gne	Autumn Term		Spring term		Summer term	
Year 7	1	2	3	4	5	6
Topic Summary	**B1 Cells**	**C1 The particle model, P1 Energy**	**B2 Skeletal and muscular systems and organisation**	**C2 Atoms, elements and compounds, P2 Speed**	**C3 Pure and Impure substances**	**P3 Forces**
Thinking Hard	Apply the EVERY to calculate magnification. Conversion of numerical units in calculations	apply particle diagrams to real life contexts.	interpretation of graphs and data tables.	Develop lines of enquiry and make predictions. developing scientific model	experimental procedures and analysis of chemical reactions	Develop line of inquiries and predictions on scientific concepts
Developing Character	Using calculations to compare cells and subcellular structures	Identifying hazards and risks involved in heating.	grit- remembering all of the names of the bones of the skeleton.		Grit: using scientific equipment to obtain explain scientific concepts.	
Understanding Diversity	There are many different cells in animals, bacteria and plants	Diverse thinking in model development	The diverse nature of muscles within the body and the skeleton.	The diversity of life on Earth created from only 100 elements.	Diversity of different substances	There are different types of force
Literacy Reading, Oracy	Robert Hooke -Discovery of cells	C1 - Democritus and the particle theory P1 - James Joule - First law of thermodynamics	Giovanni Alfonso Borelli: Applying physics to the body	C2- John Dalton - Atomic theory P2 - James Joule - Thermodynamics	Staying ahead of the forgers	Isaac Newton : The laws of motion
Gatsby, Careers	Cytopathologist case study, Biomedical scientist, immunologist, Genetic counselor	C1 - Particle Physicist P1 - Renewable energy consultant	Physiotherapist, Orthopedic surgeon, Sports medicine physician, Occupational therapist, athletic trainer	C2 - Chemical engineer, Pharmacologist, Forensic Scientist P2- Renewable energy consultant, Air traffic controller	Analytical chemist	Structural engineer
Mental and Physical Well-being	Tissue Repair and Healing: Cells such as skin cells, muscle cells, and bone cells are involved in the body's ability to repair itself after injury. For example, after a cut or bruise, skin cells regenerate to heal wounds, and bone cells (osteoblasts) help in the repair of broken bones. Proper cellular function ensures quicker recovery and better physical health.	Air Quality and Cognitive Function: The particle model can be used to understand how pollutants and particulate matter in the air impact mental well-being. Poor air quality, filled with harmful particles, can lead to reduced oxygen intake, headaches, and long-term cognitive decline. Clean air, on the other hand, promotes better brain function and overall mental clarity.	Body confidence when talking about muscles and how this can be exaggerated on social media.	Mental Clarity and Hydration: Water, a simple compound of hydrogen and oxygen atoms, is essential for the brain's function. Dehydration can lead to poor concentration, irritability, headaches, and mental fatigue. Adequate hydration ensures optimal brain function and supports emotional well-being.	Impact of Pure Medications: Pure, uncontaminated medications, whether for physical ailments or mental health conditions, are carefully formulated to target specific issues. Taking pure pharmaceutical compounds under medical supervision can improve health	
Cross-Curricular Links	Physical Education - Muscle Cells and Exercise: How exercise impacts muscle cells and cellular respiration, improving performance and endurance.	Physical Education - Respiration and Energy Transfer: The movement of oxygen and carbon dioxide particles through the lungs and blood is crucial to understanding respiration, energy release, and athletic performance.	PE	Engineering	Water Purification: Geography explores the importance of separating impurities in natural water systems and human water supply, connecting to concepts like desalination, filtration, and distillation.	Maths - converting units
Extra-Curricular Links			STEM Activity - Winchester College Rowing - Rowing is a physically demanding sport that engages multiple muscle groups and involves various skeletal components.	STEM Activity - Science Museum - Exploring different chemical reactions which links to atoms, elements and compounds	STEM Activity - Science Museum - Wonderlab exploring pure and impure substances	STEM Activity - Science planetarium visit - students will apply their understanding of forces to building rockets.
