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| A picture containing text  Description automatically generated | | Science Curriculum | | AUTUMN 2023 | |
|  | YEAR 7 | YEAR 8 | YEAR 9 | YEAR 10 | YEAR 11 |
| AUT 1 TOPIC | Lab safety/Cells/Particle model/ Energy transfers and costs | Digestion, Periodic table, heating, and cooling | Atoms, elements and compounds  How structure affects properties  Separating mixtures | Earth's atmosphere  (with additional content)  Fuels and human impacts on the atmosphere  (with additional content) | Separating mixtures  (with additional content)  Metals and alloys  (with additional content)  Polymers  (with additional content) |
| Key Focus | Laboratory safety, Bunsen burners, hazard symbols.  Animal/plant cells, specialised cells, organisation.  States of matter, changing state.  Conservation of energy, energy changes and costs. Efficiency | Healthy eating, digestive system.  Patterns in the Periodic table.  Energy transfers, conduction, convection, and thermal radiation. | 1. Atoms and elements.  2. Elements and compounds.  3. States of matter.  4. Forms (allotropes) of carbon.  5. Mixtures.  6. Chromatography. | The Earth’s early atmosphere.  Photosynthesis equation.  How carbon dioxide decreased  The proportions of different gases in the atmosphere.  Crude oil, hydrocarbons, and alkanes.  Fractional distillation and petrochemicals.  Properties of hydrocarbons.  Cracking and alkenes.  Properties of hydrocarbons.  Combustion of hydrocarbons. Atmospheric pollutants from fuels, properties, and effect.  Global climate change. Greenhouse gases.  The carbon footprint and its reduction.  Potable water.  Earth’s resources and sustainable development. Wastewater treatment. Life cycle assessment. | Pure substances.  Formulations.  Quantitative chemistry.  Metal oxides.  Electrolysis.  Life cycle assessment  Ways of reducing the use of resources.  Giant covalent structures. |
| Specification  reference | 8.1  5.1 5.2  3.1 3.2 | 8.4  5.4  3.4 | 5.1.1.1  5.1.2.1  5.2.2.1  5.2.2.2  5.2.3.1  5.2.3.2  5.1.1.2  5.4.1.3  5.8.1.3 | 5.9.1.2  5.9.1.3  5.9.1.4  5.9.1.1  5.7.1.1  5.7.1.2  5.7.1.3  5.7.1.4  5.7.1.3  5.9.3.1  5.9.3.2  5.9.2.1  5.9.2.2  5.9.2.3  5.9.2.4  5.10.1.1  5.10.1.2  5.10.1.3  5.10.2.1  5.10.2.2 | 5.8.8.1  5.8.8.2  5.1.2.3  5.2.2.6  5.3  5.4.4.1  5.4.3  5.10.2.1  5.10.2.2 |
| Practical activities | A selection of laboratory-based experiments. | A selection of laboratory-based experiments. | Entry level certificate  Investigative activity: Do different black pens have different coloured ink? | Required practical 13: Analysis and purification of water samples from different sources, including pH, dissolved solids and distillation. | Required practical 12 (6) – Investigate how paper chromatography can be used to separate and tell the difference between coloured substances. |
| CAREERS | Laboratory technician | Chef, food industry | Analytical Chemist.  Accountant/ Auditor.  Chemical Engineer.  Chemical Development Engineer.  Lecturer.  Environmental Chemist.  Forensic Researcher.  Forensic Scientist | Analytical Chemist.  Accountant/ Auditor.  Chemical Engineer.  Chemical Development Engineer.  Lecturer.  Environmental Chemist.  Forensic Researcher.  Forensic Scientist | Analytical Chemist.  Accountant/ Auditor.  Chemical Engineer.  Chemical Development Engineer.  Lecturer.  Environmental Chemist.  Forensic Researcher.  Forensic Scientist |
| Assessment | Formative assessments | Formative assessments | Formative assessments | ELC Component 4 – Chemistry: Chemistry in our world examination | GCSE Trilogy Mock chemistry paper |
| AUT 2 TOPIC | Movement/Separating mixtures/Current, voltage and resistance | Breathing, types of reaction, contact forces, | Metals and alloys  Polymers  Energy, energy transfers and energy resources | What are the feeding relationships between living organisms?  (with additional content)  What determines where particular species live?  (with additional content) | Energy, energy transfers and energy resources  (with additional content)  Forces and work  (with additional content) |
