

Department	Course	Year Group	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	
Key Stage 3 Science		7	Particles Particle model and the movement of particles in diffusion and changing state. Reproduction techniques. Pure and impure substances, as well as planning and carrying out a practical based on rock salt purification.	Cells, Tissues and Organs How to use a microscope to estimate size, then looks at cell structure. Organization of multicellular organisms in terms of cells-tissues-organs systems and why complex organisms need systems in order to keep cells alive. The digestive system and breathing system are used as two example systems; the adaptations of these systems in terms of diffusion – introducing ideas such as thin membranes, surface area and blood supply.	Energy The main energy stores and pathways. Conservation of energy and the three methods of heat transfer, conduction, convection and radiation. The relationship between power and energy. How to use a joulemeter to measure energy and calculate electricity costs.	Reproduction and Variation The structure of the male and female reproductive system. Sexual reproduction, fertilisation, embryo development and implantation, development of the foetus, birth and growth, plant asexual reproduction and asexual methods. What is meant by a species and examples of variation within a species.	Chemical Reactions Physical and Chemical change. Oxidation and combustion reactions and simple word equations are introduced. Acids and Alkalis, using simple indicators and neutralisation as a further common chemical reaction.	Forces and Motion Drawing forces, drawing force diagrams & measuring force. Looking at effect of balanced and unbalanced forces on the motion of objects. Factors that affect populations of organisms, aspects of changing populations. Classifying living organisms, focusing on the features of the main chordate group.	Ecological Relationships and Classification Food chains, and food webs, what organisms are dependent on each other for, bioaccumulation and bioamplification. Factors that affect populations of organisms, aspects of changing populations. Classifying living organisms, focusing on the features of the main chordate group.		
		8	Light and Sound Light travels in straight lines, reflection and refraction. Vision and problems with vision, the colours of the spectrum and colour is seen, how different coloured light can be produced and affects the colour of objects. Earth's space, the cause of seasons and the Earth's space in the universe.	Periodic Table How an element is an how elements can combine to form compounds and mixtures. Conservation of mass showing the same numbers of atoms on each side of a balanced chemical equation. Periodic Table.	Digestion & Nutrition The components of food, it's uses within the body concept of a balanced diet. Foods tests for the main components and then looking at the organs of the digestive system and the role each plays in digestion. The role of enzymes and gut bacteria.	Material and the Earth The structure of the Earth and some basic plate tectonics and how this can lead to earthquakes and volcanoes. The formation of the three different types of rock and their physical properties as well as fossil formation. How resources, how it has changed over the Earth's history and more recently, and the human impact on this.	Matter Fundamental understanding of the particle model, basic theory and resultant forces. Pressure Definition.	Plants & Photosynthesis Exploring the structure and function of roots, with emphasis on its adaptations. The process of photosynthesis and its importance to humans & animals. How force and how machines can reduce the force needed to do a particular job. Making links with real life objects (bikes, cars, screwdrivers) engineering, tools etc.	Forces in Action Looking at how forces can cause turning effects, how lifts can be amplified, how forces can cause deformation and what elastic deformation is. How force and how machines can reduce the force needed to do a particular job. Making links with real life objects (bikes, cars, screwdrivers) engineering, tools etc.	Space The concept of gravity together with gravity, mass & weight calculations. The scale of the universe and bodies within our solar system. Study of how the seasons work.	
		9	Reactivity The structure of the atom, formation of ions and how this leads to bonding. Reactions of acids with different groups of chemicals to form salts and extraction of these salts. Uses of reactivity for extracting metals and using this to predict or explain reactions.	Reactivity and Redox What electricity is and how current behaves in series and parallel circuits. Ohm's Law is introduced. Magnesium and iron to make electromagnets and some uses of them.	Reactions and Rates How rates are measured focusing on the element of time. The effect of changing concentration, surface area and catalysts on rates. Types of reaction – endothermic, exothermic, combustion as a type of oxidation reaction and thermal decomposition.	Biological Systems and Processes The skeletal and muscular systems, considering how these two interact to produce movement and locomotion as well as the concept of antagonistic muscle pairings. Examines the respiratory system, looking at the mechanism of breathing, lung volumes and the role of diffusion in gas exchange, and the aspects of drugs and exercise on the respiratory and other systems will be explored. Consider the basis of life by investigating the structure and function of DNA.	Atomic Structure Separation techniques - Distillation, Chromatography, Extraction and Crystallisation. The structure of the atom, development of the model of the atom and periodic table. The periodic table and the patterns found in it.	Cell Biology Cells are the basic unit of all forms of life, types of cells. Using microscopes to view cells. Diffusion and internal surfaces.	Infection and Response Pathogens are microorganisms such as viruses, bacteria that cause infectious diseases in animals and plants. How we can avoid diseases by reducing contact with them, as well as how the body uses barriers against pathogens and how our immune system is triggered. Since the 1940s a range of antibiotics have been developed which have proved successful against a number of fatal diseases caused by bacteria, unfortunately many groups of bacteria have now become resistant to these antibiotics.		
