Science Curriculum Overview
Year 7

Fareham Academy | Unlocking Potential Creating Opportunity

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic(s)	Boot camp Ecosystems	Chemical reactions Forces Matter	Sound Movement	Cells BSW Elements	Light Health	Earth Space
Topic Objectives	Bootcamp: • Learn how to use scientific. equipment safely • Learn how to design and conduct scientific experiments. Ecosystems: • Learn how organisms interact in a habitat. including feeding relationships • How to measure biodiversity and why it is important.	Chemical reactions: • Make observations of chemical reactions. • Record observations like a scientist. • Identify reactants and products in a reaction and start to write word equations. Forces: • Learn about everyday forces and how they affect our everyday lives. • Plan and undertake investigations into stretching objects and friction.	Sound: • Learn how sound is created and travels through different materials. • Conduct an experiment into the speed of sound. Movement: • Learn how the skeletal and muscular systems allow us to move. • Investigate an aspect of biomechanics- how does leg length affect jump height.	Cells: • Learn how cells are the building blocks of life and what. goes on inside cells • How cells make up tissues that perform particular functions. BSW: • British Science Week celebrations. Elements: • Learn that atoms are the building blocks of materials and how they can combine to form compounds.	Light: • Learn how light travels and allows us to see. • Describe the behaviour of light in different materials. Health: • Discover the impact of a range of lifestyle choices on the human body. • Explore these mainly related to diet and exercise.	Earth: • Learn about the structure of the Earth beneath us and the rock cycle. Space: • Learn what can be found in space. • Describe the occurrence of days, years, seasons and eclipses.

		Matter: • Use the particle model to explain the behaviour and movement of materials.				
Acquired Knowledge/ Skills		Using models to explain the properties of S, L, and G.	Experimental techniques to enforce learning, HSW planning, linking properties to everyday scenarios.	Evaluation skills with link to climate change, HSW.	Use date to make predictions, use probability to predict outcomes, apply formula to support investigations.	HSW investigations, comparison of processes and make links to everyday processes.
Assessments	In-class marking points. Data capture.	In-class marking points. Ecosystems and chemical reactions assessment.	In-class marking points. Forces, matter, sound and movement assessment.	In-class marking points.	In-class marking points. Cells, elements and light assessment.	In-class marking points. Nutrition and Earth assessment.
Other Links (e.g. SMSC, FBV, Greener Curriculum)	How the scientific method allows us to understand the world around us. The impact that humans can have on habitats and what we can do to reduce our impact.	How the work of scientists contributes to developments in models, application of science in everyday life, Robert Hooke – English scientist.			The impact of healthy lifestyles and making informed choice regarding exercise and health.	

Science Curriculum Overview
Year 8

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic(s)	Matter, Forces	Ecosystems, Energy	Chemical Reactions, Electromagnets, Earth	Genes, BSW, Circuits (Sum 1)	Circuits (Spr 2), Organisms	Project focus x6 (HSW and key stage transition)
Topic Objectives	Matter: • Explore the layout of the periodic table and how it is utilised by scientists in a range of scenarios. Forces: • Focus on planning a valid experiment linked to friction and explore a range of forces in action in everyday life.	Ecosystems: • Explore the world of biochemistry regarding energy involved in making and breaking chemical bonds in the molecules found in biological organisms. Energy: • Link types of energy to work done, investigate the impact of using different types of pulleys, investigate the different heat transfer methods and investigate the efficiency of different insulators.	Chemical reactions: • Discover a range of chemical reactions linked to everyday life. Electromagnets: • Investigate properties of permanent magnets and magnetism and link to understanding electromagnets. Earth: • Learn about the reactivity series and understand how it can be used to extract metals from their ores, explain how fossil fuels are created and the issues	Genes: • Identify and explain the adaptations of plants and animals to be able to live in different climates, understand the theory of evolution and apply Darwin's theory to explain evolution, understand how genes are involved in the inheritance. BSW: • British Science Week celebrations. Circuits: • Understand and use electrical components in circuits and explore	Circuits: • Understand and use electrical components in circuits and explore voltage current and resistance. Organisms: • Discover the impact of a range of lifestyle choices on the human body. Explore these mainly related to the breathing and digestive systems.	To facilitate the transition to key stage 4, students will work on a series of investigative projects so focusing on the wide range of how science work skills interleaved with key knowledge linked to context.

