

	Autumn Term		Spring term		Summer term	
Year 7	1	2	3	4	5	6
Topic Summary	What are homosapiens	The Royal Navy	The reacting world	Body systems	Acid Attack	The amazing brain
Thinking Hard	Acquiring knowledge = DNA and Inheritance. Being creative = The Future of Human Evolution	What organism live in our shores, how does the Royal navy bring "aliens" to our country	Knowledge of how chemicals react mastering the periodic table Independence in practical skills	Linking different body systems to show how they work together. Committing keywords to memory. Acquiring knowledge to link the body systems together	Difference between acids and alkalis. Making salts	How the brain works How we learn new skills Long & Short term memory
Developing Character	Kindness = Pregnancy Gratitude = The developing foetus	Grit -understanding how demanding aspects of Navy work were and are	Curiosity about reactions Self control in practical situations Grit for abstract concepts	Mindfulness of other people's beliefs and issues that could be within families which develops kindness	Curiosity- looking at effects of acid rain	Mindful of mental health Curiosity of how brain works
Understanding Diversity	Respecting human rights - How we look after our young	The Royal Navy does not just operate around Britain but all over the world in wide range of responsibilities.	Environmental diversity for materials	Understanding how the body works, the varied diets that students may encounter.	Understanding the idea that household items can be acids and alkalis and how we can test them.	Mental health disorders Social Media context
Literacy Reading, Oracy	Charles Darwin - Evolution and the story of our Species	Mary Anning - A rough start in Life. 6 Pioneering Women in Marine Science	The women behind the Periodic System	Unbreakable Bones. Which Countries have best / worst diets.	Acid Attack - Acid burn attacks. Can lemons be used to start your car?	Who faces greater discrimination.
Gatsby, Careers	Careers in Nursing / Medicine - Women pioneers in nursing - Mary Seacole	Understanding the range of careers and opportunities that exist in the Royal Navy. Also, marine biology and marine engineering.	Pharmacist, doctor, chemical engineer	laboratory technician, optometrist, audiologist.	chemist, making developing soaps, medicines etc. Women in Chemistry and Science	psychologist, mental health counsellor, mental health nurse, eye tester, neurologist
Mental and Physical Well-being	Being aware of and understanding our bodies and others.	Mental illness within the Royal Navy, PTSD and physical wellbeing.	Maths - calculating rates, drawing graphs. SMSC: recognition that discoveries in Science can have both harmful and beneficial effects (e.g. splitting of the atom).	Weight loss, body image RSHE: Body image	Awareness of the dangers of swallowing Acids and alkalis	Effects of Stress and Sleep, memory techniques.
Cross-Curricular Links	English looking at evil and rebels in Au1 we build further looking at respect human rights. RSHE: Puberty, Sexual Health,	RSHE: PTSD, Mental Health			Food tech - using acids in foods e.g. citric, ethanoic, malic. SMSC: the effects of human activity on the planet	Literacy article - Are rates of mental health different for people of BAME background? RSHE: Mental health. SMSC: the complexity of living things.
Extra-Curricular Links		Trip to Dockyard and Portchester Castle with History to link to the royal navy.		Trip to Science museum, numeracy links to maths using calculators, graph skills		PE
Precise Learning Endpoints: students will learn/ be able to	<ul style="list-style-type: none"> - observe, interpret and record cell structure using a light microscope. - Cells contain: cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts - Plant cells and animal cells have similarities and differences. - the structure of the male reproductive and female reproductive systems. - the process of fertilisation in animals. - the gestation period in humans. 	<ul style="list-style-type: none"> - Objects float and sink due to their density and buoyancy - nutrition is important and having a balanced diet and the consequences of imbalances in the diet, include obesity, starvation and deficiency disease. - All things are made up of particles. Solid, liquid and gases. The particles are arranged in different ways and behave differently - Streamlining of animals and ships enable them to reduce the effect of drag and water resistance. - Speed is measured using the equation speed = distance/time. 	<ul style="list-style-type: none"> - During chemical reactions, atoms are rearranged and new substances are formed. - The periodic table shows all of the elements we have discovered. - Each element has its own symbol. - A pure substance is made up of one type of atom or compound - A mixture is made of two or more different elements or compounds which are not chemically joined - A solute is what dissolves in the solvent - A solution is a liquid containing a dissolved substance (the solvent and solute) - Saturated solutions allow no more solute to dissolve 	<ul style="list-style-type: none"> - A diet is the food we eat - a balanced diet contain the correct amount of each food group - The 7 food groups are: carbohydrates, fats, proteins, water, fibre, minerals and vitamins - fats are needed for energy and insulation - Human normally have two sets of teeth; Deciduous teeth and permanent teeth - vertebrates have an internal skeleton - the skeleton is needed for support, protection and movement - a joint is where two bones meet - there are different types of joints; ball and socket, hinge and fixed 	<ul style="list-style-type: none"> - Substance can either be described as acidic, alkali or neutral - Acids pH between 0-6, neutral substances have a pH of 7, alkalis have a pH between 8-14 - The name of the salt made during neutralisation depends on the acid and alkali used - The volume of alkali needed to neutralise an acid depends on the concentration and volume of the acid - Pennies are made out of copper, copper reacts with oxygen in the air to make copper oxide - Acid rain is caused by sulphur impurities reacting with oxygen in the atmosphere to produce sulphur dioxide 	<ul style="list-style-type: none"> - The brain has different sections - cerebellum, cerebrum and medulla. - Our short term memory has a limited capacity and duration - Our long term memory has unlimited capacity and duration, we could potentially remember this information forever. - There are 5 senses; touch, smell, taste, sight, hearing - receptors in our body detect changes to the environment - There are many different types of mental health disorders which include; depression, obsessive compulsive disorder, eating disorders, phobias and post-traumatic stress disorder.

