere? – e.g. global warming, global dimming, acid rain etc.</p>	<p>comprised of and how their structure relates to their function. To understand what is meant by a concentration gradient and to understand why living organisms must transport substances.</p> <p><u>C9 – Chemistry of the Atmosphere</u> This topic looks at what air is and how the atmosphere has changed over time. The air all around us contains oxygen which is vital for life but where did it come from? How is oxygen used to burn fuels and how combustion of fuels produces gases that pollute our atmosphere? – e.g. global warming, global dimming, acid rain etc.</p>
<p>How parents / carers can support</p>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize (KS3)</li> <li>• Kerboodle</li> <li>• Seneca</li> <li>• Doodle</li> <li>•</li> <li>• Discussing and revising Science regularly</li> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Using Knowledge Organisers</li> <li>• Science Revision Guide</li> </ul>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Doodle</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Wider reading- new scientist online</li> </ul>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Doodle</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Wider reading- new scientist online</li> </ul>

	Autumn	Spring	Summer
<b>Year 10 Combined Topics and Rationale</b>	<p><b>Biology</b>  <u>B2 Organisation</u>            To know how the human body is structured. From a cellular level up to whole organ systems            To know the structure and function of the circulatory system and the digestive system            To understand how enzymes catalyse biological reactions.</p> <p><b>Chemistry</b>  <u>C1-Atomic Structure</u>            Pupils need to understand :-</p> <ul style="list-style-type: none"> <li>• What is inside atoms (the building blocks of all matter).</li> <li>• How the elements in the periodic table are ordered.</li> <li>• How to predict patterns in the periodic table</li> <li>• How to separate mixtures</li> <li>• How to write chemical formulae and balance equations</li> </ul> <p><u>C2 – Structure &amp; Bonding</u>            Pupils will learn that atoms, although invisible to the naked eye, how they are bonded and structured is vital to the properties of different substances.</p> <p>Pupils will learn about :-</p>	<p><b>Biology</b>  <u>B3 Infection and Response</u>            To know how the human body responds the various types of pathogen            To understand how our knowledge of pathogens can help develop medicines, vaccines and treatments for many diseases.</p> <p><b>Chemistry</b>  <u>C3 - Quantitative Chemistry</u>            Analytical Chemists are a vital part of the Chemical Industry e.g. analysing water to ensure it is safe to drink, researching what substances are made of etc.</p> <p>In this topic pupils will find out about:</p> <ul style="list-style-type: none"> <li>• Relative atomic mass</li> <li>• Moles</li> <li>• Conservation of mass</li> <li>• Reaction yields</li> </ul> <p><u>C4 – Chemical Changes</u>            This topic some of the most common and important chemical reactions for everyday life. Pupils will cover reactions and extraction of metals, reactions of acids, making salts and electrolysis. Pupils will also learn how to perform a titration.</p> <p><b>Physics</b></p>	<p><b>Biology</b>  <u>B4 Bioenergetics</u>            To understand the fundamental principles behind photosynthesis and respiration.            To be able to link the idea that energy on Earth comes from the sun and this energy can be transferred into organic compounds such as glucose, a chemical energy store for respiration</p> <p><b>Physics</b>  <u>P4 – Atomic structure</u>            Over the last century, we have learnt how to use radioactive sources and materials safely for a range of applications in industry, agriculture and medicine. The advances in atomic physics mean we can use atomic and nuclear physics in diagnosis and treating of cancer and tumours. This important unit looks at the atomic structure and the isotopes of elements. Then, using the idea of unstable isotopes it introduces nuclear radiation. Students will look at the hazards and uses of radioactive emissions and use graphs to calculate half-lives of radioactive isotopes.</p> <p><b>Chemistry</b>            Finish C4 then :-</p>

