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	Year 7	Year 8	Year 9	Year 10	Year 11
Phase 1	**PRACTICAL SKILLS** This unit introduces students to the practical nature of Science. It provides the fundamental practical skills that students will require and build upon over at least the next 5 years. **7I – ENERGY & 8K FORCES** This unit looks at food, energy stores and transfers, and energy resources. Introduction to forces. **7F – Acids and alkalis** This unit looks at acids and alkalis and how they are described using a pH number. It looks at neutralisation reactions and some of their uses, and reinforces standard hazard symbols.	**7H – ATOMS, ELEMENTS AND COMPOUNDS** This unit expands on particle theory and explains the difference between atoms, and molecules, elements and compounds, whilst linking these with the more abstract ideas of particle models, naming compounds and word equations. **8E – COMBUSTION** What are combustion and oxidation reactions, including those of hydrocarbons, metals and non-metals? The idea of an exothermic reaction is introduced and there is also a look at the pollution of the air by the products of fossil fuel combustion. There are opportunities to discuss the impact of global warming and methods for controlling carbon dioxide.	**MICROSCOPE AND CELLS** How to use a microscope and how developments in microscopy have allowed us to find out more about sub-cellular structure in plans, animals and bacterial cells How to apply magnification formula How cells are specialised and adapted to their functions **BIOMOLECULES AND ENZYMES** (cont Phase 2)	**EXCHANGE AND TRANSPORT IN ANIMALS** (End from Year 9 phase 4) **HEALTH AND DISEASE** (cont Phase 2) How we define Health About some pathogens, the diseases they cause and how their spread can be reduced or prevented Describe the life cycle of viruses How plants defend themselves from pests and pathogens and how plant disease can be identified How the body is protected against infections How the immune system works (mainly roles of lymphocytes and antibodies) Use of aseptic techniques for culturing organisms How new medicines are developed	**GENETICS** Identify the difference between sexual and asexual reproduction and the need for meiosis Structure of DNA and how to extract DNA Protein synthesis (transcription and translation) How the inheritance of some characteristics occurs in families (Punnett squares, genetic diagrams and pedigree charts) including blood groups and sex-linked disorders Mutation and genetic variation (genome project) Variation and Inherited and environmental factors
Phase 2	**7E – MIXTURES & SEPARATIONS** This unit revises and builds on work in KS2 on materials, specifically on mixtures, solutions and separation techniques using the context of providing clean drinking water. This consolidates the practical skills acquired in Phase 1. **7A – CELLS, TISSUES, ORGANS & SYSTEMS** This unit starts by reminding students about the features of organisms MRSGREN, and then looks at organ systems, organs, tissues and cells. This includes looking at how microscopes have changed and the discoveries it has led to.	**8K – ENERGY TRANSFERS** This unit looks at energy transfers by heating in the context of homes. **7L – SOUND** This unit looks at how sounds are made, transmitted and detected, some uses of sound and compares sound wave with waves on the surface of water. **8J – LIGHT** This unit revises work from KS2 on light, which is then extended to consider how light travels and what happens when it meets an object. The unit is set in the context of stage, film and illusions. **9A – GENETICS & EVOLUTIONS** This unit recaps ideas about the causes of variation and then looks at inherited variation in more detail. DNA is introduced before students consider how inherited genes can affect an organism's survival. The unit ends with coverage of natural selection.	**BIOMOLECULES AND ENZYMES** What biomolecules are and their uses (proteins, lipids and carbohydrates, nucleic acid will be seen in Y11) How to carry out food tests and calorimetry How enzymes work and their importance in nutrition, growth and development How enzymes are affected by pH, temperature substrate concentration **MOVEMENT IN AND OUT OF CELLS** (cont Phase 3)	**HEALTH AND DISEASE** (end from phase 1) **HORMONES AND MENSTRUAL CYCLE** What hormones are and how they work Identify endocrines glands in human body and their role Understand about negative feedback and how the level of thyroxine is controlled Effects of thyroxine and adrenaline on the body How the menstrual cycle is controlled by hormones and how hormones are used in contraception or ART **HOMEOSTASIS** (cont phase 3) Understand the importance of homeostasis How blood glucose concentration is controlled and about diabetes How thermoregulation occurs How kidneys produce urine and about kidney failure	**NATURAL SELECTION AND GENETIC MODIFICATION** How organisms change overtime and evidence for evolution Development of the theory of evolution by natural selection How different methods, including genetic analysis, are being used to investigate evolution How organisms are classified How selective breeding and genetic engineering are carried out – benefits and drawbacks About tissue culture, GMOs, fertilisers and biological control and why they are used in agriculture **REVISION** (cont phase 3)