Subject (Science)	Autumn Term		Spring term		Summer term	
Year 8	1	2	3	4	5	6
Topic Summary	Forensics/CSI	Science of Christmas	Humans place in the universe	Springtime Season	Living at the seaside	Skateboard Science
Thinking Hard	Understanding how Science can be used to solve crimes	Understanding the global aspects of food production (for Christmas dinner)	Acquiring knowledge of other planets and objects within the solar system. Creating ambition within students to be involved with future discoveries	What makes plants grow, why do animals have their young at this time of year	Looking at Science within the home - electricity, insulation, removal of waste.	How can physics help the new Olympic sport of skateboarding
Developing Character	Making life changing decisions	Showing gratitude for gifts that have likely come from all parts of the world.	Developing curiosity of humans within the universe as well as the solar system.	Enquiry skills for discovering the ideal conditions for growing plants	Need to understand that students have responsibility for carbon footprint, recycling and other waste they produce	Independently designing and building own skateboard
Understanding Diversity	That crimes can be committed by anyone in society. Under the law everyone is treated equally and fairly.	Different parts of the world will have alternate views / practices surrounding Christmas.	Awareness of the Earth's position within the solar system. Awareness of Scientists that have contributed to our knowledge of the universe.	Understanding how all life on earth relies on plants (producers)	Thinking about what happens to our waste. Do we use more than we should (in the west)	Thinking about the materials used in the construction of items such as skateboards
Literacy Reading, Oracy	Cold case solved	Tesla files		Tree rings, pests	How can we turn ocean water into energy?, Will artificial trees be the next power plant?, Ecosystems	Sky Brown
Gatsby, Careers	Forensic scientist, SOCO, fingerprint analyst, drug analyst, Police domestic and military	Electrician, nutritionist, food scientist, farmer, climate scientist, waste management	Astronaut, Astronomer,	Farming, growing crops.	electrician. Product design engineers. Heating engineers.	Engineering, Builder, mechanic
Mental and Physical Well-being	Effect of being involved in a crime.	Not all people enjoy Christmas	tolerance of others	Improvement of mental health in the spring - getting out into the countryside.	Mental health improvements from the seaside setting.	
Cross-Curricular Links	building faces from skeletons with art, golden ration with maths, RSHE: human rights to have DNA stored. SMSC: recognition that discoveries in Science can have both harmful and beneficial effects, the effects of Science on their lives	Geography - for globalisation. SMSC for religious aspects,	Maths - calculations of distances, magnifications, using standard form. SMSC: considering the historical context that influenced the way new theories are considered e.g. motion of the Earth, evolution, plate tectonics, Big Bang theory.	SMSC: awe of the scale of living things from the smallest microorganism to the largest tree	SMSC: consideration of issues such as the effects of human activity on the planet e.g. extinction of species, global warming, pollution.	SMSC: developing social skills through group and practical work
Extra-Curricular Links	STEM Club - Crime scene with Yr6. Careers - Forensic Scientist	Food Technology	Winchester Science Centre Planetarium Trip.	Growing food	Focus on women and NAME	
Precise Learning Endpoints: students will learn/ be able to	<ul style="list-style-type: none"> - fingerprints can be used to identify individuals. - DNA is made up of 4 different base pairings, which makes a double helix. - Watson, Crick, Wilkins and Franklin all played a part in the development of the DNA model. - DNA, Chromosomes and genes play a role in heredity. - DNA determines many characteristics of an individual including hair and eye colour - The importance of separation techniques filtration, evaporation, distillation and chromatography - There are a variety of different fibres used to make clothes, some are natural, some are synthetic. - Identification of pure substances - There are 4 different blood groups, A, B, O and AB 	<ul style="list-style-type: none"> - Electricity is the presence or flow of charged particles. - An electric current is the flow of electrons around a circuit. - Static electricity is the build up of electrons on an insulator. - Forces have direction and magnitude and arrows are used to represent these properties. - A force is a push or pull, Forces act pairs, opposite one another. - When seeds germinate the root starts to grow down towards gravity (geotropism), whilst the shoot grows up towards the light (phototropism) 	<ul style="list-style-type: none"> - gravity is the force of attraction between masses. - Weight = mass x gravitational field strength. - The star at the centre of our solar system is called the sun - The planets in our solar system include; Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus Neptune - The moon is Earth's natural satellite, it is the closest object to us in space - The moon reflects light from the sun - Man made Satellites orbiting the Earth are used for navigation, meteorology, astronomy and communication. - The International Space station is a manmade satellite 	<ul style="list-style-type: none"> - that seasons are caused by the Earth's axis being at 23 degrees - that days and nights are due to the Earth rotating on its axis every 24 hrs - that a year (365½ days) is the time it takes for the Earth to complete its orbit around the sun - Soil has another characteristic called its pH. This is a measurement of whether it is acid, neutral or alkali - Photosynthesis in plants removes carbon dioxide from the atmosphere and adds oxygen - Explain the effects of temperature, light on the rate of photosynthesis. - Plants may be adapted to survive in dry environments by means of: changes to surface area, particularly of the leaves, water-storage tissues, extensive root systems. 	