Science	OCSE Science	10	Energy The concept of energy stores and Transfers between those stores in a system. Calculating the amount of joules within a system using the formulae for energy in various stores. Renewable and non-renewable resources uses, Advantages and Disadvantages. Cell Biology How structural differences between types of cells enables them to perform specific functions within the organism. These differences in cells are controlled by genes in the nucleus. For an organism to grow, cells must divide by mitosis producing two new identical cells. If cells are isolated at an early stage of growth before they have become too specialised, they can retain their ability to grow into a range of different types of cells. This phenomenon has led to the development of stem cell technology. Atomic Structure and the properties of matter Chemists use theories of structure and bonding to explain the physical and chemical properties of materials. Analysis of structures shows that atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures. Scientists use knowledge of structure and bonding to synthesise new materials with	Electricity Circuit symbols and the concept of current, resistors and variable resistors including variable resistors used in a range of circuits. Domestic uses of electricity including the national grid, transformers and the wiring of the domestic ring. Reproduction The human digestive system provides the body with nutrients, and the respiratory system that provides it with oxygen to remove carbon dioxide. Damage to these systems can be debilitating or fatal. Although there has been huge progress in surgical techniques, especially with regard to coronary heart disease, many interventions would not be necessary if individuals reduced their risks through improved diet and lifestyle. Plant Transport System Plant transport system is designed to ensure environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis. Quantitative Chemistry Quantitative analysis to determine the formulae of compounds and the quantities for reactions, and analysts can then use quantitative methods to	Particle Model of Matter States of matter and the energy changes involved in a change of state. Density and how to find the density of regular and irregular solids and liquids. The concept of Pressure in a gas how it can be affected by temperature and volume. Bioenergetics Biotin how plants harness the sun's energy in photosynthesis in order to make food. Both animals and plants use this oxygen to oxidise food in a process called aerobic respiration which transfers the energy that the organism needs to perform its functions. Anaerobic respiration does not require oxygen to transfer energy, during vigorous exercise the human body is unable to supply the cells with sufficient oxygen and it switches to anaerobic respiration. Chemical Changes Understanding of chemical change began with reactions in a systematic way and organizing their results logically. Use the knowledge of chemical reactions to develop wide range of different materials and processes, it also helped biotechnologists to	Atomic Structure The makeup of the atom, differences between elements and isotopes. Hazards and uses of nuclear radiation (alpha, Beta and Gamma), Half lives of isotopes and contamination. Homeostasis and response Cells in the body can only survive within narrow physical and chemical limits. They require a constant temperature and pH as well as a constant supply of dissolved food and water. Control systems include receptors which sense changes and effectors that bring about changes. Explore the structure and function of the nervous system and hormonal system. Energy Changes Energy changes are an important part of chemical reactions, the interaction of particles often involves transfers of energy due to the breaking and formation of bonds. Reactions in which energy is released to the surroundings are exothermic reactions, while those that take in thermal energy are endothermic. Electrodes 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.	Rates 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 be reversible and therefore the effect of different variables needs to be established in order to identify how to maximise the yield of different product. Understanding energy changes that accompany chemical reactions is important for this process. Chemical Reactions Reactions in which energy is released to the surroundings are exothermic reactions, while those that take in thermal energy are endothermic. Electrodes 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.				
		11	Forces Scalars and vectors including drawing of vector diagrams to resolve forces. Newtons Laws of motion including momentum. Forces and their effect on objects including elasticity. Homeostasis, variation and evolution Discuss how the number of chromosomes are halved during meiosis and then combined with new genes from the sexual partner to produce unique offspring. Some mutations occur continuously and on rare occasions can affect the functioning of the animal or plant, these mutations may be damaging and lead to a number of genetic disorders or death. However a new mutation can be beneficial and consequently, lead to increased fitness in the individual. Organic Chemistry A great variety of carbon compounds is possible because carbon atoms can form chains and rings (called C-Compounds). Sources include fossil fuels which are a major source of hydrocarbons for the petrochemical industry. Chemists are able to take organic molecules and modify them in many ways to make new and useful	Waves Principles of waves including frequency, wavelength and amplitude. The electromagnetic spectrum its uses and Hazards. Measuring waves in a practical environment to determine wavelength and frequency. Evolution Materials including carbon and water are continually recycled by the living world, being released through respiration of animals, plants and decomposing microorganisms and taken up by plants in photosynthesis. All species live in ecosystems composed of complex communities of animals and plants dependent on each other and that are adapted to particular conditions, both abiotic and biotic. Explain how humans are threatening biodiversity as well as the natural systems that support it.	Redox and Electrochemistry Basic principles of magnetism including poles and the uses of attraction. Electromagnetism and the motor effect. Principles of an electromagnet and how to change its strength. Chemistry of the Atmosphere The Earth's atmosphere is dynamic and forever changing. The causes of these changes are sometimes man-made and sometimes part of many natural cycles. Scientists use very complex software to predict weather and climate change there are many variables that can influence this. The problems caused by increased levels of air pollutants require scientists and engineers to develop solutions that help to reduce the impact of human activity.	Atomic Structure States of matter and the energy changes involved in a change of state. Hazards and uses of nuclear radiation (alpha, Beta and Gamma), Half lives of isotopes and contamination. Nuclear Fission and Fusion.					