Extended learning checkpoints	End of Topic Test (EOTT)	End of Topic Test (EOTT), Whole School Assessment	End of Topic Test (EOTT)	End of Topic Test (EOTT)	End of Topic Test (EOTT), Whole School Assessment	End of Topic Test (EOTT)
Precise Learning Endpoints: students will learn/ be able to	-Understand how a microscope works - microscopes allow us to calculate the size of cells - Describe and draw the basic structure of cells. -Compare unicellular and multicellular cells. - Cells are specialised for a particular function. - Substances diffuse into and out of cells. -Red blood cells, Root hair cells, palisade cells and muscle cells are specialised cells.	C1 - All physical objects are made from particles. -The arrangement of particles is caused by the forces acting between the particles - substances change state when they are heated or cooled. P1 - objects gain or lose energy from their energy stores. -Joules are the unit for energy - Energy cannot be created or destroyed - Energy can be transferred between stores and we can calculate how quickly this can happen. - 'Extra' Energy can be obtained from sources such as fuels and mains electricity supplies	- Bones work together with muscles and joints to allow us to move. - The skeleton supports, protects and allows movement. - Muscles work in pairs and are called antagonistic muscles -Body cells work together to form our organs.	C2- There are only 92 types of atom that exist naturally and make up everything. - atoms are the smallest unit of matter that can exist on its own. - The periodic table is not simply a list - it has a specific layout, it is arranged in groups and periods which have certain things in common. -The periodic table can be used to work out how many protons, neutrons and electrons an atom has. -Chemical symbols are a system or one or two letters that scientists use around the world, to have a quick way to explain which atoms they are talking about. P2 - The equation that links speed is distance /time - Distance time graphs show how an object's speed changes over time. - Relative motion is the speed of a moving object from the viewpoint of another moving object.	- Diffusion is the movement of particles from an area of high concentration to an area of low concentration. -Kinetic theory states all particles are moving. -A pure substance is only one type of atom, molecule or compound. - Different separation techniques can be used to separate different mixtures.	- Forces have size and direction -There are 10 main forces and they can be catagorised into contact and non-contact -Forces make objects change shape and direction -A moment is the turning effect of a force.

Subject (Science)	Autumn Term		Spring term		Summer term	
Year 8	1	2	3	4	5	6
Topic Summary	**B3 Nutrition and digestion**	**C4 Chemical reactions, P4 Pressure in fluids**	**B4 Gas Exchange**	**P5 Sound, C5 Energy changes**	**P6 Light**	**B5 reproduction**
Thinking Hard	experimental data, interpret graphs, writing conclusions	balancing equations, use for EVERY for calculations, use of experimental procedures and applying scientific apparatus to different experiments, apply to real life examples and scenario based questions	Identifying variables in investigations, interpreting graphs	interpretation of graphs, validity of data, calculate means and ranges	interpretation of graphs, scenario based questions and real-life contexts	link to real-life contexts and apply understanding to exam questions, growth charts, application of pre-known mathematical concepts to solve problems.
Developing Character	Not all bacteria are harmful	Using and re-arranging equations				Kindness - Everyone is different and need to be respected.
Understanding Diversity	Some people do not have a balanced diet		Different style graphs can be used to present data.	awareness of how some people have issues with hearing.	Not everyone sees object the same due the to biology of the eye.	Not all people can conceive naturally. Biological sex is not the same as gender which is more fluid.
Literacy Reading, Oracy	Hopkins and Funk - discovery of vitamins	C4 - Marie Currie P4 - Zheng He - Treasure voyage	Marcello Malpighi - Discovery of alveoli and capillaries in lungs	P5- Paul Langevin: Discovering the magic of sound C5 - Svante Arrhenius - Activation Energy	Architectural glass designer	Sir Roberts Edwards, Dr Patrick Steptoe and JEan Purdy the inventors of IVF
Gatsby, Careers	Dietitian	C4- Environmental chemist P4 - Meteorologist	Respiratory specialist	P5- Sound Engineer C5 - Thermodynamic Engineer	A journey through photography: From early experiments to the digital age.	Reproductive Endocrinologist
Mental and Physical Well-being	Having a healthy diet and understanding that some people many not have this. Deficiency in diet may lead to disease.		Awareness of asthma and smoking	How sound can damage hearing.	Colour Blindness can cause issues with how people perceive colour and how it can affect their everyday life	Understanding that some students may have been an IVF baby or parents may be going through IVF with all of the stresses involved.