			associated with them, explore combustion, and understand the carbon cycle.	voltage current and resistance.		
Acquired Knowledge/ Skills	Explore the different parts of the periodic table and the key features of these. Explore forces learning related to friction, squashing, stretching, moments and pressure. Using formula, number manipulation, graph work. HSW planning, using models reaffirm understanding.	Explore the fundamentals of photosynthesis and the minerals that plants need. Extend learning to respiration. Explore energy transfers related to different states and evaluate methods of insulation after investigation. Using formula, number manipulation, evaluate using data, HSW investigation.	Explore how energy relates to reactions we experience in 'real life': combustion, thermal decomposition, endo and exothermic. Explore how magnetic fields work and link this to the earth's magnetic fields and also link electro-magnetics to everyday life. Explore the real issues associated with climate change related to global warming and how this is caused yet evaluate the importance of carbon in the atmosphere. Link learning is then to the importance of recycling. Experimental techniques to enforce learning, HSW planning, linking properties to everyday scenarios.	Evaluation of the theories of evolution is key as this overlaps with different views in society. BSW week – new theme to be explored each year. Increase level of understanding using models to understand the different strands related to electricity in series and parallel circuits as well exploring static electricity and where this is experienced in the real world. Using formula, number manipulation, evaluation skills, understanding models, use data to make predictions HSW.	Increase level of understanding using models to understand the different strands related to electricity in series and parallel circuits as well exploring static electricity and where this is experienced in the real world. Explore the biology associated with the breathing and digestion systems but link how lifestyle choices will impact health. Use data to make predictions, draw quantitative conclusions, apply formula to support investigations.	HSW investigations, comparison of processes and make links to everyday processes. This helps with the transition into KS4 as there are a set number of required practicals and associated skills that needs to be at the core of students learning and understanding.

Assessments	In-class marking points x2.	In-class marking points. Matter, forces, and ecosystems assessment.	In-class marking points.	In-class marking points. Energy, reactions, EM, Earth, and genes assessment.	In-class marking points. Circuits and organisms assessment.	In-class marking points.
Other Links (e.g. SMSC, FBV, Greener Curriculum)	How the work of scientists contributes to developments in models, application of science in everyday life, Robert Hooke – English scientist.	Importance of exercise on health, the use of biotechnology in food production for example, economic importance of fertilisers for farming industry. Olympics sprinting/running discussion, heat loss in terms of monetary costs in today's world.	Comprehension of the increasingly worrying state of the climate and the impacts of this for the planet, impact of quarrying for metals on the environment and the importance of recycling.	Religion vs science, work of Charles Darwin, importance of preserving biodiversity, ethical/respectful points of view.	Impacts on society from use of drugs and alcohol, age limits set by law, how to keep health at its highest both mental and physical.	Articulate communication of ideas and how to draw fair and evidence-based conclusions.

Science Curriculum Overview
Year 9 (Part 1)

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	Autumn 1	Autumn 2	Spring 1
Topic(s)	B1 – Cell biology C1 – Atomic structure and the Periodic Table	P4 – Atomic structure B2 – Organisation (overlaps to Spr 2)	C2 – Bonding, structure, and properties of matter
Topic Objectives	B1: • Students will distinguish between prokaryotic cells and eukaryotic cells and learn about transport with a range of cells. Students will also explore cell division and how cell treatment can be utilised in real life, despite ethical arguments. C1: • The historical development of the Periodic Table and models of atomic structure provide good examples of how scientific ideas and explanations develop over time as new evidence emerges - students will learn to and understand the current Periodic Table and how it is utilised.	P4: • Students will explore the uses and dangers of radiation and understand the various types of decay. There is an overlap here with chemistry to reinforce understanding. B2: • Students will learn about which enzymes act on which nutrient, along with gaining in-depth knowledge on the heart and the blood.	C2: • Students will utilise the Periodic Table to explore a range of different bonding and establish properties within each – properties of these materials may offer new applications in a range of different technologies.
Acquired Knowledge/ Skills	B1 – Students can: • understand that cells are the basic unit of all forms of life • explore how structural differences between types of cells enables them to perform specific functions within the organism and	P4 – Students can: • understand that ionising radiation is hazardous but can be very useful • explore the fact that it took many nuclear physicists several decades to understand the structure of atoms, nuclear forces and stability	C2 – Students can: • utilise theories of structure and bonding to explain the physical and chemical properties of materials • analyse structures to understand that atoms can be arranged in a variety of ways, some