<ul style="list-style-type: none"> - in the home there are some simple ways to reduce thermal energy transfers using insulators. - Energy cannot be created or destroyed. It can be stored, or it can be transferred - A carbon footprint is a measure of the impact our activities have on the environment. - Non-native species are brought to different countries on ships and boats. - Non-native species can cause major issues by out competing the native species which can drive natural selection. - Organisms affect and are affected by, their environment, including the accumulation of toxic materials. - Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. 	<ul style="list-style-type: none"> - a force is an interaction between two objects resulting in a change of motion or shape of one or both objects. - The size of a force is measured in Newtons (N). - Forces always come in opposing pairs; the action force and the reaction force. - If more than one force act on an object they combine to produce a resultant force.

Subject (Science)	Autumn Term	Spring term	Summer term
Year 9	1	2	3
Topic Summary	1	2	3
Thinking Hard	B1 Key concepts in Biology, P1-2 Forces and motion, C2 States of matter, separating and purifying substances. Structure of cells, Microscopy, how cells differentiate, exchange and transport materials throughout the cell. The structure of atoms and how we separate substances. How Newton's laws explain motion. B1 - How do scientists think hard about the structure and behaviour of cells when advancing in medicine? P1-2-How do engineers think hard using ideas of forces when designing bridges, fairground rides and machinery? C2 - How do chemical engineers think hard when separating and purifying crude oil?	B2 Cells and control, P3 Conservation of Energy, C1 key concepts, C6 The periodic table Understanding how organisms grow and develop, Explain how energy transfers from system to system. Understanding the development of the atom overtime. Understanding how chemists use theories of structure and bonding to explain the physical and chemical properties of materials. B2 - Is it beneficial for an organism to reproduce on their own? P3 - If Energy cannot be created or destroyed, where did it come from? C1 - What is our planet made of? C6 - Whic element is the most important?	B3 Genetics, P14 Particle model, C1 (KC) bonding, Explaining why there are differences in the inherited characteristics of offspring, Explain how heating a system will change the energy stored in the system and raise its temperature or produce changes of state. B3: How has the discovery of the human genome changed our lives? P14: Why is the sand on the beach always hotter than the water? C1: How is everything in the universe linked together?
Developing Character	B1-Curiosity - How are cells in an animal similar to the cells of a bacteria? P1-2-Grit- Engineers showing grit during design and analysis, and possibly the redesign of products. C2 - Why do chemical engineers need to be mindful of the environment when extracting crude oil?	B2 - Gratitude in advances of knowledge in reproduction such as IVF P3 - Gratitude for our electrical items that make our lives easier C1 - How did Dalton show grit when forming his model of an atom? C6 - Curiosity of the behaviour of a group of elements Curiosity: How systems work, Where does the energy come from?	B3- be mindful of inherited disorders P14 - What is the 4th state of matter?
Understanding Diversity	B1- Why are specialised cells so important? P1-2- Can we keep inventing new roller coasters? C2 - Which countries have the most impacts from crude oil extraction?	B2 - Understanding the different view points surrounding embryonic stem cells P3 - Understand that developing countries need help generating more electricity C1 - Atoms behave differently but are all made of protons, neutrons and electrons C6 - Understand why some elements are more reactive than others developing countries need to produce energy and the exploitation of lithium mining.	B3: Do all humans have the same DNA? P14: Curiosity - Why does ice float?
Literacy Reading, Oracy	B1-Entomology of scientific words used in Biology. Reading the Core Microscope method P1-2 - Reading core practical on acceleration. Breaking Down scientific keywords. Writing the evaluation using the correct terminology C2 - Reading core practical on the composition of inks. Reading method.	B2 - Reading articles on uses of embryonic stem cells P3 - Read article on the future of energy C1 - Read the timeline of the discovery of the structure of an atom C6 - Read the properties of elements	P3: Reading and writing a hypothesis on Calculating Density and Specific Heat Capacity Required Practical Activity. P14: Reading multiple measurements from different instruments. C1: Recalling key terminology and nomenclature.
