| Topic | Substantive Knowledge | Science Investigation Skills | Substantive Knowledge being Revisited | Important Vocabulary |
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| 7F Acids and Alkalis | Recognise hazard symbols, hazards. Understand what indicators do and the pH scale. Neutralisation reactions, word equations and uses of neutralisation. | All variables practical skills assessment 3 (indigestion remedy) | KS2 Changes which are not easily reversible and reacting acid with sodium bicarbonate. | acid, alkali, indicator, neutralisation, products, reactants, hazard, pH |
| 7V Investigation Skills1 | Meaning of key words and ability to state a hypothesis. | Planning investigations | KS2 investigation skills 7F | hypothesis, variables, risk assessment, method, dependent, independent, control variables. |
| 7J Current electricity | Use a model to explain an electrical circuit, identify series and parallel circuits and know where to put switches within them and know basic components including fuses. Describe how current behaves and use a voltmeter. Increasing the voltage will increase the current. Describe the relationship between resistance and current. | Drawing line graphs 6 (length vs resistance) | KS2 Appliances and series circuit building, circuit symbols including placing switches. Factors affecting bulb brightness. Conductors and insulators. | Current, potential difference, model, parallel, series, charges, resistance, circuit |
| 7C Muscles and bones | Gas exchange system and the lungs. Blood and the heart. Bones skeleton and joints. Antagonistic pairs of muscles. How drugs and alcohol affect us. | Using bar charts 9 (Jaw bite force) | KS2 Skeleton and muscles | Reading, continuous variation, discontinuous variation, variation, bar chart, scatter graph, resources, |
| 7G The Particle Model | Particle arrangement in the three states of matter. Diffusion, the movement of particles and causes of pressure. | Writing a method practical skills assessment 1 (diffusion expt) | KS2 Properties of materials including dissolving and evaporating. | state of matter, particles, diffusion, Air pressure, |
| 7I Energy | Describe the different ways in which energy is transferred and stored and know the joule. Conservation of energy principle Describe fossil fuels and know how they were made. Explain how fossil feels are made and why described as non-renewable. Name and understand some renewable energy, fossil fuels and their advantages and disadvantage. Understand efficiency. | Risk assessment practical skills assessment 5 (heating water with Bunsen) | KS2 Almost nothing on energy other than nutrition. | energy, joule, fossil fuel, renewable |

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| 7A Cells, tissues, organs, systems | MRS GREN life processes and organisms. Plant and animal organs and functions. Also tissue within organs. Cell parts and functions. Recall and understand systems such as plant water transport, animal digestive, breathing etc systems. | Using sources/researching 7 (organ systems) | KS2 Heart, blood vessels, blood. Water and nutrient transport in animals and plants. | cell, tissues, organs, systems Organism magnification cell-surface membrane, nucleus, |
| 7E Mixtures and separation | Classify and describe how mixtures can be separated Including distillation chromatography and filtration.<br>To be able to define the 5S words. | Control variables practical skills Assmt 2 (dissolving) | 7G particle diagrams.<br>KS2 separation of mixtures by sieving, filtration, evaporation. | property, evaporation, filtration, chromatography, distillation, dissolve, solution, solvents, solids, chromatography, distillation, |
| 7B Reproduction in animals | Egg fertilisation in animal reproduction. Compare offspring care in various species. Male and female reproductive systems. Sperm and egg adaptations and menopause. Sexual intercourse, embryo implantation and care in the uterus. Stages of foetus development, caring for foetus and baby. Stages of birth. Adolescence and menstrual cycle. | Using graphs 8 (gestation) | 7A Cell parts<br>KS2 Describe the changes humans go through from childhood to old age. | reproduce, fertilisation, organs, uterus,<br>stamen stigma, pollen |
| 7H Atoms, elements and molecules | Recognise the difference between atoms and molecules, identify mixtures, elements and compounds from descriptions.<br>Use chemical symbols describe and identify metals and non-metals by their properties. Name simple compounds. Use and understand word equations. | Writing a plan 4 (Metals' properties) | 7G particle diagrams<br>KS2 Changes which are not easily reversible. Burning and some reactions. | Chemical reaction, physical change, properties, atom, compound, elements, molecule, bond, |
| 7K Forces | Contact and noncontact forces. Measure forces and masses with their units. Hooke's Law. Friction and how it friction can be changed. Friction can be helpful or not helpful. Calculate pressure using its unit. Describe the effects of high and low pressure in simple situations identify and explain the effects of balanced and unbalanced forces. | Line graph (Hooke's Law) | Gravity, air resistance, water resistance, friction between surfaces. Force multipliers such as levers,, pulleys and gears. Non-contact forces. | Newton, non-contact, contact |