	that these differences in cells are controlled by genes in the nucleus • distinguish between different types of transport • understand that for an organism to grow, cells must divide by mitosis producing two new identical cells • explore research and application of stem cell technology • Triple content reference: culturing microorganisms. C1 – Students can: • utilise the periodic table to understand atomic structure • predict properties, both chemical and physical, of elements in different groups using known trends • understand the development of the periodic table in relation to scientists' contributions and discoveries • link the development of the periodic table to what scientists know and understand about the current atomic model • Triple content reference: properties of transition metals • Transition metals links to Guy Fawkes and fireworks.	• understand the dangers of radiation • explore how today, radioactive materials are widely used in medicine, industry, agriculture and electrical power generation • Triple content reference: hazards and uses of radioactive emissions and of background radiation. B2 – Students can: • explore the human digestive system which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide • understand that damage to any of these systems can be debilitating if not fatal • explore the progress in surgical techniques, especially with regards to coronary heart disease and understand that interventions would not be necessary if individuals reduced their risks through improved diet and lifestyle • learn how the plant's transport system is dependent on environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis.	of which are molecular while others are giant structures • understand how scientists use knowledge of structure and bonding to engineer new materials with desirable properties • Triple content reference: bulk and surface properties of matter including nanoparticles.
Assessments	Students will complete a B1 in class assessment in line with data capture requirements.		C1, P4, and B2 combined in-class assessment.

Other Links (e.g. SMSC, FBV, Greener Curriculum)	Advancements in technology for the development of microscopes. Evaluation of views associated with stem cell technology and therapeutic cloning. Exploration of developments in models of the atom using evidence. Medical impact of growing microorganisms.	Exploration of developments in establishing the modern Periodic Table using evidence. Understanding of the impacts of radiation/radioactive decay – link learning to the Chernobyl disaster. The importance of diet and healthy lifestyle (incorporates diet, heart disease, risk factors). Evaluation of how faulty heart valves can be treated. Background radiation in different parts of the UK. Exploration of views of use of nuclear radiation as medical treatments.	Exploration of some limitations of models that facilitate understanding. Understanding of nanotechnology uses in electronics and medicine for example. Uses of nanotechnology in things like electronics and medicine.

Please note: Triple content spec reference is to list the content but will be in the Year 10 and Year 11 learning journeys for Triple Science.

Science Curriculum Overview
Year 9 (Part 2)

Fareham Academy | Unlocking Potential Creating Opportunity

	Spring 2	Summer 1	Summer 2
Topic(s)	C2 – Bonding, structure, and properties of matter P1 – Energy (overlaps to Sum 1)	B3 – Students explore a range of disease, symptoms and how they are treated	C5 – Energy changes P3 – Particle model of matter
Topic Objectives	C2: • Students will utilise the periodic table to explore a range of different bonding and establish properties within each. P1: • Students will understand that there a range of energy sources that are transferred usefully or wasted and do so in line with the conservation of energy. Students will also make use of equations for a range of types of energy calculation.	B3: • Students explore a range of diseases, symptoms and how they are treated as well as exploration of developing new drugs.	C5: • Students explore how energy lost and gained is related to a range of chemical reactions and how this can be quantified in calculations. P3: • Students will apply understanding of the particle model to a range of contexts.
Acquired Knowledge/ Skills	C2 – Students can: • use theories of structure and bonding to explain the physical and chemical properties of materials • analyse structures to understand that atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures	B3 – Students can: • understand that pathogens cause infectious diseases in animals and plants • learn that pathogens frequently produce toxins that damage tissues and make us feel ill • explore ways in which we can avoid spread of disease • understand the role of white blood cells	C5 – Students can: • understand that energy changes are an important part of chemical reactions • link ideas to know that interaction of particles often involves transfers of energy due to the breaking and formation of bonds • reactions in which energy is released to the surroundings are exothermic reactions, while those that take in thermal energy are endothermic and that these interactions