Gatsby, Careers	B1- Careers in Health, working in a lab, working with animals. P1-2 - Engineering, astrophysics, biomedical engineering, structural engineer, civil engineer C2 - Chemical engineer, lab scientist, environmental scientist, oil rigs	Careers: Engineering, energy companies both fossil fuel and renewable, Health workers B2 - neuroscientists, fertility specialists, oncologist P3 - Work with renewable energy e.g windfarm engineer C1 - Research Chemist C6 - Chemist, pharmacist	B3: Geneticist, Forensic Scientist, P14: Engineering, C1: Chemical engineering, Jeweler, industrial diamond manufacturer
Mental and Physical Well-being	B1- To understand the link between a healthy diets and cell function P1-2 - Improvement to prosthetic limbs C2 - Advances in medicine	B2 - Advances in medical treatments such as IVF and cancer P3 - Reducing energy use to save money C1 - creation of new medicines C6 - Understanding of minerals needed	B3: Living with genetic diseases P14: How to conserve Thermal energy C1: relationships and sharing
Cross-Curricular Links	B1- maths- calculating magnification, art- drawing cells, engineering-working of the microscope P1-2 - P.E- motion and movements, Dance - motion and movement, Engineering - forces C2 - Food tech	SMSC: the effects of Science on their lives e.g. enhancement of plant growth. B2 - E&P- ethics surrounding embryonic stem cells P3 - Geography- energy for all, Engineering- more efficient energy C1 - History- development of the atom C6 - Engineering - different materials, B2 - Hospital labs, medical facilities	Maths: ratios, Engineering disciplines
Extra-Curricular Links	B1-Trip to a lab, e.g Life Lab P1-2 - University talks e.g. astrophysics, trips to theme parks C2 - Trips to labs, forensics labs	P3 - Eddie from Esso C1 - CERN C6 - Nutritionists	
Precise Learning Endpoints: students will learn/ be able to	<ul style="list-style-type: none"> Organisms are made of one or more cells, which need a supply of energy and molecules to carry out life processes. Plant and animal cells (eukaryotic cells) have a cell membrane, cytoplasm and genetic material enclosed in a nucleus. Cells may be specialised to carry out a particular function: An electron microscope has much higher magnification and resolving power than a light microscope The nucleus of a cell contains chromosomes made of DNA molecules. Each chromosome carries a large number of genes. Enzymes are specific and can be denatured due to changes in the active site. Enzymes are biological catalysts. Substances are transported into and out of our cells by diffusion, osmosis and active transport. Scalar quantities have magnitude but no specific direction, vectors have both magnitude and direction. recall and calculate speed, acceleration and momentum. Solid, liquid and gases are states of matter and have specific arrangements and movements. substances can be separated by using distillation, filtration, crystallisation and chromatography. 	<ul style="list-style-type: none"> The electronic structure of an atom can be represented by numbers or by a diagram. The elements in Group 0 of the periodic table are called the noble gases. They are unreactive and do not easily form molecules The elements in Group 1 of the periodic table are known as the alkali metals and have characteristic properties because of the single electron in their outer shell. All substances are made of atoms. An atom is the smallest part of an element that can exist. The discovery of the electron led to the plum pudding model of the atom. The plum pudding model suggested that the atom is a ball of positive charge with negative electrons embedded in it. Cell division by mitosis is important in growth, repair and asexual reproduction. During the cell cycle the genetic material is doubled and then divided into two identical cells Cancer is the result of changes in cells that lead to uncontrolled cell division. Energy transferred in a closed system has no net change to the total energy in that system. Energy systems used on Earth are both renewable and non-renewable. 	<ul style="list-style-type: none"> In sexual reproduction there is mixing of genetic information which leads to variety in the offspring. The formation of gametes involves meiosis. The genome of an organism is the entire genetic material of that organism Some disorders are inherited. These disorders are caused by the inheritance of certain alleles Chemical equations are used to model the changes that happen in chemical reactions. Ionic equations are used to model chemical changes involving ions. Dalton's simple model has changed over time because of the discovery of subatomic particles. An electronic configuration describes the arrangement of electrons in shells in an atom or ion. There are three types of strong chemical bonds: ionic, covalent and metallic. The three states of matter are solid, liquid and gas. Melting and freezing take place at the melting point, boiling and condensing take place at the boiling point. In chemical equations, the three states of matter are shown as (s), (l) and (g), with (aq) for aqueous solutions. The pressure of a fixed mass of gas at a constant volume depends of the temperature of the gas. Specific heat capacity is the thermal energy that must be transferred to change the temperature of 1kg of a material by 1 degree C. Specific latent heat is the energy that must be transferred to change 1kg of a materials from one state of matter to another.

