1. Thinking and Working Scientifically

- Asking investigable questions and refining hypotheses
- Experimental design: fair tests, comparative investigations, controls, and variables
- Operational definitions and measurement choices
- Precision, accuracy, uncertainty, significant figures, and units
- Apparatus selection, calibration, range, resolution, and method suitability
- Recording data in scientific tables with headings, units, consistency, and repeated readings
- Processing data: averages, gradients, rates, percentage change, uncertainty, and error where appropriate
- Presenting data using line graphs, scatter graphs, bar charts, best-fit lines, and suitable displays
- Interpreting trends, gradients, anomalies, relationships, and patterns
- Drawing conclusions linked to scientific theory and evidence
- Evaluating reliability, validity, bias, uncertainty, and sources of error
- Improving methods using range, repeats, controls, calibration, and precision
- Laboratory safety, risk assessment, ethical behaviour, and responsible practice

2. Biology: Cells, Organisms, Genetics, Health, and Ecosystems

- Cell structure and function in plant, animal, and microbial cells
- Cell processes: diffusion, osmosis, active transport, and movement of substances where appropriate
- Biological organisation: cells, tissues, organs, organ systems, organisms, populations, communities, and ecosystems
- Enzymes and factors affecting enzyme activity
- Nutrition, digestion, food tests, balanced diet, deficiency, and health
- Transport in plants: xylem, phloem, transpiration, and water movement
- Human transport, gas exchange, circulation, respiration, and excretion
- Respiration: aerobic and anaerobic; energy transfer in living organisms
- Coordination and response: nervous and endocrine systems at an introductory-to-formal level
- Plant and human reproduction, growth, and development
- Inheritance, variation, DNA/genetic information at an appropriate level, dominant/recessive ideas, and simple genetic crosses where appropriate
- Adaptation, natural selection, and evolution at an introductory-to-formal level
- Ecosystems, food webs, nutrient cycles, population change, biodiversity, and human impact
- Disease, immunity, pathogens, transmission, prevention, hygiene, vaccination, and public health at an age-appropriate level
- Biotechnology and microorganisms: fermentation, food production, decomposition, genetic applications at an introductory level, and useful/harmful roles

3. Chemistry: Particles, Atomic Structure, Reactions, Materials, and Environment

- Particulate nature of matter and kinetic theory

- Atomic structure: protons, neutrons, electrons, isotopes at an introductory level where appropriate
- Elements, compounds, mixtures, and separation techniques
- Chemical symbols, formulae, word equations, and balanced symbol equations
- Periodic table structure, groups, periods, and trends at an age-appropriate level
- Metals and non-metals: properties, uses, reactivity, displacement, extraction ideas, and corrosion
- Chemical bonding: ionic, covalent, and simple metallic bonding ideas
- Structure-property links in materials
- Acids, alkalis, indicators, pH, neutralisation, salts, and titration ideas where appropriate
- Quantitative chemistry: relative masses, moles, reacting masses, gas volume, concentration, and stoichiometric reasoning where appropriate
- Redox: oxidation, reduction, oxygen/electron ideas at an age-appropriate level
- Rates of reaction and factors affecting rate
- Energetics: endothermic and exothermic changes, energy profiles at an introductory level where appropriate
- Reversible reactions and equilibrium at an introductory level where appropriate
- Electrochemistry: electrolysis, cells, batteries, and applications at an introductory level where appropriate
- Organic chemistry: hydrocarbons, combustion, fuels, polymers, and environmental links
- Air, water, pollution, treatment, atmospheric issues, carbon impact, sustainability, and material life cycles

4. Physics: Mechanics, Energy, Waves, Electricity, Magnetism, and Atomic Ideas

- Motion: distance, displacement, speed, velocity, acceleration, and motion graphs
- Forces and resultant force
- Newtonian ideas: inertia, acceleration, force-motion relationships, balanced/unbalanced forces, and momentum at an introductory level where appropriate
- Mass, weight, gravity, pressure in solids, liquids, and gases
- Energy stores, transfers, conservation, work, power, and efficiency
- Thermal physics: temperature, internal energy, heat transfer, insulation, specific heat, and change of state ideas where appropriate
- Waves: properties, wave speed, reflection, refraction, diffraction, superposition at an introductory level where appropriate
- Sound: production, transmission, frequency, amplitude, pitch, loudness, and speed in media
- Light: reflection, refraction, lenses, image formation, optical instruments at an introductory level where appropriate
- Electromagnetic spectrum: uses, risks, and safety considerations
- Electricity: charge, current, voltage, resistance, circuit rules, series and parallel circuits, electrical energy, power, and domestic safety
- Magnetism, magnetic fields, electromagnets, motors, generators, electromagnetic induction at an introductory level where appropriate
- Atomic/nuclear physics: radioactivity, half-life concept, uses, risks, and safety at an introductory level where appropriate

5. Earth and Space Science

- Earth structure, plate tectonics, earthquakes, volcanoes, and geological processes
- Rock cycle, mineral resources, soil formation, weathering, erosion, and deposition
- Water cycle, freshwater resources, oceans, and environmental water systems
- Weather, climate, climate data, climate change, and human impact
- Atmosphere, air quality, pollution, greenhouse effect, and sustainability
- Natural hazards, risk reduction, monitoring, and evidence-based preparedness
- Earth resources: minerals, fuels, water, land, renewable and non-renewable resources
- Earth, Sun, Moon system: day/night, seasons, phases, eclipses, tides where appropriate
- Solar System: planets, moons, asteroids, comets, gravity, orbits, and scale
- Stars, galaxies, life cycles of stars, and universe-scale ideas at an age-appropriate level
- Space exploration, satellite technology, remote sensing, and benefits/risks where appropriate

6. Science in STEM Contexts

- Science in health, environment, technology, energy, transport, materials, communication, agriculture, and industry
- Science and design cycle: ask, model, design, test, analyse, improve, and communicate
- Evidence-based decision making with quantitative and qualitative data
- Sustainability: energy use, water, materials, biodiversity, waste, pollution, carbon impact, and circular systems
- Evaluating scientific claims in media, advertising, technical reports, and everyday contexts
- Evidence quality, missing information, uncertainty, assumptions, bias, limitations, and peer review at an introductory level
- Risk, ethics, safety, social responsibility, and global impact in science and technology
- Communicating scientific reasoning using diagrams, data, calculations, models, and technical summaries