	• understand how scientists use knowledge of structure and bonding to engineer new materials with desirable properties. P1 – Students can: • understand that the concept of energy emerged in the 19th century • explain that the idea was used to explain the work output of steam engines and then generalised to understand other heat engines • understand that the limits to the use of fossil fuels and global warming are critical problems for this century. • explore the ideas that Physicists and engineers are working hard on in order to identify ways to reduce our energy usage • utilise equation triangles for various energy calculations.	• learn how vaccinations work and explore the explain how antibiotic resistance works and its impact on use for curing illnesses and new drug development • Triple content reference: monoclonal antibodies • Triple content reference: plant disease. B2 – Students can: • explore the human digestive system which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide • understand that damage to any of these systems can be debilitating if not fatal • explore the progress in surgical techniques, especially with regards to coronary heart disease and understand that interventions would not be necessary if individuals reduced their risks through improved diet and lifestyle • learn how the plant's transport system is dependent on environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis.	between particles can produce heating or cooling effects that are used in a range of everyday applications • understand that some interactions between ions in an electrolyte result in the production of electricity • Triple content reference: chemical cells and fuel cells. P3 – Students can: • understand that the particle model is widely used to predict the behaviour of solids, liquids and gases • learn that the particle model can help scientists to explain a wide range of observations and helps engineers use these principles when designing vessels to withstand high pressures/temperatures such as submarines and spacecraft • Triple content reference: pressure in gases • Triple content reference: nuclear fission and fusion.
Assessments			Before beginning new topics, students will revise recent topics in order to complete a combined C2, P1, and B3 in class assessment.

Other Links (e.g. SMSC, FBV, Greener Curriculum)	Exploration of some limitations of models that facilitate understanding. Understanding of nanotechnology uses in electronics for example. Learning related to ways in which energy transfers can be reduced – real life context related to homes for example. Exploration of energy resources available for use on earth and the issues surrounding non-renewable energy resources and the impact on the environment of renewable resources.	Impact on society of communicable diseases and how spread can be reduced/prevented. Ethical and moral issues associated with HIV/aids and tackling stigmas. Understandings of the government hygiene checks on all eateries. Exploration of STDs and how to reduce spread. Learning linked to impacts of malaria in certain countries in the world and how spread can be reduced – link to national campaigns like red nose day. Evaluation of why we need vaccinations. Age limits related to buying certain medicines. Processes/laws involved in drug development and testing.	Real life applications of endo/exothermic reactions. Understanding how bike pumps work.

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Science Curriculum Overview
Year 10 (Part 1)

Fareham Academy | Unlocking Potential Creating Opportunity

	Autumn 1	Autumn 2	Spring 1
Topic(s)	C3 – Quantitative C4 – Chemical changes	Revision of previous chemistry learning (C2 and C5) B4 – Bioenergetics Revision of previous biology learning (B1 and B2)	Revision of previous biology learning (B1 and B3) P2 – Electricity
Topic Objectives	C3: • Students should be mature enough in their understanding of fundamentals to complete the quantitative topic. C4: • Students will build on learning of said fundamentals to explore reactions between metals and oxygen, metals and acids and will also use prior knowledge of bonding to explain the process associated with electrolysis.	B4: • Students will explore how plants harness the Sun's energy in photosynthesis in order to make food. Then link this learning to aerobic and anaerobic respiration.	P2: • Students will understand how vital electricity is to modern life, explore a range of concepts and utilise equations for various electricity calculations.
Acquired Knowledge/ Skills	C3 – Students can: • utilise quantitative analysis to determine the formulae of compounds and the equations for reactions • use quantitative methods to determine the purity of chemical samples and to monitor the yield from chemical reactions	B4 – Students can: • understand the role of photosynthesis and the importance of the process in food production • understand the role of aerobic respiration in plants and animals and the importance of transferring the energy that the organism needs to perform its functions.	P2 – Students can: • understand that electric charge is a fundamental property of matter everywhere • understand the difference in the microstructure of conductors, semiconductors and insulators and how it is possible to design components and build electric circuits

