

Long Term Plan – Triple Science (2025-26)

Vision: Our vision is to ignite a passion for science in every student. We strive to create a dynamic, hands-on learning environment where curiosity thrives and students are empowered to explore the wonders of science. Our aim is to develop critical thinkers and problem solvers equipped with the skills and knowledge to address real-world challenges. By integrating sustainable practices and collaborative projects, we prepare students to lead in a rapidly evolving scientific landscape. We are committed to fostering a culture of scientific curiosity and inspiring students to make meaningful contributions to society and the global community.							Year End Points
	HT1	HT2	HT3	HT4	HT5	HT6	
Year 10 Biology	Cell biology Required practical microscopes Required practical osmosis	Organisation Required practical food tests Required practical enzymes	Infection and response	Infection and response	Bioenergetics Required practical photosynthesis Homeostasis and response (The nervous system, brain and eye) Required practical reaction times	Ecology Required practical sampling	By the end of year 10 students will know: How to compare the light and electron microscope, how to covert between mm, μm and nn and how to calculate magnification. The difference between prokaryotic and eukaryotic cells. The role of diffusion, osmosis and active transport and how to apply this knowledge to lungs and fish gills, for example. How normal body cells grow and divide during the cell cycle and the role of mitosis. How the digestive system works and the role of a variety of enzyme groups in digestion. How to test for different food groups and how to find the optimum conditions for enzymes. The need for transport systems in multicellular organisms, including plants, the relationship between the structure and functions of the human circulatory system and the function of the gas exchange system in animals. How evaporation and transpiration are controlled in plants. The relationship between health and disease, communicable diseases including sexually transmitted infections in humans (including HIV/AIDs), non-communicable diseases , the role of bacteria, viruses and fungi as pathogens in animals and plants, the body’s defences against pathogens and the role of the immune system against disease, how to reduce and prevent the spread of infectious diseases in animals and plants, the process of the discovery and development of new medicines and the impact of lifestyle factors on the incidence of non-communicable diseases. How monoclonal antibodies are made and some examples of their uses including pregnancy tests, the diagnosis of disease, monitoring levels of infection, treating disease and research. The process of photosynthesis and the factors affecting the rate of photosynthesis. The importance of cellular respiration and the processes of aerobic and anaerobic respiration both in animals and plants. The difference between a community and an ecosystem. Some abiotic and biotic factors which affect communities; the importance of interactions between organisms in a community, methods of identifying species and measuring distribution, frequency and abundance of species within a habitat, organisms are interdependent and are adapted to their environment. The principles of nervous coordination and control in humans, the relationship between the structure and function of the human nervous system, the relationship between structure and function in a reflex arc.

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Year 10 Chemistry	Atomic structure and the periodic table	Bonding, structure and the properties of matter	Quantitative chemistry	Quantitative chemistry Chemical changes Required practical Titration	Chemical changes Required practical Making salts Required practical Electrolysis	Energy changes Required practical Temperature changes	By the end of year 10 students will know: The different chemical changes that can take place and these chemical changes can be classified in different ways. Students will be able to predict exactly which new substances will be formed. That the extraction of important resources from the earth makes use of the way that some elements and compounds react with each other and how easily they can be ‘pulled apart’ using the principles of electrolysis. How to represent chemical reactions and given information, students will be able to use quantitative methods to determine the purity of chemical samples. How to use titration to determine the concentration of acids and alkalis. That energy changes are an important part of chemical reactions and the interaction of particles often involves the transfer of energy due to the breaking and formation of bonds. Reactions in which energy is released to the surroundings are exothermic reactions, while those that take in thermal energy are endothermic. Students will know that these interactions between particles can produce heating or cooling effects that are used in a range of everyday applications and that some interactions between ions in an electrolyte result in the production of electricity. Cells and batteries use these chemical reactions to provide electricity. Students will also know that electricity can also be used to decompose ionic substances and is a useful means of producing elements that are too expensive to extract any other way. That chemical reactions can occur at vastly different rates. Whilst the reactivity of chemicals is a significant factor in how fast chemical reactions proceed, there are many variables that can be manipulated in order to speed them up or slow them down. Chemical reactions may also be reversible and therefore the effect of different variables needs to be established in order to identify how to maximise the yield of desired product. Students will know that in industry, chemists and chemical engineers determine the effect of different variables on reaction rate and yield of product and whilst there may be compromises to be made, they carry out optimisation processes to ensure that enough product is produced within a sufficient time, and in an energy-efficient way.