	<ul style="list-style-type: none"> <li>• Ionic lattices (giants)</li> <li>• Giant covalent macromolecules</li> <li>• Metals</li> <li>• Nanotechnology</li> <li>• Allotropes of carbon</li> </ul> <p><b>Physics</b></p> <p><u>P2 – Electricity</u></p> <p>Electricity can be a bit of a mystery because we cannot what is happening inside the wires. In this topic, students will learn about what is happening in a circuit and how they can model it. They will learn about power sources and how they can use circuit components to make circuits perform different jobs. They will also learn what is electric charge and how it can be used to calculate current in a circuit. Students will use a range of equations and Physics laws to calculate quantities such as resistance, potential difference, current, charge and power and they will look at how energy is being transferred in circuits.</p>	<p><u>P3 – Particle model of matter</u></p> <p>In the 19<sup>th</sup> century scientists proposed the existence of atoms to explain some of their observations – for example, the random motion of small particles of pollen, seen floating on water. Now, our everyday life involves understanding matter as they are such a crucial part of our life. In this unit, students will look at the particle model of matter and how changes of state occur. They will look at how internal energy changes as solids change to liquids and to gases and they will explain the link between particles and the pressure in solids, liquids and gases.</p>	<p><u>C5 - Energy Changes</u></p> <p>Pupils will learn about exothermic and endothermic chemical reactions and their usefulness in everyday life. They learn why some reactions give out heat and increase the temperature of the surroundings and why some take in heat and decrease the temperature of their surroundings. Chemical and fuel cells are also studied and their increasing importance in the modern world – particularly for modern vehicles like cars.</p>
<p>How parents / carers can support</p>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Doodle</li> <li>• Tassomai</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> </ul>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Doodle</li> <li>• Tassomai</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> </ul>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Doodle</li> <li>• Tassomai</li> </ul> <p>Discussing and revising Science regularly</p>

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<b>Year 10 Separate Topics and Rationale</b>	<p><b><u>Biology</u></b> <b><u>B2 - Organisation</u></b> To know how the human body is structured. From a cellular level up to whole organ systems To know the structure and function of the circulatory system and the digestive system To understand how enzymes catalyse biological reactions</p> <p>Chemistry C1 - Atomic Structure and C2 – Structure &amp; Bonding</p> <p><b><u>Biology</u></b> <b><u>B2 - Organisation</u></b> To know how the human body is structured. From a cellular level up to whole organ systems To know the structure and function of the circulatory system and the digestive system To understand how enzymes catalyse biological reactions.</p> <p><b><u>Chemistry</u></b></p>	<p><b><u>Biology</u></b> <b><u>B3 - Infection and response</u></b> To know how the human body responds the various types of pathogens. To understand how our knowledge of pathogens can help develop medicines, vaccines and treatments for many diseases. To identify how we can produce (monoclonal) antibodies on a large scale and how this technology could develop in the future.</p> <p><b><u>Chemistry</u></b> <b><u>C3 – Quantitative Chemistry</u></b> Analytical Chemists are a vital part of the Chemical Industry e.g. analysing water to ensure it is safe to drink, researching what substances are made of etc.</p> <p>In this topic pupils will find out about:</p> <ul style="list-style-type: none"> <li>• Relative atomic mass</li> <li>• Moles</li> <li>• Conservation of mass</li> <li>• Reaction yields</li> </ul> <p><b><u>C4 – Chemical Changes</u></b></p>	<p><b><u>Biology</u></b> <b><u>B4 - Bioenergetics</u></b> To understand the fundamental principles behind photosynthesis and respiration. To be able to link the idea that energy on Earth comes from the sun and this energy can be transferred into organic compounds such as glucose, a chemical energy store for respiration</p> <p>Chemistry – Finish C4, C5 – Energy Changes and C6 – Rates of Reaction</p> <p><b><u>Physics</u></b> <b><u>P4 – Atomic structure</u></b> Over the last century, we have learnt how to use radioactive sources and materials safely for a range of applications in industry, agriculture and medicine. The advances in atomic physics mean we can use atomic and nuclear physics in diagnosis and treating of cancer and tumours. This important unit looks at the atomic structure and the isotopes of elements. Then, using the idea of unstable isotopes it introduces nuclear radiation. Students will</p>