		12	Genetics The concept of energy stores and Transfers between those stores in a system. Calculating the amount of joules within a system using the formulae for energy in various stores. Renewable and non-renewable resources uses, Advantages and Disadvantages. Genes Scalars and vectors including drawing of vector diagrams to resolve forces. Newtons Laws of motion including momentum. Forces and their effect on objects including elasticity.	Electricity Circuit symbols and the rules surrounding current voltage and resistance in a series and parallel circuit. Domestic uses of electricity including the national grid, transformers and the wiring of the domestic ring. Ohm's electricity and electric fuses.	Particle Model of Matter States of matter and the energy changes involved in a change of state. Density and how to find the density of regular and irregular solids and liquids. The concept of Pressure in a gas how it can be affected by temperature and volume. Magnetism Basic principles of magnetism including poles and the uses of attraction. Electromagnetism and the motor effect. The generator effect and its uses.	Atomic Structure States of matter and the energy changes involved in a change of state. Hazards and uses of nuclear radiation (alpha, Beta and Gamma), Half lives of isotopes and contamination. Nuclear Fission and Fusion.					
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OCSE Biology (as OCSE Science plus additional content)		10	Genetics The concept of energy stores and Transfers between those stores in a system. Calculating the amount of joules within a system using the formulae for energy in various stores. Renewable and non-renewable resources uses, Advantages and Disadvantages. Cell Biology Culturing microorganisms	Electricity Circuit symbols and the rules surrounding current voltage and resistance in a series and parallel circuit. Domestic uses of electricity including the national grid, transformers and the wiring of the domestic ring. Ohm's electricity and electric fuses.	Particle Model of Matter States of matter and the energy changes involved in a change of state. Density and how to find the density of regular and irregular solids and liquids. The concept of Pressure in a gas how it can be affected by temperature and volume. Magnetism Basic principles of magnetism including poles and the uses of attraction. Electromagnetism and the motor effect. The generator effect and its uses.	Atomic Structure States of matter and the energy changes involved in a change of state. Hazards and uses of nuclear radiation (alpha, Beta and Gamma), Half lives of isotopes and contamination. Nuclear Fission and Fusion.					
		11	Inheritance Protein synthesis. Nucleol, Darnen, Nucleolase Speciation	Ecology Biomass and Energy Transfer. Food security and Farming. Dietary	Chemical Changes Titrations	Bioenergetics Biomass and Energy Transfer. Food security and Farming. Dietary					
		12	Homeostasis Many particles	Homeostasis and Response The Brain The eye and vision The kidney		Homeostasis and Response The Brain The eye and vision The kidney					
OCSE Chemistry (as OCSE Science plus additional content)		10	Organic Chemistry Reactions of alkenes Alcohols Carboxylic acids Polymers	Chemical Analysis Carbon and Alion analysis Identifying unknowns Flame emission spectroscopy	Chemical Changes Titrations	Homeostasis and Response The Brain The eye and vision The kidney					
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OCSE Physics		10	Energy The concept of energy stores and Transfers between those stores in a system. Calculating the amount of joules within a system using the formulae for energy in various stores. Renewable and non-renewable resources uses, Advantages and Disadvantages. Genes Scalars and vectors including drawing of vector diagrams to resolve forces. Newtons Laws of motion including momentum. Forces and their effect on objects including elasticity.	Electricity Circuit symbols and the rules surrounding current voltage and resistance in a series and parallel circuit. Domestic uses of electricity including the national grid, transformers and the wiring of the domestic ring. Ohm's electricity and electric fuses.	Particle Model of Matter States of matter and the energy changes involved in a change of state. Density and how to find the density of regular and irregular solids and liquids. The concept of Pressure in a gas how it can be affected by temperature and volume. Magnetism Basic principles of magnetism including poles and the uses of attraction. Electromagnetism and the motor effect. The generator effect and its uses.	Atomic Structure States of matter and the energy changes involved in a change of state. Hazards and uses of nuclear radiation (alpha, Beta and Gamma), Half lives of isotopes and contamination. Nuclear Fission and Fusion.					
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