Subject (Science)	Autumn Term	Spring term	Summer term
Subject (Science)	Autumn Term	Spring term	Summer term
Year 10	1	3	
Topic Summary	B2 Cells and control, P14 Particle model, B3 Genetics	B4 - Natural selection and genetic modification, C3 Acids and Alkalis, B5 Health and disease and the development of medicines, B7 Animal coordination, control and homeostasis	P6 Radioactivity, C3 Acids, Electrolysis processes, C4, Obtaining and using metals, Reversible reactions and equilibria, B6 Plant structures and their functions
Thinking Hard	Understanding how organisms grow and develop. Explain how energy transfers from system to system. Explaining why there are differences in the inherited characteristics of offspring. Explain the different states of matter in terms of movement and arrangement of particles. Describing the structure of DNA and meiotic cell development. B2 Cells & Control - How long does it take one cell to make an entire organism? P14 Particle Model - What state of matter is a flame? B3 Genetics - How will our understanding of genetics change society?	Explaining the reactions of acids and alkalis with other substances. How can we avoid diseases by reducing contact with them. How we can produce medicines to help in the fight against disease. Acquiring knowledge of how the body requires control systems that constantly monitor and adjust the composition of the body and its systems. how we can use the knowledge of these systems to control certain aspects such as fertility. B4 - How do fossils provide evidence for human evolution? B4 - Why is genetic engineering so controversial? B5: Is interspecies transmission of disease possible?	Look at how ionising radiation is hazardous but can be very useful. Predict the products of electrolysis of binary products. Understand P6: If radiation is so dangerous why do we use it in medicine? C3: Why would you see bubbling if you electrolysis salt water? C4: How can I create an explosion with only metal and water?
Developing Character	B3 - Mindfulness: Being mindful of inherited disorders B2 - Curiosity: What will STEM Cell research allow society to do? P14 - Curiosity: How many times did Scientists have to melt ice to work out what happened to the particles.	B5 - Self control: thinking about transmission of disease B4 - Curiosity: How will humans evolve and change in the future? C3 - Mindfulness: The causes of acid rain and the effects around the planet. Making fertiliser and impact on farm	P6 - Curiosity: Why do we use radiation for treatment of cancer? C3: Grit: How much alkali to my acid to make the pH turn green? B6: Kindness: Why do we need to look after our plants?
Understanding Diversity	B2 - Which is the more diverse the animal or plant kingdom? P14 - Do the three particle models fully explain the diverse environment around us? E.g rubber band v wood B3 - How can humans be so diverse as only 0.1% of DNA is different between us? What % DNA needs to be different to be a different species?	B4 - How and why did humans evolve to be different around the world, link to early hominid migration patterns. B5: The understanding of other countries and their treatment of disease in particular malaria - new vaccine. The role of gender, age, ethnicity and socio-economic background in the transmission and treatment of communicable disease. (Covid, HIV) C3: Use of Hazard symbols on acids, recognised internationally to ensure health and safety.	B6: Is it ethical to eat plants if they are alive? C4: Why is it important that we recycle metals and resources? P6: What happened in Chernobyl?
Literacy Reading, Oracy	Writing and Reading Scientifically B2 - Linking exercise to cancer recovery. Do Now Reading (https://www.theguardian.com/society/2023/jun/06/walking-and-yoga-can-cut-risk-of-cancer-spreading-or-returning) P14 - https://www.energy.gov/science/doe-explains-the-higgs-boson#:~:text=The%20Higgs%20boson%20is%20the,all%20fundamental%20particles%20have%20mass. B3 - https://www.newscientist.com/definition/genetics/	Writing and Reading Scientifically B4: What will humans look like in a million years? https://www.bbcearth.com/news/what-will-humans-look-like-in-a-million-years B5 - Understanding the importance of drug development. https://www.theguardian.com/technology/2023/may/25/artificial-intelligence-antibiotic-deadly-superbug-hospital C3 - Making better fertiliser https://www.theguardian.com/environment/2022/dec/28/top-conservation-issues-watch-out-for-2023-wetland-fertiliser-amphibians	P6: Reading extract from the Radium Girls. P6: Read an article from Chernobyl. Read the article on Herschel and Ritter (EMS) B6: Photosynthesis core practical C4: 6 mark question on electrolysis
Gatsby, Careers	B2 and B3: Linking the incredible progress science is currently making on a cellular and genetic level to potential careers in biochemistry, chemistry and biology.	B4 - archaeologist, anthropologist C3 - Making soaps, pharmaceuticals	Career: Atomic Energy P6: Will the nuclear power industry be the biggest employer in the future? C3: mining, jewellery maker, use of metals for machinery, mechanics, B3: botanist, ecologist, medic
Mental and Physical Well-being	B2: We are made from cells, which are made from atoms. Atoms are non-living, but how can we be made from something non-living and have feelings and emotions. Linking physical and mental wellbeing to hormones, and chemical messengers and how these chemicals control our well-being and our state of mind. B3: Living with genetic diseases, should we carry out genetic testing at birth and issue people with a genetic passport? How would people with genetic diseases cope? P14: Linking the different energy levels of the particle model to the mind, i.e. settling the mind, linking it to our school value of mindfulness. AND Linking higher energy levels of particles to a quicker transport system in our body, caused by physical exercise and potentially reducing inflammation risks in the body RSHE: Development of treatments for Genetic diseases.	How hormones can control our emotions	P6: Why do doctors stand behind lead walls when carrying out X-rays C4: How are metals useful for prosthetic legs? B6: How do plants make their own food?