Cross-Curricular Links	Food technology - Healthy eating and nutrition Maths - graph skills	Maths - using equations, Geography - air pressure and weather conditions	MAths - drawing graphs with lines of best fit.	Maths using equations to make calculations.	Photography	Religious studies and ethics - Ethical Issues in Reproduction: Ethical discussions around reproduction, including contraception, fertility treatments (e.g., IVF), abortion, and genetic engineering, connect with religious and ethical studies
Extra-Curricular Links		STEM - Science Museum - Wonderlab activity which explores different chemical reactions	STEM Winchester college trip - different physical activities exploring the human body, respiration and endurance			
Extended learning checkpoints	End of Topic Test (EOTT)	End of Topic Test (EOTT), Whole School Assessment	End of Topic Test (EOTT)	End of Topic Test (EOTT)	End of Topic Test (EOTT), Whole School Assessment	End of Topic Test (EOTT)
Precise Learning Endpoints: students will learn/ be able to	- There are seven major components of a human healthy diet. -Deficiency disease can happen if a balanced diet is not followed. -There are nine organs in the digestive system that play a vital role in digestion. -Bacteria have a role in digestion.	C4 - In a chemical reaction chemical bonds in the reactants are broken, the atoms are rearranged and new bonds are made in the products. -There are 4 types of chemical reaction - The law of conservation states the mass of all the reactants is equal to the mass of all the products. - Acids are solutions with pH less than 7, Alkalis are soluble bases with pH greater than 7. -P4 - The relationship between pressure and depth - Pressure is the force exerted on 1m2. - Fluids are substances that flow.	-The respiratory system allows air to pass in and out of the body. - Gas exchange takes place in the lungs -Asthma is when the lining of the airways from the mouth to the lungs becomes irritated and swells up. - Smoking damages the ciliated cells lining the gas exchange system.	P5 - - There are two types of wave. - Waves transfer energy from one place to another - Sound is the transfer of energy detected by our ears. - Microphones, speakers and ultrasound echolocation can produce and detect sound. C5 - When a substance changes state the temperature stays the same. - A heating curve will show what happens to the temperature of a substance when it is heated. - Temperature changes take place when chemical reactions happen.	- Light is a way of transferring energy by waves. -Light waves can interact differently with different materials - Light is an oscillation in electric and magnetic fields - Light can be used to see objects. - Materials respond to different colours of light	- There are two biological sexes - Two parents are required in sexual reproduction - Fertilisation is when the sperm and the ovum fuse. - Males and females have specialised organs for reproduction. -The fetus develops within the Uterus. - The menstrual cycle is a repeating cycle, lasts on average 28 days. - Plants reproduce sexually and have sex organs.

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Subject (Science)	Autumn Term		Spring term		Summer term	
Year 9	1	2	3	4	5	6
Topic Summary	**P7 Electricity in circuits**	**B6 Photosynthesis, B7 Respiration**	**P8 Static electricity, C7 Materials**	**P9 Magnets, B9 inheritance**	**C8 The Earth and its atmosphere, B8 Ecosystems**	**P10 The Particle model, P11 Space**
Thinking Hard	understanding the relationship between current, potential difference and resistance.	B6 - explaining how the structure of a leaf. B7 - comparing aerobic and anaerobic respiration	P8- representing electrostatic force with diagrams	P9 - Comparing and explaining the magnetic field around an electromagnet and a permanent magnet. B9 -explain continuous and discontinuous data	C8 - Explaining the carbon cycle B8 - Using quadrats to estimate population density.	P10 - Using equations to calculate an object's density P11- Using the movement of the Earth to explain seasons and night and day.
