



## Long Term Plan Year 9 Subject

| Half Term | Unit Title                                    | Key Knowledge/Content to learn and retain  | Essential Skills to acquire (subject & generic)   | Link to intent and ethos | Anticipated misconceptions   | Links to previous KS   | Link to future KS   | Opportunity for stretch and high prior attainers   | SMSC & British Values  | Cultural Capital   | Career Link   |
|-----------|---|--|---|--------------------------|--|--|---|--|--|--|---|
| One       | Introduction to science, Organisms and Matter | Use of scientific methods, evaluate risks. Plan experiments and recognise risk and how to control and reduce risk. Introduction to cells and the   | Drawing and labelling scientific diagrams.<br><br>Extended writing<br><br>Develop a line of enquiry based on observation<br><br>Accurate volume readings<br><br>Bar graph drawing<br><br>Line graph drawing<br><br>Evaluate risks<br><br>Investigating the skeletal system<br><br>Observing cells, and identifying cells and specialised cells. |                          | Students often believe digestion and absorption only occur in the stomach. Deoxygenated blood is blue. Blood transports oxygen only; sugars and wastes are transported by another means. Plant food is soil. Recall of plant transport often confused with animal transport. phloem. may believe that transpiration alone is responsible for supplying water for all plant cells. That solid particles are unable to move. | Linked to cell topic completed in KS3 and KS2. Linked to animal topics and identifying that humans are animals.  | Link to physics – distance speed time graphs. Links to health and social care.<br><br>Links to future cell work – and core practical observing cells. Links to engineering materials and maths.<br><br>Linked to Biology 1 – Biology 6 topics at GCSE. Linked to Chemistry 3 at GCSE. | Students to investigate the skeletal system and how it works – compare chicken skeletal system to human system. Compare plant cells and animal cells   | Disability caused by damage/disease to the skeletal system.                      | How plants and animals differ but are living organisms. Health, development, pathogens, disease. Compounds that are strong and conductive.   | Agriculture. Biochemist. Biomedical engineer. Biotechnologist. Chemist. Chemical laboratory technician. Clinical research specialist. Epidemiologist. Chemical Development Engineer. Lecturer. Environmental Chemist Forensic researcher. Forensic scientist. |
| Two       | Physics matter, ecosystems, reactions, waves  | Measuring forces. Use of distance time graph. Gravity on earth and space.<br><br>Food and linked to energy how energy transfers from one organisms to another.<br><br>The way in which waves move through different mediums. | Calculation of speed.<br><br>Drawing and assess a distance-time graph.<br><br>Food webs<br><br>Predator prey relationships<br><br>Reactivity series<br><br>Acids and alkalis<br><br>Different types of waves<br><br>Waves travelling through different mediums.   |                          | Difference between distance and displacement. Gravity pull force – struggle to understand the concept.<br><br>Energy is released from respiration reactions not being made. Arrows the correct way on food webs and chains.<br><br>Understand the big and small number used in chemical formula.   | Linked to previous forces and contact and non-contact. Linked to biology ks2 topics food webs, predator and prey. Linked to acid and alkali products from KS2. | Linked to Biology 16, 17, 18 topics at GCSE. Linked to Physics 9, 10, 11. Linked to Chemistry 5 at GCSE.<br><br>Linked to maths, geography, engineering materials   | Students to investigate the gravity on different planets. To link energy and the food energies to physics energy.  | Car safety and human impact on the environment,                                  | Car safety, driving, speed awareness, taking care of a vehicle, road traffic deaths. Ethical farming, biodiversity, ethics in ecology. Human impact on the environment. Recycling metals rather than extracting new metal. | Rollercoaster engineer. Research Physicist Electrical engineer. Home efficiency improvement practitioner. Astrophysicist Marine Biologist. Ecological engineer. Ecologist. Evolutionary Biologist. Museum laboratory technician. Researcher                   |
| Three     | Genes, earth chemistry, Energy, Organisms     | Understanding the reproductive systems and how these can lead o pregnancy.<br><br>Energy coming from food and how this transfers through the food system.<br><br>Investigating the breathing system.                         | Variation<br><br>Reproductive systems.<br><br>Pregnancy<br><br>Fertilisation<br><br>Earth’s atmosphere.<br><br>Human impact on the Earth.<br><br>Energy in food.<br><br>Cost of electricity.  |                          | Types of variation and how to place this in graph form. The concept of genres being passed through generations. Over-estimating the understanding of the greenhouse effect. Not relying on the mental model of electrons carrying items to drop off.   | Linked to previous energy topics in KS2. Linked to Biology human body. Linked to chemistry and forces.   | Linked to Biology 13 – GCSE. Linked to Chemistry 13 – GCSE.<br><br>Linked to Physics 2, 4, 5 – GCSE.<br><br>Linked to topics Health and Social care, Geography and environment, Biology, engineering systems.   | Students to investigate the differences in energy in foods. To create and model Earth chemistry using other items. To discover how variation occurs and demonstrate this using models.   | Links to health and avoiding teenage pregnancy.                                  | Understanding pregnancy and what factors can affect pregnancy. To understand health through healthy food choices. Understanding what can affect breathing – diseases and infections.                                       | Agriculture Biochemist Biomedical researcher Research scientist Electrician Electrical engineer   |
| Four      | Matter, electricity, ecosystems               | How reactions can cause disasters such as the Hindenburg.<br><br>Photosynthesis and how that helps human survival<br><br>Respiration how energy is created through respiration reactions in both humans and plants.          | Reactivity of metals.<br><br>Creating circuits<br><br>Parallel and series circuits<br><br>Photosynthesis<br><br>Aerobic respiration<br><br>Respiration reactions.   |                          | Not relying on the mental model of electrons carrying items to drop off in electricity. Clarify how plants “produce” – when actually it is gaseous exchange.   | Linked to previous Ecosystems topic in KS2 and KS3. Photosynthesis topic to have been cover in KS2 and KS3.  | Linked to Biology 8 and 9 GCSE. Linked to Chemistry 2. Linked to physics 4 and 5.<br><br>Linked to topics Engineering materials, engineering systems, geography and environmental science, health and social care.  | Students to create their own circuits and investigate how these work and how adding further components affects the circuit.<br><br>Through photosynthesis students are able to know what organelles are involved in what process for photosynthesis and are able to link parts of the plant to the intake of carbon dioxide. | Links to poverty, heat poverty. How plants link to human health and development. | National grid, alternative energy, global energy supplies, global politics. Alternative energy sources, biofuels. Third world poverty.   | Electrical engineer. Energy engineer, Development worker. Agriculture, Farmer, Biomedical engineer. Biotechnologist.  |