	• classify different types of chemical reaction in order to make sense of how different chemicals react together and to establish patterns and to make predictions about the behaviour of other chemicals • Triple content reference: yield and atom economy of chemical reactions • Triple content reference: using concentrations of solutions in mol/dm3 • Triple content reference: Use of amount of substance in relation to volumes of gases. C4 – Students can: • know about different chemical changes mean that scientists can begin to predict exactly what new substances would be formed and use this knowledge to develop a wide range of different materials and processes • aids biochemists to understand the complex reactions that take place in living organisms. • the extraction of important resources from the earth makes use of the way that some elements and compounds react with each other and how easily they can be 'pulled apart' • Triple content reference: titrations.	• understand that anaerobic respiration does not require oxygen to transfer energy • link understanding of aerobic respiration to anaerobic respiration and explore how these impacts upon various levels of exercise.	• know that electrical power fills the modern world with artificial light and sound, information and entertainment, remote sensing and control • learn that the fundamentals of electromagnetism were worked out by scientists of the 19th century however, power stations, like all machines, have a limited lifetime • explore testimonies that propose that if we continue to demand more electricity this means building new power stations in every generation; but then explore ow this could ever contribute to a sustainable future • utilise equation equations for various electricity calculations • Triple content reference: static electricity.
Assessments	Students will complete a C3 in-class assessment.	Before biology, students will complete a full chemistry 1 mock exam.	Before physics, students will complete a full biology 1 mock exam.
Other Links (e.g. SMSC, FBV, Greener Curriculum)	Introduction to Avogadro as an Italian scientist. Evaluation of the impacts on the environment of extracting metals. Dangers associated with acids and alkalis – explore context of heinous criminal acts using acids.	Understanding off the fact that plants complete photosynthesis and the impacts of deforestation. Learning linked to limiting factors in photosynthesis are important in the economics of enhancing the conditions in greenhouses to gain the maximum rate of photosynthesis while still maintaining profit.	Awareness that electrical power fills the modern world and that demand on providing more electricity means building new power stations in every generation and how sustainability must be considered. Teaching of electrical safety, wiring plugs and associated dangers.

	Consideration to energy costs related to electrolysis. Consideration of economic impacts on industries related to yield of reactions.	Understanding that anaerobic respiration has economic importance in the manufacture of bread and alcoholic drinks. Importance of exercise in health.	Awareness of the need/importance of the National Grid.

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Science Curriculum Overview
Year 10 (Part 2)

Fareham Academy | Unlocking Potential Creating Opportunity

	Spring 2	Summer 1	Summer 2
Topic(s)	Revision of previous physics learning (P1, P3, and P4) B5 – Homeostasis (overlaps to Sum 1)	B6 – Inheritance, variation and evolution B7 – Ecology (overlaps to Sum 2)	Revision of B5-7 C6 – The rate and extent of chemical change
Topic Objectives	B5: • Students will explore vital life process associated with homeostasis and response – this incorporates both hormonal and nervous response.	B6: • Students will explore the key areas associated with mitosis to link to learning about meiosis and explore the science of inheritance and evolution. B7: • Ecology explores how materials are continually recycled in the living world and students will also explore the impact of living in a sustainable way to ensure our future health, prosperity and well-being.	C6: • Students explore the economic factors associated with maximising the rate and yield of industrial processes.
Acquired Knowledge/ Skills	B5 – Students can: • understand that cells require a constant temperature and pH as well as a constant supply of dissolved food and water for survival • learn that the body utilises a range of control systems • explore the structure and function of the nervous system • explore the hormonal system	B6 – Students can: • explain how meiosis works and link to variation arising in a species and how natural selection contributes as well • know that gene mutations occur continuously, and some are beneficial in plants and animals • explore how scientists have developed selective breeding for the good of the people	C6 – Students can: • recall that chemical reactions can occur at vastly different rates dependent on many variables that can be manipulated in order to speed them up or slow them down • understand that chemical reactions may also be reversible and therefore the effect of different variables needs to be established in order to identify how to maximise the yield of desired product

	• explore hormones related to the menstrual cycle, fertility and contraception • Triple content reference: the brain • Triple content reference: the eye • Triple content reference: control of body temperature • Triple content reference: maintaining water and nitrogen balance in the body • Triple content reference: plant hormones.	• explore the controversy of genetic modification science • Triple content reference: advantages/ disadvantages of sexual and asexual reproduction • Triple content reference: DNA structure • Triple content reference: cloning • Triple content reference: theory of evolution • Triple content reference: speciation • Triple content reference: understanding genetics. B7 – Students can: • understand that the sun is a source of energy that passes through ecosystems • learn that carbon and water are continually recycled by the living world, being released through respiration of animals/plants/decomposing microorganisms and taken up by plants in photosynthesis. • how all species live in ecosystems composed of complex communities of animals/plants dependent on each other and that are adapted to particular conditions, both abiotic/biotic • appreciate that for the world to benefit from these services humans need to engage with the environment in a sustainable way - then explore how humans are threatening biodiversity as well as the natural systems that support it • Triple content reference: decomposition • Triple content reference: impact of environmental change • Triple content reference: trophic levels in an ecosystem • Triple content reference: food production.	• make link to real life industrial process whereby chemists determine the effect of different variables on reaction rate and yield of product, taking compromises into consideration.