Developing Character	**Grit**- fault finding in circuit equipment		understanding the characteristics of metals			
Understanding Diversity	The effect of different components on the flow of charge around a circuit.	How different organisms release energy	There are many different metals and ceramics	be mindful of sensitivities around differences in people	being mindful of people opinions on global warming	We may not be the only lifeform in the universe
Literacy Reading, Oracy	Shuji Nakamura - Lighting the way with blue LED's	B6- The discovery of Photosynthesis B7- Louis Pastueur - Anaerobic respiration	P8- Michael Faraday - Electromagnetic induction. C7- Sheffield steel	P9 - Magnetism - The mystery of magnets B9 - Barbara McClintock - The discovery of jumping genes	B8 - Rachel Carson - Convincing the world about bioaccumulation C8 - Greta Thunberg	P10 - Archimedes and the crown of Syracuse P11 - Hidden figures
Gatsby, Careers	Electrical engineer	B6- Botanist B7 -Brewer	P8- Materials Scientist C7 - Metallurgist	P9- Radiographer B9 - Genetics counsellor	C8 - Mining geologist B8 - Conservation Scientist	P10 - HVAC Engineer P11 - PhD Student - Scientific research
Mental and Physical Well-being	Just as circuits in an electrical system transmit energy through pathways, the brain operates through a network of neurons that communicate via electrical impulses. These neural pathways are crucial for cognitive functions such as memory, learning, and emotional regulation.	During photosynthesis, plants convert sunlight into chemical energy, producing oxygen as a byproduct. This oxygen is essential for the survival of aerobic organisms, including humans. Adequate oxygen levels are crucial for optimal brain function and mood regulation.	Static electricity can cause dry skin and hair. When humidity is low, the skin can lose moisture, leading to dryness, irritation, and flakiness. This physical discomfort can lead to decreased self-esteem or body image issues.	genetic disorders can affect people's physical and mental health	worries about the future of the planet	
Cross-Curricular Links	Maths - calculations using equations	PE- build up of lactic acid	Engineering - ceramics	Engineering - magnets	Geography maths using quadrats to estimate populations.	Maths - equation calculations,
Extended learning checkpoints	End of Topic Test (EOTT)	End of Topic Test (EOTT), Whole School Assessment	End of Topic Test (EOTT)	End of Topic Test (EOTT)	End of Topic Test (EOTT), Whole School Assessment	End of Topic Test (EOTT)
Extended learning checkpoint		ASSESSMENT		assessment	assessment	
Precise Learning Endpoints: students will learn/ be able to	-Circuits are closed loops that carry electricity - Current is the rate of flow of charge. - Electrical insulators and electrical conductors can affect the flow of charge. - There are two types of Circuit - Series and parallel. -Resistance is the slowing down of electrons in a circuit.	B6- - Photosynthesis is the process that plants use to produce their ow - Glucose is used for respiration, making cell walls and converting - Leaves are organs of the plant and are adapted to allow photosy B7- -all living things release energy through aerobic respiration. -Cells can survive without oxygen through anaerobic respiration.	P8- -Static charges build up when charges are transferred. -Materials have a charge because of the particles they are made of. - Charges can exert a non-contact force on each other that we call an electrostatic force. C7- - Some metals are extracted from their ores. - Some metals are more reactive than others and will replace the less reactive metal in a compound. - Ceramics are materials made by firing a starting material in a kiln.	P9 -Some materials are attracted to or repelled from one another. -Magnetic field lines travel from north to south. - The Earth has a magnetic field - When a wire has an electric current flowing through it it will generate a magnetic field. B9 -Genetic information is transmitted from one generation to another. - Variation is the differences between organisms. - Animals compete with each other for food, mates and territory. -Plants compete with each other for light, water, minerals and space. -Biodiversity is the range of different species in an area	C8- - The Earth is made of of different layers. -There are three types of rock, Igneous, sedimentary and metamorphic - Nitrogen, oxygen and argon make up most of the Earth's atmosphere. -Greenhouse gases stop heat from the Earth escaping into space and increase the Earth's average temperature. - The level of carbon dioxide in the atmosphere is kept in balance by a series of biological and chemical processes called the carbon cycle. B8 - Scientists show feeding relationships using food webs and chains. - How organisms depend on each other is called interdependence. - Some chemicals that do not get broken down can build up through the food chain and is called bioaccumulation. -	P10 - The particle model explains how objects have different densities. - Density is how many particles an object has in a specific volume. - Density, mass and volume can be linked by a mathematical equation. - Changing state happens when temperature changes. P11 - Stars, planets, galaxies make up the universe. - Light years are units of distance used in astronomy. -The seasons are explained by the movement of the Earth. -Weight is a force acting on a mass due to it being in a gravitational field.