	<p><b><u>C1-Atomic Structure</u></b> Pupils need to understand :-</p> <ul style="list-style-type: none"> <li>• What is inside atoms (the building blocks of all matter).</li> <li>• How the elements in the periodic table are ordered.</li> <li>• How to predict patterns in the periodic table</li> <li>• How to separate mixtures</li> <li>• How to write chemical formulae and balance equations</li> </ul> <p><b><u>C2 – Structure &amp; Bonding</u></b> Pupils will learn that atoms, although invisible to the naked eye, how they are bonded and structured is vital to the properties of different substances.</p> <p>Pupils will learn about :-</p> <ul style="list-style-type: none"> <li>• Ionic lattices (giant)</li> <li>• Giant covalent macromolecules</li> <li>• Metals</li> <li>• Nanotechnology</li> <li>• Allotropes of carbon</li> </ul> <p><b><u>Physics</u></b> <b><u>P2 – Electricity</u></b> Electricity can be a bit of a mystery because we cannot see what is happening inside the wires. In this topic, students will learn about what is happening in a circuit</p>	<p>This topic covers some of the most common and important chemical reactions for everyday life. Pupils will cover reactions and extraction of metals, reactions of acids, making salts and electrolysis. Pupils will also learn how to perform a titration.</p> <p><b><u>Physics</u></b> <b><u>P3 – Particle model of matter</u></b> In the 19<sup>th</sup> century scientists proposed the existence of atoms to explain some of their observations – for example, the random motion of small particles of pollen, seen floating on water. Now, our everyday life involves understanding matter as they are such a crucial part of our life. In this unit, students will look at the particle model of matter and how changes of state occur. They will look at how internal energy changes as solids change to liquids and to gases and they will explain the link between particles and the pressure in solids, liquids and gases. Students will also learn about Gas Laws and to describe the effect of changing the pressure in a gas.</p>	<p>look at the hazards and uses of radioactive emissions and use graphs to calculate half-lives of radioactive isotopes. Furthermore, they will learn about background radiation and apply their knowledge to explain the uses of nuclear radiation including fission and fusion.</p> <p><b><u>Chemistry</u></b> Finish C4 then :-</p> <p><b><u>C5 - Energy Changes</u></b> Pupils will learn about exothermic and endothermic chemical reactions and their usefulness in everyday life. They learn why some reactions give out heat and increase the temperature of the surroundings and why some take in heat and decrease the temperature of their surroundings. Chemical and fuel cells are also studied and their increasing importance in the modern world – particularly for modern vehicles like cars.</p>
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	<p>and how they can model it. They will learn about power sources and how they can use circuit components to make circuits perform different jobs. They will also learn what is electric charge and how it can be used to calculate current in a circuit. Students will use a range of equations and Physics laws to calculate quantities such as resistance, potential difference, current, charge and power and they will look at how energy is being transferred in circuits. Students will also learn about static electricity and explain the concept of an electric field.</p>		
<p>How parents / carers can support</p>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Tassomai</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Wider reading- new scientist online</li> </ul>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Tassomai</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Wider reading- new scientist online</li> </ul>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Tassomai</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Wider reading- new scientist online</li> </ul>
	<p><b>Autumn</b></p>	<p><b>Spring</b></p>	<p><b>Summer</b></p>

## Year 11 Combined Topics and Rationale

### **Biology**

#### **B5 Homeostasis**

To have an understanding of why internal conditions in the body need to be maintained in order for optimal functioning.

To be able to explain how negative feedback systems work to maintain conditions such as temperature

### **Chemistry**

#### **C6 – Rates of Reaction**

Why some chemical reactions are faster than others as well as the factors that affect the rate of a chemical reaction are studied. Pupils will study the effect of temperature, pressure, concentration and catalysts on reactions. They will also cover reversible reactions and equilibrium.