| Key Focus | Skeletal and muscular systems, joints.  Filtration, evaporation, distillation, and chromatography.  Series and parallel circuits. | Rates of breathing, respiratory system.  Chemical changes, word equations, combustion, thermal decomposition.  Newton’s laws of motion.  Hooke’s law. | 7. Extraction of metals from their ores.  8. Properties of metals.  9. Alloys.  10. Polymers.  1. Changes in energy storage.  2. Energy transfers and efficiency.  3. Energy resources. | Photosynthesis  Rate of photosynthesis Limiting factors.  Plant tissues: details of tissue types.  Plant organ system Transpiration and factors affecting this.  Structure and function of plant organ systems.  Uses of glucose from photosynthesis  Adaptations.  Levels of organisation Communities – interdependence and the stability of communities.  How materials are cycled: additional details about the water cycle, the carbon cycle. | Changes in energy.  Energy changes in systems: Specific heat capacity.  Power: Equation and calculations.  Internal energy: changes of state.  Temperature changes in a system and specific heat capacity. Changes of heat and specific latent heat.  Particle motion in gases  Efficiency.  Density of materials.  Scalar and vector quantities. Gravity.  Resultant forces: free body diagrams.  Forces and elasticity. |
| Specification  reference | 8.1  5.2  2.1 2.2 | 8.3  6.3  1.3 | 5.4.1.3  5.10.2.2  5.2.2.5  5.2.2.7  5.2.2.8 | 4.4.1.1  4.4.1.2  4.2.3.1  4.2.3.2  4.4.1.3  4.4.1.3  4.7.1.4  4.7.2.1  4.7.1.1  4.7.2.2  4.7.1.2 | 6.1.1.2  6.1.1.3  6.1.1.4  6.3.2.1  6.3.2.2  6.3.2.3  6.3.3.1  6.5.1.1  6.5.1.3  6.5.1.4 |
| Practical actrivities | A selection of laboratory-based experiments. | A selection of laboratory-based experiments. | Entry level certificate  Investigative activity:  Which colour is the best emitter of heat radiation, black, white, or silver? | Entry level certificate  Investigative activity: Does the intensity of light affect the rate of photosynthesis.  Required practical 5: investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed. | Required practical 14: an investigation to determine the specific heat capacity of one or more materials.  Required practical 18: Investigate the relationship between force and extension for a spring.  Required practical 19: Investigate the effect of varying the force on the acceleration of an object of constant mass and the effect of varying the mass of an object on the acceleration produced by constant force |
| CAREERS | Electrician, personal trainer | construction, diver | Analytical Chemist.  Accountant/ Auditor.  Chemical Engineer.  Chemical Development Engineer.  Lecturer.  Environmental Chemist.  Forensic Researcher.  Forensic Scientist | Biologist.  Conservation officer.  Ecologist.  Laboratory technician.  Lecturer or teacher.  Marine biologist.  Medical representative.  Microbiologist. | Astronomer.  Clinical scientist, medical physics.  Lecturer/academic.  Nanotechnologist.  Radiation protection practitioner.  Research scientist.  Teacher.  Sound engineer |
| Assessment | Summative, formative assessment | Summative, formative assessment | ELC Component 3 – Chemistry: Elements, mixtures, and compounds | Formative assessments | Formative assessments |
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\*AUT 1 and AUT 2 are different just to give alternative suggestions\*

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| SPR1 TOPIC | Interdependence, Earth, Speed | Respiration, elements, magnets, and electromagnets | | Forces and work  Speed and stopping distances  Atoms and nuclear radiation | | 3.2.3 How life has developed on Earth?  (with additional content) | | Speed and stopping distances.  Atoms and nuclear radiation |