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| Five | Reactions, waves,              | <p>pH scale and how they link to common products.</p> <p>How the human body works – and how we are able to hear sound.</p> <p>Combustion and comparing fuels. How this links to our everyday life.</p> <p>EM spectrum – how EM is used in everyday life.</p> | <p>Combustion</p> <p>Thermal decomposition</p> <p>Types of wave</p> <p>Sound waves</p> <p>EM spectrum</p> <p>Using waves to generate electricity.</p>                      |  | <p>Students to be aware of the mass number and the atomic number.</p> <p>Students think that waves are broken down to another type of wave rather than a different degree.</p>   | <p>Linked to previous KS2 and KS3 topics and the body (ears and sound).</p> <p>Reactions to be covered in KS3 in year 7 and 8.</p>   | <p>Linked to Physics 12 GCSE, Linked to Chemistry 7, 8, 9, 10, 11, 12, 13 GCSE.</p> <p>Linked to engineering materials, computer science.</p>                             | <p>Students to develop further skills in EM waves and the development of treatments.</p>     | <p>Links to health via treatments and investigating medicines using EM waves.</p>  | <p>Fuel cells for new powers – hydrogen batteries.</p> <p>Medical physics, communication, 3<sup>rd</sup> world politics.</p> | <p>Research scientist</p> <p>Fuel researcher.</p> <p>Medical engineer.</p> <p>Research physicist.</p> <p>Fibre optics practitioner</p>   |
| Six  | Genes, Earth chemistry, energy | <p>How the greenhouse effect is affecting the Earth. How humans are impacting the Earth.</p> <p>How the Earth moves within the solar system.</p> <p>How to calculate energy transfer and work done.</p>  | <p>Natural selection</p> <p>Extinction and variation</p> <p>Earths and useful resources</p> <p>Recycling</p> <p>Universe</p> <p>Work done</p> <p>Pulleys</p> <p>Levers</p> |  | <p>That students believe global warming and the greenhouse effect are the same.</p> <p>The concept of time and the projected death of the sun, we state it is imminent but this is hard to covey.</p> <p>Heat and temperature being interchanged when they are not.</p> <p>Energy and power being used mistakenly for one another.</p> | <p>Genes linked to cells and chromosomes in KS3 and variation linked to KS2 and KS3.</p> <p>Earth chemistry Linked to KS2 and KS3 in relation to Earth Chemistry.</p> <p>Energy linked to energy topics covered in KS2 and KS3 in year 7,8, 9.</p> | <p>GCSE linked to Biology 16, 17, 18 GCSE. GCSE linked to Chemistry 14. Linked to Physics 1, 2.</p> <p>Linked to geography and the environment, Engineering materials</p> | <p>Students to create models based upon the Earth to develop creativity and model ideas.</p> | <p>The creation of new methods of recycling and how this may look in the future.</p> <p>Eco-housing and the development of more sustainable methods.</p> | <p>How water is cleaned in other countries. The loss of habitat and how this is affecting human and animal life.</p>         | <p>Evolutionary Biologist.</p> <p>Biomedical engineer.</p> <p>Biotechnologist.</p> <p>Palaeontologist.</p> <p>Museum laboratory technician.</p> <p>Astrophysicist</p> <p>Rollercoaster engineer.</p> <p>Architect.</p> <p>Environmentalis t.</p> |