Cross-Curricular Links		History and French, RSHE: development and treatment of Cancer. SMSC: recognition that discoveries in Science can have both harmful and beneficial effects, drawing attention to how cultural differences can influence the extent to which scientific ideas are accepted, used and valued.	B6: link to geography and climate change and ecosystems C4: Engineering - uses of materials P6: Radiation - Environmental links linked to genobyl and carbon emissions
Extra-Curricular Links			School trips such as the living rainforest, visit university to see radiography equipment. Work experience, such as use of metals and materials i.e. mechanic etc.
Precise Learning Endpoints: students will learn/ be able to	- Cell division by mitosis is important in growth , repair and asexual reproduction. - During the cell cycle the genetic material is doubled and then divided into two identical cells - Cancer is the result of changes in cells that lead to uncontrolled cell division. - In sexual reproduction there is mixing of genetic information which leads to variety in the offspring. - The formation of gametes involves meiosis. - The genome of an organism is the entire genetic material of that organism - Some disorders are inherited. These disorders are caused by the inheritance of certain alleles - The three states of matter are solid, liquid and gas. Melting and freezing take place at the melting point, boiling and condensing take place at the boiling point. - In chemical equations, the three states of matter are shown as (s), (l) and (g), with (aq) for aqueous solutions. - The pressure of a fixed mass of gas at a constant volume depends of the temperature of the gas. - Specific heat capacity is the thermal energy that must be transferred to change the temperature of 1kg of a material by 1 degree C. - Specific latent heat is the energy that must be transferred to change 1kg of a materials from one state of matter to another.	- Stone tools provide evidence for human evolution. - Genetic engineering allows us to create new breeds and varieties. - Acids in solution are sources of hydrogen ions and Alkalis in solution are sources of hydroxide ions. - A base is a substance that reacts with any acid to form a salt and water. - Diseases caused by viruses, bacteria, protists and fungi are spread in animals and plants - White blood cells help to defend against pathogens by: • phagocytosis • antibody production • antitoxin production. - Homeostasis is the regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes. - The nervous system enables humans to react to their surroundings and to coordinate their behaviour. - The endocrine system is composed of glands which secrete chemicals called hormones directly into the bloodstream. - Blood glucose concentration is monitored and controlled by the pancreas - Hormones control human reproduction, including the menstrual cycle.	- Elements have a characteristic positive charge, but isotopes of an element differ in mass. - Alpha, beta, gamma and neutron radiation are emitted by unstable nuclei. - The half life of a radioactive isotope is the time taken for half the undecayed nuclei to decay. - Electrons change orbit when there is absorption or emission of electromagnetic radiation. - Balance nuclear equation in terms of mass and charge. - In some chemical reactions, the products of the reaction can react to produce the original reactants. Such reactions are called reversible reactions. - Most metals are extracted from ores found in the Earth's crust. - Electrolysis is a process in which electrical energy, from a direct current supply, decomposes electrolytes. - Photosynthetic organisms are the main producers of food and biomass. - Limiting factors on the rate of photosynthesis are light intensity, temperature and carbon dioxide concentration. - Translocation transports sucrose around the plant

Subject (Science)	Autumn Term	Spring term	Summer term	
Year 11	1	2	3	4
Topic Summary	P2 forces and motion, B3 Genetics, C4 obtaining and using metals, reversible reactions and equilibria	P7 (Astronomy (triple only),P8,P3 Energy, forces doing work (springs), C7 Rates of reaction, Heat energy, B7 Animal co-ordination, control and homeostasis	P10,P11(static - triple only), P12,13 Magnetism and Electromagnetic induction. B9 Ecosystems and material cycles. C9 TRIPLE only - Esters and carboxylic acids	EXAMS
Thinking Hard	How do you represent all the forces acting on an object. Understand what is meant by dynamic equilibrium. Explaining why there are differences in the inherited characteristics of offspring. Deduce the relative reactivity of some metals by reactions with water, acids and salt solution. P2: How can parents use distance time graphs to find the route you took home? B3: How will our understanding of genetics change society? C4: How can plants be used to extract metals from the soil	P7 How do we know anything about the universe when we cannot look at it from the outside? P8: How do Engineers use forces when designing a great variety of machines and instruments, from road bridges to fairground rides? P8: Why do scientists say, 'what comes up, must come down?' B7: How we can use the knowledge of our hormonal systems to control certain aspects such as fertility? C7: How can chemical reactions be used to treat sport injuries? C7: Why it is when you speed up a reaction you get the same amount of product? What happens inside glow sticks to make them glow when we crack them? P3: Why doesn't energy disappear from a kettle when you boil it? P3: Mindfulness how we improve our homes to reduce energy loss and the negative impact generating energy has on the environment P7: Mindfulness: Understanding how science describes our place in the universe B7: Curiosity: How hormones control the menstrual cycle. C5: Grit: Understand that you may need to repeat experiments a number of times due to experimental errors P8: Grit-Rearrange and substitute values into many different equations B7: Self control - Are you able to stop your flight or flight response? - adrenal glands releasing adrenaline	How do magnetic fields produce forces and change to voltage of electricity supplies? Calculating the current and voltage produced by a transformer. Understand what is meant by dynamic equilibrium. All species live in ecosystems composed of complex communities and the Sun is a source of energy that passes through these ecosystems. P13: What has magnetism go to do with the northern lights? P12: How do transformers follow the law of conservation of energy? B9: Can ecosystems ever be sustainable? C9: Grit: explaining and applying formulae to esters and alcohols.	Retrieving information from all topics to use in exams.