#### **C7 – Organic Chemistry**

Pupils will learn about carbon compounds uses as fuels and feedstocks for other compounds. The alkanes and how to differentiate between alkanes and alkanes is also studied.

### **Physics**

#### **P5 – Forces**

All we do every day involve forces. We might not be able to see forces, but we can experience their effects. Forces are everywhere around us, from brushing our

### **Biology**

#### **B6 - Inheritance, variation and evolution**

To develop learners' understanding of the function of DNA as a hereditary unit.

To be able to explain how variation allows for evolution to occur.

### **Chemistry**

#### **C8 Chemical Analysis**

This topic covers purity of substances, formulations, chromatography and the how to test and identify common gases.

#### **C10 - Using Resources**

This topic covers the use of the Earth's resources and how we can be more sustainable of them. Potable water and water treatment and waste is covered as well as Life Cycle Assessments, recycling and using materials. Why the Haber Process is such a vitally important industrial process and the use of NPK fertilisers is also studied.

### **Physics**

#### **P6 – Waves**

### **Biology**

#### **B7 Ecology**

To develop learners who understand the natural world, the threats it faces in terms of climate change, and way in which scientists can monitor the environment.

### **Chemistry**

Revision of Chemistry of the Atmosphere (Y9) and all Y10 and Y11 Chemistry in preparation for final GCSE exams.

### **Physics**

#### **P7 – Electromagnetism**

We have all experienced magnetism in our daily lives – many magnets like the ones on the fridge – we know they are there, and some of them, we cannot see. In this topic, students will learn how a material can become magnetic when current flows through it and will learn about the applications of electromagnets such as electric bells and loudspeakers. They will understand the difference between permanent and induced magnets, and they will be able to draw magnetic fields around magnets. Students will be able to describe the motor effect and they will investigate ways to increase the strength of a magnetic field.

	<p>teeth in the morning to the Moon orbiting the Earth. In this topic, students will learn about how forces arise, how they change the motion, shape and direction of an object. They will investigate and measure speed and acceleration and they will use appropriate equations and graphs to calculate these quantities. The students will learn to describe and explain Newton's three laws of motion and their effects. Finally, they will learn about the concept of momentum and how it is applied in car safety.</p>	<p>Electromagnetic waves, which travel at the speed of light, allow us to communicate with friends around the world. These waves, transfer energy for receivers to detect them and information for us to understand the message. Our eyes and ears detect light and sound. In this topic, students learn about waves as a means of transferring energy about sound and light and what happens when these hit different materials. They look at the electromagnetic spectrum and how each type of electromagnetic radiation can be used in our everyday life in a range of applications as well as hazards associated with each electromagnetic radiation.</p>	
<p>How parents / carers can support</p>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Doodle</li> <li>• Tassomai</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Wider reading- new scientist online</li> </ul>	<ul style="list-style-type: none"> <li>• Online learning platforms such as</li> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Doodle</li> <li>• Tassomai</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Wider reading- new scientist online</li> </ul>	<p>Online learning platforms such as</p> <ul style="list-style-type: none"> <li>• BBC bitesize</li> <li>• Seneca</li> <li>• Doodle</li> <li>• Tassomai</li> </ul> <p>Discussing and revising Science regularly</p> <ul style="list-style-type: none"> <li>• Flashcards – all around the house</li> <li>• Kahoot/quizzes</li> <li>• Wider reading- new scientist online</li> </ul>

## Year 11 Separate Topics and Rationale

### **Biology**

#### **B5 - Homeostasis**

To have an understanding of why internal conditions in the body need to be maintained in order for optimal functioning.

To be able to explain how negative feedback systems work to maintain conditions such as blood glucose.

To know how the endocrine system functions to maintain processes in the body such as puberty and the menstrual cycle.

### **Chemistry**

#### **C6 – Rates of Reaction**

Why some chemical reactions are faster than others as well as the factors that affect the rate of a chemical reaction are studied. Pupils will study the effect of temperature, pressure, concentration and catalysts on reactions. They will also cover reversible reactions and equilibrium.