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Year 10 Physics	Energy Required practical Thermal insulation	Electricity Required practical Resistance Required practical IV characteristics	Electricity Particle model of matter Required practical Specific heat capacity	Particle model of matter Required practical density Atomic structure	Atomic structure	Waves Required practical Waves. Required practical Radiation and absorption.	By the end of year 10 students will know: Renewable and non-renewable energy sources used on Earth, changes in how these are used. Power as the rate of transfer of energy, calculating energy efficiency for any energy transfers, the domestic a.c. supply; live, neutral and earth mains wires, safety measures, power transfer related to p.d. and current, or current and resistance. Relating models of arrangements and motions of the molecules in solid, liquid and gas phases to their densities, melting, evaporation, and sublimation as reversible changes, calculating energy changes involved on heating, using specific heat capacity; and those involved in changes of state, using specific latent heat, links between pressure and temperature of a gas at constant volume, related to the motion of its particles (qualitative). The nuclear model and its development in the light of changing evidence, masses and sizes of nuclei, atoms and small molecules, differences in numbers of protons, and neutrons related to masses and identities of nuclei, isotope characteristics and equations to represent changes, ionisation; absorption or emission of radiation related to changes in electron orbits, radioactive nuclei: emission of alpha or beta particles, neutrons, or gamma rays, related to changes in the nuclear mass and/or charge, radioactive materials, half-life, irradiation, contamination and their associated hazardous effects, waste disposal, nuclear fission, nuclear fusion and our Sun’s energy. Speed of sound, estimating speeds and accelerations in everyday contexts, interpreting quantitatively graphs of distance, time, and speed. Forces and fields: electrostatic, magnetic, gravity, forces as vectors, calculating work done as force x distance; elastic and inelastic stretching, pressure in fluids acts in all directions: variation in Earth’s atmosphere with height, with depth for liquids, up-thrust force (qualitative). Acceleration caused by forces; Newton’s First Law, weight and gravitational field strength, decelerations and braking distances involved on roads, safety. Pressure, changes in pressure with variation in depth in water and also in the atmosphere, upthrust, floating and density.

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Year 11 Biology	Ecology Required practical decay	Homeostasis and response	Homeostasis and response Inheritance, variation and evolution	Inheritance, variation and evolution			By the end of year 11 students will know: The principles of homeostasis and how nervous coordination and control in humans maintains optimum conditions. The relationship between the structure and function of the human nervous system, the relationship between structure and function in a reflex arc. The principles of hormonal coordination in humans including the hormones involve in human reproduction and the use of hormonal and non-hormonal methods of contraception. How plant hormones enable plants to respond to light and gravity and how hormones are used in horticulture. The detail of homeostasis including the control of body temperature and water levels using the hormone ADH. The basic structure of the kidney and its function in filtering the blood and controlling water levels in the body. The genome as the entire genetic material of an organism and how the genome and its interaction with the environment influence the phenotype of an organism. How sex is determined in humans. How single gene inheritance and single gene crosses involving dominant and recessive phenotypes can occur. The idea that most phenotypes result from the interaction of many genes and how genomics can impact medicine through ideas such as embryo screening and the ethics involved. That there is genetic variety within populations of a species and natural selection leads to evolution. The evidence that scientists use for evolution and how the study of classification has developed. The role of key scientists including; Gregor Mendel, Jean Baptiste Lamarck, Charles Darwin, Alfred Wallace Carl Linnaeus. including; The importance of selective breeding of both plants and animals in agriculture and the use of modern biotechnology in farming along with the practical and ethical challenges. Reasons for the human population explosion and its impact in terms of pollution of the land, water and air. The importance of biodiversity and some of the positive and negative human interactions with ecosystems.

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Year 11 Chemistry	The rate and extent of chemical change Required practical Rates of reaction.	Organic chemistry Chemical analysis Required practical Chromatography Required practical Flame tests	Chemistry of the atmosphere	Using resources Required practical Water purification			By the end of year 11 students will know: How to distinguish between pure and impure substances and how to carry out separation techniques for mixtures of substances: filtration, crystallisation, chromatography, simple and fractional distillation. That carbon compounds are used both as fuels and feedstock, and the competing demands for limited resources. How fractional distillation of crude oil and cracking are used to make more useful materials. How important organic chemistry is and the great variety of carbon compounds that are possible due carbon compounds forming chains and rings linked by carbon atoms. How to identify different types of organic molecules by their functional group and how to name these compounds. The use of addition and condensation polymerisation in creating useful products. How to apply life cycle assessment and recycling to assess environmental impacts associated with all the stages of a product's life. The evidence for the composition and the evolution of the Earth's atmosphere since its formation. The evidence, and the uncertainties in evidence, for climate change. The potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate. Other common atmospheric pollutants: sulphur dioxide, oxides of nitrogen, particulates and their sources. The Earth's water resources through the detailed study of the water cycle and how we obtain potable water and the treatment of waste water to allow safe discharge into the water courses.

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Year 11 Physics	Forces Required practical acceleration Required practical force and extension Waves Required practical Waves.	Waves Required practical light Required practical Radiation and absorption. Magnetism and electromagnetism	Magnetism and electromagnetism Space				By the end of year 11 students will know: Amplitude, wavelength, frequency, relating velocity to frequency and wavelength, transverse and longitudinal waves, velocities differing between media: absorption, reflection, refraction effects Electromagnetic waves, velocity in vacuum; waves transferring energy; wavelengths and frequencies from radio to gamma-rays, production and detection, by electrical circuits, or by changes in atoms and nuclei, uses in the radio, microwave, infra-red, visible, ultra-violet, X-ray and gamma ray regions, hazardous effects on bodily tissues. Reflection and refraction, the causes of refraction, coloured light, how light behaves depends on the medium (transparent, translucent, opaque), what happens to light as it passes through different lenses. Exploring the magnetic fields of permanent and induced magnets, and the Earth's magnetic field, using a compass, magnetic effects of currents, how solenoids enhance the effect, how transformers are used in the national grid and the reasons for their use. The life cycle of a star, how red-shift has proven the Big Bang to be the most realistic method for the creation of the Universe, the main features of the solar system.