Phase 3	**7G – THE PARTICLE MODEL** This unit develops an understanding of the different properties of solids, liquids and gases. Scientific method and ideas on experiments, observations, hypotheses and theories are discussed, leading to an understanding of the particle theory of matter. **7K – FORCES** This unit revises the concepts of forces and their effects and extends students' knowledge of friction, gravity and springs. These ideas are presented using a theme of outdoor sports, such as climbing and mountain biking, to link to ideas about forces, friction and pressure. **8I - FLUIDS** This unit looks at changes of state, and then goes on to look at fluids and some of their effects, including pressure, floating and sinking, and drag.	**8D – UNICELLULAR ORGANISMS** Under the broad theme of their uses, this unit takes a detailed look at what unicellular organisms are, the differences between different types, their problems and their uses. **8C – BREATHING AND RESPIRATION** Under the broader theme of water sports, this unit covers gas exchange in humans and other organisms, together with details of aerobic and anaerobic respiration in humans. **9B – PLANT GROWTH** This unit looks at photosynthesis and aerobic respiration in plants in more detail, and then considers plant adaptations. The products we get from plants are then looked at, before studying farming methods and their problems.	**MOVEMENT IN AND OUT OF CELLS** How substances are carried by diffusion, osmosis and active transport How to find out the concentration of solutes in potatoes **MITOSIS AND GROWTH** Stages of mitosis and importance of mitosis in growth, repair and asexual reproduction Growth in animal and plants and how to interpret graphs (eg percentile growth curves) How cells become specialised and the importance of stem cells **THE NERVOUS SYSTEM** (cont Phase 4)	**HOMEOSTASIS** (end from phase 2) **PLANT STRUCTURES AND FUNCTIONS** Role of photosynthesis and how different factors affect its rate How rate of water uptake by a plant is affected by different factors How the reactant and products of photosynthesis are transported (transpiration and translocation) How leaf structure and specialised cells in the plant are adapted to their function How plants are adapted to extreme conditions Phototropism and geotropism - effects and uses of plants hormones	**REVISION**
Phase 4	**8A – DIGESTION & BALANCED DIET** This unit looks at the main components in the human diet and why they are needed. The digestive system is also covered in some detail, and the idea of enzymes is introduced. **7B – ASEXUAL & SEXUAL REPRODUCTION** This unit explores sexual reproduction in animals, in the context of efforts being made by zoos to prevent endangered species becoming extinct. However, the central focus for learning is the human reproductive system and sexual reproductions in humans. **7J – CURRENT ELECTRICITY** This unit looks at the measurement of current and how it behaves in series and parallel circuits, and at voltage and resistance. Various models for thinking about what is happening in circuits are explored, and the unit concludes by looking at how we use electricity safely.	**8F – THE PERIODIC TABLE** This unit examines and strengthens the students' understanding of matter, atoms and chemical and physical change. Students then look at using the trends in the periodic table to make predictions about physical and chemical properties of elements and their compounds. **8G – MTEALS & THEIR USES** This unit builds upon the students' knowledge and understanding of common physical properties of metals, and to introduce their main chemical properties. The idea that reactions can occur at different speeds is also illustrated, leading to the introduction of the general reactivity series of metals. **9F – REACTIVITY** This unit reviews physical change and gas pressure, and then the reactivity series and a chemical method of preventing rusting are covered. Exothermic and endothermic reactions are introduced, followed by displacement reactions. Calculation of percentage change is related to oxidation and thermal decomposition reactions.	**THE NERVOUS SYSTEM** Identify the different parts of the brain and what they control along with spinal and brain problems Identify different specialised cells in the nervous system and explain how the system works How the eye works and how the eye problems are corrected **EXCHANGE AND TRANSPORT IN ANIMALS**(cont Phase 1 of Year 10) The features and role of exchange surfaces including surface area: volume ratio understand the Fick's Law in relation with the rate of diffusion Difference between aerobic and anaerobic respiration How the lungs, heart, blood vessels and blood are adapted to their functions How to calculate cardiac output How to investigate the rate of respiration in living organisms	**ECOSYSTEMS** How ecosystems are organised How communities are affected by biotic and abiotic factors How the abundance and distribution of organisms are measured How energy is transferred through trophic levels About parasitism and mutualism How humans can affect the ecosystems and benefits of maintaining biodiversity How indicator species are used to assess pollution Importance of the water cycle, the carbon cycle and the nitrogen cycle How rate of decomposition of food and compost can vary	**STUDY LEAVE**
	END OF YEAR EXAM	**END OF YEAR EXAM**	**END OF YEAR EXAM**		
	7D – ECOSYSTEMS With a general theme about adaptations, this unit looks at ecosystems and the factors that affect them. This includes the impact of human activity and the importance of biodiversity.	**8L – EARTH & SPACE & 9I FORCES** This unit builds on work from KS2 on the Solar System and looks at the Earth, including the seasons and the Earth's magnetic field and gravity. It also looks at the Solar System and what is beyond the Solar System, whilst revising some aspects of forces and their effects, energy stores and transfers. It then looks at calculations of speed and relative speed and representing journeys on distance-time graphs.			

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