#### **C7 – Organic Chemistry**

Pupils will learn about carbon compounds uses as fuels and feedstocks for other compounds. The alkanes and how to differentiate between alkanes and alkenes is also studied.

### **Biology**

#### **B6 - Inheritance, Variation and Evolution**

To develop learners' understanding of the function of DNA as a hereditary unit.

To be able to explain how variation allows for evolution to occur.

### **Chemistry**

#### **C8 Chemical Analysis**

This topic covers purity of substances, formulations, chromatography and the how to test and identify common gases. Triple students also learn about the identification of ions by chemical and spectroscopic means.

#### **C10 - Using Resources**

This topic covers the use of the Earth's resources and how we can be more sustainable of them. Potable water and water treatment and waste is covered as well as Life Cycle Assessments, recycling and using materials. Why the Haber Process is such a vitally important industrial process and the use of NPK fertilisers is also studied.

### **Physics**

#### **P6 – Waves**

Electromagnetic waves, which travel at the speed of light, allow us to communicate

### **Biology**

#### **B7 Ecology**

To develop learners who have an understanding of the natural world, the threats it faces in terms of climate change, and way in which scientists can monitor the environment.

To know how humans are impacting the environment from intensive farming to fisheries.

### **Chemistry**

Revision of Chemistry of the Atmosphere (Y9) and all Y10 and Y11 Chemistry in preparation for final GCSE exams.

### **Physics**

#### **P7 – Electromagnetism**

We have all experienced magnetism in our daily lives – many magnets like the ones on the fridge – we know they are there, and some of them, we cannot see. In this topic, students will learn how a material can become magnetic when current flows through it and will learn about the applications of electromagnets such as electric bells and loudspeakers. They will understand the difference between permanent and induced magnets, and they will be able to draw magnetic fields around magnets. Students will be able to describe the motor effect and they will investigate

	<p>The alkenes, alcohols, carboxylic acids, esters, synthetic and natural polymers and the reactions of these compounds are also covered.</p> <p><b>Physics</b>  <u>P5 – Forces</u>  All we do every day involve forces. We might not be able to see forces, but we can experience their effects. Forces are everywhere around us, from brushing our teeth in the morning to the Moon orbiting the Earth. In this topic, students will learn about how forces arise, how they change the motion, shape and direction of an object. They will investigate physical quantities such as pressure and moments. They will investigate and measure speed and acceleration and they will use appropriate equations and graphs to calculate these quantities. The students will learn to describe and explain Newton’s three laws of motion and their effects. Finally, they will learn about the concept of momentum and how it is applied in car safety.</p>	<p>with friends around the world. These waves, transfer energy for receivers to detect them and information for us to understand the message. Our eyes and ears detect light and sound. In this topic, students learn about waves as a means of transferring energy about sound and light and what happens when these hit different materials.</p> <p>Students will study light and colour and learn how to construct ray diagrams. They look at the electromagnetic spectrum and how each type of electromagnetic radiation can be used in our everyday life in a range of applications as well as hazards associated with each electromagnetic radiation. Also, they will investigate infrared radiation from a black body. Finally, they will learn to apply their knowledge on the uses of sound, ultrasound and seismic waves.</p>	<p>ways to increase the strength of a magnetic field. The students will also learn to describe and explain how electricity is generated and how transformers work.</p> <p><b>Physics</b>  <u>P8 – Space</u>  Questions about where we are, and where we came from, have been asked for thousands of years. In the past century, astronomers and astrophysicists have made remarkable progress in understanding the scale and structure of the universe, its evolution and ours. In this topic, students will learn to describe and explain how planets are moving in orbit in the Solar System and the stages of the lifecycle of a star. Applying their knowledge from previous topics such as forces and waves, they will calculate the orbits of satellites and they will explain Red Shift as evidence for the Big Bang.</p>
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