Subject (Science)						
Subject (Science)	Autumn Term		Spring term		Summer term	
Year 10	1		3			
Topic Summary	**B1 Key concepts in Biology, P1-2 Forces and motion, C2 States of matter, separating and purifying substances.**	**B2 Cells and control, B3 Genetics,C6 The periodic table**	**B4 - Natural selection and genetic modification, C3 Acids and Alkalis**	**C5,6,7 Ionic and covalent bonding, P3 Conservation of energy**	**P4, P5 -Waves- light and the electromagnetic spectrum, B5 Health and Disease**	**P6 Radioactivity, C3 Electrolysis processes, C4, Obtaining and using metals, Reversible reactions and equilibria**
Thinking Hard	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?	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, Describing the structure of DNA and meiotic cell development. B2 Cells & Control - How long does it take one cell to make an entire organism? B3 Genetics - How will our understanding of genetics change society? C6 - Which element is the most important?	Explaining the reactions of acids and alkalis with other substances, **B4 - How do fossils provide evidence for human evolution?** **B4 - Why is genetic engineering so controversial?**	How is everything in the universe linked together? If Energy cannot be created or destroyed where did it come from?	P4 Can the Sun have Sunquakes? P5 How can the Sun purify water? B5: Is interspecies transmission of disease possible?	P6: If radiation is so dangerous why do we use it in medicine? C3 - What would you see bubbling if you electrolyse salt water? C4 - How can I create an explosion with only metal and water?
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?	B3 - Mindfulness: Being mindful of inherited disorders B2 - Curiosity:What will STEM Cell research allow society to do? C6 - Curiosity of the behaviour of a group of elements	**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 farming.**	Grit: drawing dot and cross diagrams. Gratitude for our electrical items that make our lives easier.	Curiosity: How did we first identify colours and do we all see the same? Self control: thinking about transmission of disease	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?
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 - Which is the more diverse the animal or plant kingdom? 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? C6 - Understand why some elements are more reactive than others	**B4 - How and why did humans evolve to be different around the world, link to early hominid migration patterns.** **C3: Use of Hazard symbols on acids, recognised internationally to ensure health and safety.**	Hydrogen in the most common atom in the universe and it is the smallest particle that can take part in a chemical reaction. Understand that developing countries need help generating more electricity	There are different frequencies of waves. 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)	P6: What happened in Chernobyl? C4: Why is it important that we recycle metals and resources?
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.	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) 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 **C3 - Making better fertiliser** https://www.theguardian.com/environment/2022/dec/28/top-conservation-issues-watch-out-for-2023-wetland-fertiliser-amphibians	**: Recalling key terminology and nomenclature.** **Read articles on the future of energy**	Describing wave patterns, reading core practical methods B5 -Understanding the importance of drug development. https://www.theguardian.com/technology/2023/may/25/artificial-intelligence-antibiotic-deadly-superbug-hospital	P6: Reading extract from the Radium Girls. P6: Read an article from Chernobyl. Read the article on Herschel and Ritter (EMS)
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 C6 - Chemist, pharmacist	**B4**- archaeologist, anthropologist **C3** - Making soaps, pharmaceuticals	Chemical engineerings, Jeweler, industrial diamond manufacturer. Renewable energy engineer.	Healthcare professionals - NHS	P6 - Nuclear Engineer
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: We are made from cells, which are made from atoms. Atoms are non-living, but how can we 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?	Awareness of how to help save the planet	Relationships and sharing Reducing energy to save money	Lightwaves can be used to reduce stress. Awareness of hearing impaired people. Controversy over vaccinations	P6: Why do doctors stand behind lead walls when carrying out X-rays. C4: How are metals useful for prosthetic legs?
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	RSHE: Development of treatments for Genetic diseases.	History and French, **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.	Maths: ratios SMSC: Understanding how Discoveries in Science can affect lives.	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 Engineering uses of materials
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	B2: Hospital labs, medical facilities C6 Nutritionists				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.
Extended learning checkpoint	States of matter and microscopes	Cells and the periodic table EOTT, Assessment	Natural selection and Acids	Ionic and covalent bonding	**development of medicines**	waves and light
Precise Learning Endpoints: students will learn/ be able to	- 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.	- 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 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.	-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. - Indicators can be used in acid-alkali titrations -Different soluble and insoluble salts can be prepared in the laboratory.	-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 physical properties of a substance are linked to its bonding and structure. - Atoms can form lattices and molecular structures. -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.	- Waves transfer energy and information. -The speed of a wave is related to its frequency and wavelength and to the time it takes to travel certain distances. Waves refract at boundaries between different materials. -Waves can be reflected, transmitted or absorbed by different materials. -Construct ray diagrams to explain reflection , refraction and total internal reflection. -Light is part of a family of waves called the electromagnetic spectrum, which all have some properties in common. - 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.	P6 -- 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.