Developing Character	B3: Be mindful of inherited disorders and how they can affect people's lives. Ethical consideration to testing drugs on animals P2: Optimism working out the maths free body diagrams, resultant forces and work done C4: Understanding why certain metals are more reactive than others. Why can't we make earring out of potassium?	P3: Why doesn't energy disappear from a kettle when you boil it? P3: Mindfulness how we improve our homes to reduce energy loss and the negative impact generating energy has on the environment P7: Mindfulness: Understanding how science describes our place in the universe B7: Curiosity: How hormones control the menstrual cycle. C5: Grit: Understand that you may need to repeat experiments a number of times due to experimental errors P8: Grit-Rearrange and substitute values into many different equations B7: Self control - Are you able to stop your flight or flight response? - adrenal glands releasing adrenaline	B9: Humans benefit from these ecosystem and we need to engage with the environment in a sustainable way. B9-Mindfulness: Every ecosystem can have its own challenges. P12: Curiosity: How magnets can create electricity. P13: Gratitude: How all homes are connected via the national grid. C9: Curiosity: how Wine can turn into vinegar.	Self-control to revise and have Grit to continue even when it becomes overwhelming
Understanding Diversity	P2: Topic has a gender imbalance B3: Some people suffer from genetically inherited diseases C4: Some people who work in mines to extract metals are paid very little money	B7: Mindful of discussing fertility treatment and how it can affect people. C7: Understanding the diverse ways we create materials P3: What are the alternative ways that electricity can be produced? C7: How can people keep warm who live in cold climates? P8: There are numerous calculations that involve energy	Reading exam question and understanding what is being asked. B9: Reading and writing the method C9: Range of different foods containing carboxylic acids.	Be aware that you are not alone, others can be struggling to.
Literacy Reading, Oracy Gatsby, Careers	Reading methods of core practical and explaining key terminology Linking the incredible progress science is currently making on a cellular and genetic level to potential careers in biochemistry, chemistry and biology. Careers in Engineering, Astronaut, Physicist, Race car driver, pilot, footballer Biotech sales, Forensics science, Clinical research, Researcher, Quality control specialist	Reading methods of core practical and explaining key terminology Keyword definitions, writing scientific methods B7: Write a paper to explain how the cause of type 1 and 2 diabetes, and how both can be controlled C7: Reading and extracting information from graph - ONS (analyst, banking) C7: Biomedical scientists carry out reactions to develop new drugs and medicines P3: Engineering - design buildings that are energy efficient P8: Electricians need to be able to calculate the power and efficiency of devices/appliances B7: Nurse and health care workers advising on birth control B7: Diabetic nurse treated patients and advising on the prevention of type 2 diabetes B7: How can Diabetes affect your life? C7: Energy transfers can improve your mental health, by exercising and having a hot chocolate P8: Work done can be calculated when carrying out any type of physical exercise B7: How calculating your BMI could lead to a change in your lifestyle	Reading: chemical formula, interpreting graphs. B9: zoologist, Park Ranger C9: chemist, B9: flood defence engineer, P12: electrical engineer, electrician	revision, notes, creating revision material
Mental and Physical Well-being	Living with genetic diseases, should we carry out genetic testing at birth and issue people with a genetic passport? Should we genetically modify plants and what effect will this have on the ecosystem	How hormones can control our emotions RSHE C7: Maths Calculating the energy change in a reaction given the bond energies P3: Geography - energy generation and impact socially, ecologically and environmentally P3: Geography - theme parks and tourism, link to GPE and KE of rollercoaster rides P8: Maths - Using and rearranging calculations to work out GPE, KE, and Work done B7 PE Link using exercise to control type 2 diabetes and BMI B7: RSHE: Methods of contraception - Barrier and hormonal methods	Geography, maths, SMSC: consideration of issues such as the effects of human activity on the planet e.g. extinction of species, global warming, pollution B9: looking after the planet around you improves mental health B9: Art Zoo trip. B9: Geography: nature reserve, aquarium, Geography: theme parks, salt marshes, parks	stress in exams.