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| 7D Ecosystems | Species, and continuous discontinuous variation. Also causes of inherited variation and adaptations. | Using bar charts and cont/discontinuous variables 10 (Variation in Humans) | KS2 How the environment affects living things. Food chains and terms. Eg producer, predator. | photosynthesis, carbon dioxide, respiration, surface area, adaptation, |
| 7L Sound | Cause of sound, loudness and the link between frequency and pitch. Parts of the ear and their functions, and microphones converts sound into electrical signals.<br>Animals have different hearing ranges. Ultrasound and sonar / echolocation. Compere longitudinal and transverse waves. Recall reflection and superposition. | Conclusions<br>(pitch of sound) | 7G Particle arrangement<br>KS2 Vibrations cause sound, mediums, volume is affected by the size of vibrations and the distance away. | Vibration, ultrasound |
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| 8V Investigation skills. Displaying data | Displaying data on graphs, conclusions and investigation evaluation. | | KS2 and Maths graphs skills. 7J 7C, 7K | Line graph, bar graph, axis, reliable, reproducible, precise, accurate. |
| 8F Periodic Table | History of the discovery of the elements. Understand the reason for using symbols and recall the main symbols for elements. Explain the difference between physical and chemical changes. Interpret chemical formula. Recognise patterns, groups et cetera within the periodic table. Identify metals and non-metals by their properties and position on the table.<br>Understand properties such as freezing and boiling points. | Trends and anomalies (oxides across p. table) | 7G, 7E, 7H. Particle theory. Understanding that everything is made from just a few elements and these elements can combine to make compounds when chemical reactions occur. | atom, compound, physical change, physical property, chemical change, chemical property, metal, non metal, catalyst, chemical property, halogen, physical property |
| 8E Combustion | Describe reactions of hydrogen and hydrocarbons and use word equations. Describe oxidation reactions of metals, changes in mass observed and explain combustion. Use the fire triangle and identify hazard symbols for fires. Describe pollutants from burning fuel and explain how these pollutants cause problems. | Full plan<br>(candle height) | 8F How both elements and compounds react together. | conservation of mass, complete combustion, incomplete combustion, |

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| | Describe the greenhouse effect and how human activity may be causing global warming. | | | |
| 8G Metals and their uses | Describe the properties of metals, catalysts. Metal and non-metal reactions and equations. Describe corrosion and rusting and protection from these. Identify reactants and products of the reaction using symbol equations. Metals with water, reactivity series and word and symbol equations.<br>Metals with acids. Alloys and their properties. Melting points and boiling points. | | 8F 7G. Where metals lie on the periodic table. Particle theory | metal, non-metal, , reactivity series, mixture, permeable, |
| 8H Rocks | Rocks properties and uses. The structure of the Earth, igneous and metamorphic rocks. Grain size, weathering, sedimentary rock formations and their textures. The rock cycle. Extraction and recycling of metals. | Full plan<br>(Rocks absorbing water) | 7F Acids reacting with alkalis. | |
| 8L Earth and Space | Compare different models of the solar system and use the tilt of the earth's axis to explain seasons and the pattern of dark and light on Earth.<br>Magnetic attraction and repulsion, Earth's magnetic field and general magnetic fields. Weight and gravity.<br>Stars and galaxies, constellations, the Milky Way and light-years. | Prediction and displaying data.<br>(daylength bar graph) | 7K Gravity | orbit, planet, star, field, weight, moon, light year. |
| 8I Fluids | Properties of states of matter using particle model. Explain expansion due to temperature. Calculating density and finding the volume of irregular objects. Understand the constant temperature effect while changing state and a description of the particles. Ice's unusually large volume relative to water. | Line graphs<br>(up-thrust) | 7G 7K pressure. Particle theory in liquids and gases. | density, mass, volume, physical change, fluid |