Assessments	Before starting the biology learning, students will complete a full physics 1 mock paper.		Before starting chemistry, students will complete a full biology paper 2 mock (likely to form part of their PPE schedule).
Other Links (e.g. SMSC, FBV, Greener Curriculum)	Learning related to homeostasis and living with diabetes. Learning related to reflex and how this keeps us safe in life. Impacts of reaction time and links to effects of alcohol for example. Exploration of the hormones involved in human reproduction including the menstrual cycle. Evaluation of different hormonal and non-hormonal methods of contraception. Explanation of the hormones used in modern reproductive technologies to treat infertility – explicit learning around IVF – overall consideration of impacts on people involved in this. Exploration of the intricate process involved in organ donation.	Exploration of differences between as/sexual reproduction. Understanding of the 'human genome project': includes genes linked to different types of diseases/inherited disorders/tracing human migration patterns from the past. Gender versus sex discussions. Making informed judgements about the economic, social and ethical issues concerning embryo screening. Mutations linked to pepper moths and the industrial revolution. Evaluation of evolution and theories associated to it – links to religion. Evaluation of the impacts of selective breeding in varying contexts. Evaluation of genetic engineering and ethical views associated to this in agriculture and medicine. Analysis of evidence for evolution. MRSA in the context of antibiotic resistance and the associated impacts. Discussion around internal structures becoming more developed due to improvements in areas like microscopes. Impact of abiotic factors affecting communities. Importance of understanding that photosynthetic organisms are the producers of biomass for life on Earth – food we eat, etc.	Economical impacts of RoR/equilibrium for industry – IE how to maximise yield.

		Human impacts of carbon dioxide on atmosphere. Exploration of waste management related to the rapid growth in the human population. Impacts of deforestation. Global warming and its biological consequences. Scientists and concerned citizens have put in place programmes to reduce the negative effects of humans on ecosystems and biodiversity. Exploration of ethical issues associated with cloning. Exploration of uses of gases from decomposition. Exploration of the factors threatening food security.	

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Science Curriculum Overview
Year 11

Fareham Academy | Unlocking Potential Creating Opportunity

	Autumn 1	Autumn 2	Spring 1
Topic(s)	C7 – Organic chemistry C8 – Chemical analysis C9 – Chemistry of the atmosphere C10 – Using resources	Revision as stated at the end of Aut 1 PPEs Full in class chemistry paper 2 mock P5 – forces (overlaps to Spr 1)	P6 – Waves P7 – Magnetism and electromagnetism
Topic Objectives	C7: • Students explore how organic chemistry closely links with real life contexts. C8: • Students appreciate the role of chemical analysts by conducing analytical tests. C9: • Students explore how the atmosphere has evolved, and the current crisis concerns on climate change. C10: • Understand a range of example where the earth provides vital resources and how overuse is creating worldwide problems.	P5: • Students will explore how a range of forces interact with each other and in the world around them.	P6: • Students will compare and contrast waves and their properties. P7: • Students will conclude the physics topic by exploring how magnetism, linked to electromagnetism is used in real life.