Cross-Curricular Links	P2: Calculating forces, acceleration, speed, using maths to rearrange equations. B3: History looking at human evolution and stone tools. C4: Calculating percentage abundance of elements, working out concentration, mass and volume	How hormones can control our emotions RSHE C7: Maths Calculating the energy change in a reaction given the bond energies P3: Geography - energy generation and impact socially, ecologically and environmentally P3: Geography - theme parks and tourism, link to GPE and KE of rollercoaster rides P8: Maths - Using and rearranging calculations to work out GPE, KE, and Work done B7 PE Link using exercise to control type 2 diabetes and BMI B7: RSHE: Methods of contraception - Barrier and hormonal methods	B9: Art Zoo trip. B9: Geography: nature reserve, aquarium, Geography: theme parks, salt marshes, parks	RSHE: mental health in exams
Extra-Curricular Links	B3 - https://www.newsscientist.com/definition/genetics/ P2- How the understanding of forces allows us to build faster cars, more efficient rockets and planes. Richard Branson invests £600,000 to clean the virgin galactic planes so that they do not consume too much fuel C4.	Engineering, RSHE: IVF, menstrual cycle, pregnancy, menopause, contraception. SMSC: IVF human cloning, recognition that discoveries in Science can have both harmful and beneficial effects. Over reliance on finite resources could lead to climate change. The health of the nation is deteriorating due to the increase and obesity and type 2 diabetes	Engineering, Art, Geography, Food Technology, Maths RSHE: Testing on animals. SMSC: Mental health based around outdoor activity.	
Precise Learning Endpoints: students will learn/ be able to	- Scalar quantities have magnitude but no specific direction, vectors have both magnitude and direction. - recall and calculate speed, acceleration and momentum. - Velocity is the change in distance per second. - Acceleration as a change in velocity per second. - Speed can be determined in the laboratory using light gates and other equipment. - Velocity time graphs show how the velocity of a vehicle changes with time. - In some chemical reactions, the products of the reaction can react to produce the original reactants. Such reactions are called reversible reactions. - Most metals are extracted from ores found in the Earth's crust. - The reactivity of a metal is found by comparing its reactions with other metals. - Phytoremediation and Bioremediation are biological methods for extracting metals from low grade ores. - A lifecycle assessment of a product is a 'cradle to grave' analysis of its impact on the environment. - The Haber process is a reversible reaction between nitrogen and hydrogen to form ammonia. - In sexual reproduction there is mixing of genetic information which leads to variety in the offspring. - The formation of gametes involves meiosis. - The genome of an organism is the entire genetic material of that organism - Some disorders are inherited. These disorders are caused by the inheritance of certain alleles	- A force is a push or a pull that acts on another object due to the interaction with another object. - The extension an elastic object is directly proportional to the force applied, provided that the limit of proportionality is not exceeded. - Photosynthetic organisms are the main producers of food and biomass. - Limiting factors on the rate of photosynthesis are light intensity, temperature and carbon dioxide concentration. - Translocation transports sucrose around the plant - Reactions occur when particles collide and the rate of reaction is increased when frequency and/or collisions is increased. - Heat Energy changes in chemical reactions. - Homeostasis is the regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes. - The nervous system enables humans to react to their surroundings and to coordinate their behaviour. - The endocrine system is composed of glands which secrete chemicals called hormones directly into the bloodstream. - Blood glucose concentration is monitored and controlled by the pancreas - describe the roles of hormones in human reproduction, including the menstrual cycle. - The solar system contains the sun and eight planets, their natural satellites, dwarf planets, asteroids and comets. - Bodies of lower mass will travel in orbits around bodies of much higher mass. - The Doppler effect and red-shift both provide evidence for the nature of the Universe. - Stars go through a number of stages in their lives. Their eventual fate depends on their mass.	- Current can create a magnetic effect. - magnetic forces are due to interactions between magnetic fields. - Step-up and step-down transformers are used in the transmission of electricity in the national grid. - Alternating current in one circuit can induce a current in another circuit. - Biodiversity is the variety of living organisms in an area and can be affected by Humans. - Communities can be affected by abiotic and biotic factors. - The Carbon cycle, water cycle and nitrogen cycle are important processes in the ecosystem. - Parasitism and mutualism are examples of interdependence where the survival of one species is closely linked with another species. - The number of organisms in an area can be found using fieldwork techniques. - Polyesters are condensation polymers - Homologous series have similar reactions as they contain the same functional group - Carboxylic acids form a homologous series of compounds. - An ester link forms each time two different monomers react together. - Biological polymers are naturally occurring condensation polymers.	Students will be able to retrieve information for their Science examinations.