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Subject (Science)	Autumn Term		Spring term		Summer term	
Year 11	1	2	3	4	5	6
Topic Summary	**C7 Rates of Reaction, C19 Heat Energy changes in reactions, C17 The periodic table, B7 Animal coordination , control and hormones**	C8 Fuels and Earth Science, C9 Easters, P12, P13 Magnetism and motor effect, electromagnetic induction, P11 Static electricity, P10 Electricity and Circuits	**B9 Ecosystems and material cycles**	**P8,9,15 Energy: forces doing work, forces and their effects, forces and matter (springs)**	Retrieving information from all topics to use in exams.	
Thinking Hard	C7: How can chemical reactions be used to treat sport injuries? What happens inside glow sticks to make them glow when we crack them? B7: How Can hormones increase the chance of pregnancy? How are body mass and type 2 diabetes correlated? C17: Why do alkali metals have different reactivities?	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. P13: What has magnetism go to do with the northern lights? P12: How do transformers follow the law of conservation of energy? C9: Grit: explaining and applying formulae to esters and alcohols.	All species live in ecosystems composed of complex communities and the Sun is a source of energy that passes through these ecosystems. B9- Can ecosystems ever be sustainable?	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?'	Self-control to revise and have Grit to continue even when it becomes overwhelming	
Developing Character	Curiosity: B7: Oxytocin can be called the 'cuddle' hormone how can this make children feel better? C7: Why it is when you speed up a reaction you get the same amount of product?	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.	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.	P8: Grit:Rearrange and substitute values into many different equations	Be aware that you are not alone, others can be struggling to.	
Understanding Diversity	C7:Understanding the diverse ways we create materials C7: How can people keep warm who live in cold climates	Reading exam question and understanding what is being asked. C9: Range of different foods containing carboxylic acids.	Reading exam question and understanding what is being asked. B9- Reading and writing the method	**P8: There are numerous calculation that involve energy** **P9 - How do all the forces on a single body combine to affect it?**	revision, notes, creating revision material	
Literacy Reading, Oracy	Reading methods of core practical and explaining key terminology	Reading: chemical formula, interpreting graphs.	Reading: chemical formula, interpreting graphs.	Reading methods of core practical and explaining key terminology		
Gatsby, Careers	C7: Reading and extracting information from graph - ONS (analyst, banking) C7: Biomedical scientists carry out reactions to development new drugs and medicines	C9:chemist, P12: electrical engineer, electrician	B9: zoologist, Park Ranger, B9: flood defence engineer,	P8: Electricians need to be able to calculate the power and efficiency of devices/appliances	stress in exams.	
Mental and Physical Well-being	C7: Energy transfers can improve your mental health, by exercising and having a hot chocolate	Geography, maths,	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	**P8: Work done can be calculated when carrying out any type of physical exercise**	RSHE: mental health in exams	
Cross-Curricular Links	C7: Maths Calculating the energy change in a reaction given the bond energies	Geography:theme parks, salt marshes, parks	B9: Art Zoo trip, B9:Geography:nature reserve, aquarium, Geography:theme parks, salt marshes, parks	P8: Maths - Using and rearranging calculations to work out GPE, KE, and Work done		
Extra-Curricular Links		Engineering, Art, Geography, Food Technology, Maths RSHE: Testing on animals. SMSC: Mental health based around outdoor activity.	Engineering, Art, Geography, Food Technology, Maths **RSHE**: Testing on animals. **SMSC**: Mental health based around outdoor activity.	Engineering,		
Extended learning checkpoints.	ELC based on year 10 topics:Astronomy, Genetics, States of matter	Fractional distillation, Fuels EOTT, Electromagnets, Electromagnets	Mock exams	work done calculations, Forces EOTT,	Students will be able to retrieve information for their Science examinations.	
Precise Learning Endpoints: students will learn/ be able to	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. - The menstrual cycle is controlled by hormones. - Blood glucose is controlled by glands and hormones - compare the properties and reactions of the elements in group 1, 7 and 0.	-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. - 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. - use equations to calculate current, charge and potential difference.	-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.	P8 -Energy is transferred whenever things happen. -The energy transferred by a force is called work done. p9 - Objects can interact by exerting forces on each other. -Every object usually has more than one force acting on it. P15 -The extension of a spring is the change in length when a force is applied. -There is a linear relationship between force and the length -The equation for linear elastic distortion is F = k x X P7 (TRIPLE) - 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.		