Acquired Knowledge/ Skills	C7 – Students can: • comprehend that the chemistry of carbon compounds is so important that it forms a separate branch of chemistry • make links to the fact that the main sources of organic compounds are living, or once-living materials from plants and animals. These sources include fossil fuels which are a major source of feedstock for the petrochemical industry • understand that chemists are able to take organic molecules and modify them in many ways to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents. • Triple content reference: reactions of alkenes and alcohols. • Triple content reference: synthetic and naturally occurring polymers. C8 – Students can: • learn the results for a range of chemical tests where results are based on reactions that produce a gas with distinctive properties, or a colour change or an insoluble solid that appears as a precipitate • link to real life industries: forensic scientists and drug control scientists. • Triple content reference: identification of ions by chemical and spectroscopic means. C9 – Students can: • understand that the Earth's atmosphere is dynamic and forever changing • link the causes of these changes to be as a result of man-made and sometimes part of many natural cycles • know that scientists use very complex software to predict weather and climate	P5 – Students can: • re-engage with the maths components of equation triangles and equation manipulation • understand that engineers analyse forces when designing a great variety of machines and instruments, from road bridges and fairground rides to atomic force microscopes. • link this to understand that anything mechanical can be analysed in this way. • Triple content reference: moments, levers, and gears. • Triple content reference: pressure and pressure differences in fluids. • Triple content reference: changes in momentum.	P6 – Students can: • re-engage with the maths components of equation triangles and equation manipulation • Understand that wave behaviour is common in both natural and man-made systems • explain that waves carry energy from one place to another and can also carry information • link understanding to know that designing comfortable and safe structures such as bridges, houses and music performance halls requires an understanding of mechanical waves • learn that modern technologies such as imaging and communication systems show how we can make the most of electromagnetic waves. • Triple content reference: reflection of waves. • Triple content reference: sound waves. • Triple content reference: waves for detection and exploration. • Triple content reference: lenses. • Triple content reference: visible light. • Triple content reference: black body radiation. P7 – Students can: • understand that engineers make use of the fact that a magnet moving in a coil can produce electric current • understand that when current flows around a magnet it can produce movement meaning that systems that involve control or communications can take full advantage of this. • Triple content reference: electric motors. • Triple content reference: loudspeakers. • Triple content reference: induced potential, transformers, and the National Grid. • Triple content reference: P8 – Space physics.

	change as there are many variables that can influence this • comprehend that the problems caused by increased levels of air pollutants require scientists and engineers to develop solutions that help to reduce the impact of human activity. C10 – Students can: • understand that industries use the Earth's natural resources to manufacture useful products • appreciate that in order to operate sustainably, chemists seek to minimise the use of limited resources, use of energy, waste and environmental impact in the manufacture of these products • show awareness that chemists also aim to develop ways of disposing of products at the end of their useful life in ways that ensure that materials and stored energy are utilised • understand that pollution, disposal of waste products and changing land use has a significant effect on the environment, and environmental chemists study how human activity has affected the Earth's natural cycles, and how damaging effects can be minimised. • Triple content reference: using materials. • Triple content reference: the Haber process and the use of NPK fertilisers.		
Assessments	Running alongside new content being taught above, students will also prepare for 3x full Paper 1 mocks in biology, chemistry and physics (at the start of Aut 2).	PPEs Full in-class chemistry Paper 2 mock.	This leads to the second PPE session where students will complete the full Paper 2 physics mocks and another mock(s) which is to be decided based upon need.

Other Links (e.g. SMSC, FBV, Greener Curriculum)	Environmental impacts of drilling for crude oil on the environment. Consideration of the energy requirements. Exploration of finite resources and use of infinite and renewable resources to generate electricity. Utilizing instrumental methods in real life contexts – e.g. chromatography related to food additives. Exploration of the development of the earth's atmosphere and human contributions to climate change. Impact of greenhouse gases on climate change. Discussion and evaluation of human contributing factors to climate change. Understanding of carbon footprint related to the greenhouse gases emitted over the full life cycle of a product, service or event. Consideration of sustainable development. Learning about potable water and its treatment and natural conversations of the plight of people on the planet that cannot access potable water. Exploring alternative method of extracting metals for our use and the impact of the past and how it impacts now/future. Completing LCAs to assess the environmental impacts of many products. Exploring ways to reduce in use and the reuse/recycling of materials and its environmental impacts.	Exploration of Newton's law. Learning from speed/acceleration links to impacts of driver's thinking (drugs, alcohol, speed) and braking distance (quality of tyres, brakes and weather) - forms part of learning how to drive. Momentum again covered in the context of car/driving safety. Pressure content in real life scenarios.	Dangers of electromagnetic waves – eg UV and sun damage, low impact of X-rays on humans. Uses of electromagnetic waves in everyday life – communication for example. Refraction uses in real life – examples like fishing. Exploring the hazardous effects on human tissue from radiation. Use of compasses related to magnetism in real life activities like camping. Seismic waves provided new evidence that led to discoveries about parts of the Earth which are not directly observable. The work and progress of astronomers and astrophysicists.

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