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| | Fluid: pressure changes with depth. Explain gas pressure in terms of particles.<br>Causes of up-thrust and factors which affect it.<br>Changes to drag due to speed or shape. | | | |
| 8J Light | Comparing light and soundwaves.<br>Light in straight lines and reflecting or scattering and even reflections causing an image.<br>Refraction and lenses including how the eye works.<br>Dispersion and rainbows. | Line graphs<br>Refraction of 3 materials. r vs i | KS2 Light travels in straight lines | absorbed, reflect, transmit, reflection, dispersion, Spectrum |
| 8M ** Energy | Stores, transfers, ????<br>What about skills? | | 7I energy is transferred and stored | All 12 Transfers and stores. |
| 8K Energy transfers | Conduction, convection and radiation and ways of reducing heat transfer.<br>Power efficiency and Sankey diagrams.<br>Electricity costs and payback times. | Accuracy and precision (measuring equipment) | 8M Heat is a form of energy | Conduction, convection, radiation, power weight, , Joule, density |
| 8A Food and Nutrition | Nutrients, diets and labels. Food tests. Balanced diet and malnutrition. Parts of the digestive system. Functions of enzymes and bacteria in digestion.<br>Diffusion for absorption and small intestine adaptations. | Risk assessment and control variables. (amylase) | 7G Diffusion | Carbohydrate, fibre, lipid, minerals, protein, starch, sugar, vitamins, digestion, enzymes, accurate |
| 8C Breathing and Respiration | Aerobic respiration. The gas exchange system. Effect of exercise on breathing and heart rate, Respiration and waste products. Effects of reduced oxygen supply. Aerobic respiration and gas exchange in different organisms. | Writing a hypothesis and concluding. (gas exchange) | 7C muscle action and bone functions | asexual reproduction, zygote, pollination, fertilisation, , aerobic respiration, diffusion, gas exchange, mitochondrion, anaerobic exercise, |
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| 8D Unicellular Organisms | Cell features for identifying members of different kingdoms. Unicellular versus multicellular organisms. Yeast brewing and limits. | Hypothesis and concluding. (Mouldy bread) | 7A parts of a cell. | bacteria, diffusion, fungus, microorganism, prokaryote, protoctist, unicellular, viruses, aerobic respiration, anaerobic respiration, decay, decomposer |

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| | Anaerobic bacteria for yoghurt and cheese. Bacterial reproduction. Protists and algae. Decomposers, recycling and the carbon cycle | | | |
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| 9M Equations and units | Substituting into equations, unit conversion and prefixes. | None | Maths, KS2 | micro, milli, kilo, mega, Giga, |
| 9R Patterns of reactivity | Displacement reactions of metals from metal oxides and solutions of metal salts<br>Reactions of acids with metal oxides and carbonates<br>Decomposition of carbonates | Displaying data in tables and charts.<br>Discovering patterns and relationships in data. | 8F compounds. 8G Properties of metals | decomposition, balanced equation, state symbol, symbol equation, displacement salt, acid, base |
| 9I Forces and motion | Names of forces, balanced and unbalanced forces and explaining top speed. Conservation, storing and transferring energy. Conservation of energy and efficiency. Mean speed formula and using simple distance time graphs. Levers and moment calculations. Name some force multiplier machines. | Reproducibility and evaluation (pendulums) | 7K 7M Forces, friction and Mechanical energy transfer. | Accelerate, balanced forces, resultant force, unbalanced forces, conservation of energy, speed, work, gravitational field, direct proportion, |
| 9A Genetics and Evolution | Variation, and causes, and environmental effect.. How sexual reproduction causes inherited variation, normal distribution. DNA discovery and structure.. Chromosomes, genes, genetic information and nuclei. Adaptations and extinction. Preserving biodiversity. Population variation and link to natural selection. | Graphs | 7B, 7A Reproduction and nucleus | Variation, fertilisation, gamete, inherit, chromosome, Gene, biodiversity, |
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