| Key Focus | Food chains and webs, pyramids of numbers and biomass.  Sedimentary, metamorphic, and igneous rock formation.  Speed calculations | Aerobic and anaerobic respiration.  Fermentation.  Elements, compounds, and mixtures.  Magnetic fields and electromagnets. | | 4. Types of forces.  5. Effects of forces.  6. Speed.  7. Stopping distances.  8. Reaction times and stopping distances.  9. Weather conditions and braking distances.  10. Radioactivity. | | Abiotic and biotic factors.  Waste management.  Land use Biodiversity – general background.  Deforestation Global warming Maintaining biodiversity.  Evolution. Evidence for evolution  Fossils.  Selective breeding.  Variation – causes of variation in terms of genotype and phenotype.  mutations.  Extinction  Resistant bacteria including MRSA.  Sexual and asexual reproduction.  Meiosis | | Distance and displacement. scalar and vector quantities. Velocity: distinguish between scalar and vector quantities. The distance-time relationship: graphical representations Acceleration.  Newton’s Laws.  Factors affecting braking distance 2: force and kinetic energy.  Mass number, atomic number and isotopes.  The development of the model of the atom (cf chemistry)  Nuclear equations.  Half-lives and the random nature of radioactive decay. |
| Specification  reference | 9.1  7.1  1.1 | 9.3  5.3  2.3  2.4 | | 6.1.1.1  6.1.2.1  6.1.3  6.5.1.2 | | 4.7.3.2  4.7.3.3  4.7.3.1  4.7.3.4  4.7.3.5  4.7.3.6  4.7.1.2  4.7.1.3  4.6.2.2  4.6.3.1  4.6.2.3  4.6.2.1  4.6.3.3  4.6.3.4  4.6.1.1  4.6.1.2 | | 6.5.4.1.1  6.5.4.1.3  6.5.4.1.4  6.5.4.1.5  6.5.4.2.1  6.5.4.2.2  6.4.1.2  6.4.1.3  6.4.2.2  6.4.2.3  6.5.4.3.4 |
| Practical activities | A selection of laboratory-based experiments. | A selection of laboratory-based experiments. | | Entry level certificate  Investigative activity:  What happens to a car on a ramp when the slope is increased? | | Required practical 7: measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species. | | Required practical 19: Investigate the effect of varying the force on the acceleration of an object of constant mass and the effect of varying the mass of an object on the acceleration produced by constant force. |
| CAREER | Zookeeper, geologist | Crane operator | | Astronomer.  Clinical scientist, medical physics.  Lecturer/academic.  Nanotechnologist.  Radiation protection practitioner.  Research scientist.  Teacher.  Sound engineer | | Biologist.  Conservation officer.  Ecologist.  Laboratory technician.  Lecturer or teacher.  Marine biologist.  Medical representative.  Microbiologist. | | Astronomer.  Clinical scientist, medical physics.  Lecturer/academic.  Nanotechnologist.  Radiation protection practitioner.  Research scientist.  Teacher.  Sound engineer |
| Assessment | Formative assessments | Formative assessments | | ELC Component 5 – Physics: Energy, forces and the structure of matter examination. | | ELC Component 2 – Biology: Environment, evolution, and inheritance examination. | | GCSE Trilogy Mock chemistry paper |
| SPR2 TOPIC | Human reproduction, metals and non-metals, gravity | Photosynthesis, climate, work | | 3.1.1 What is the body made of?  3.1.2 How the body works | | Electrical current  (with additional content)  Domestic electricity  (with additional content) | | What is the body made of?  (with additional content)  How the body works  (with additional content) |
| Key Focus | Fertilisation, conception, pregnancy, menstrual cycle, and puberty.  Metal reactions, reactivity series.  Mass, weight, and gravity. | | Photosynthesis, leaf structure, plant storage.  Carbon cycle, global warming, and its effects.  Work done and energy transfer. Levers and pulleys. | | 1. Cells basic building blocks of living organisms.  2. Tissue and organs exemplified by human circulatory system and the digestive system.  3. Human digestive system.  4. Respiration  5. Infectious (communicable) diseases | | Electrical charge and current.  Current, resistance and potential difference: Standard circuit diagram symbols  Resistors: ohmic conductors, diodes, thermistors  Series and parallel circuits.  Direct and alternating potential difference.  Mains electricity.  Power.  Energy transfers in everyday appliances.  The National Grid. | Cell structure.  Cell differentiation.  Cell division.  Transport in cells.  Structures within the lung.  Pacemaker cells.  Parts of the blood.  Coronary heart disease.  Health issues.  Cancer.  Specific enzyme reactions.  Metabolism.  Anaerobic respiration. |
| Specification  reference | 10.2  6.2  1.2 | | 9.4  7.3  3.3 | | 6.5.4.1.2  6.5.4.3.1  6.5.4.3.2  6.5.4.3.3  6.4.1.1  6.4.2.1  6.4.2.4 | | 6.2.1.2  6.2.1.3  6.2.1.1  6.2.1.4  6.2.2  6.2.3.2  6.2.3.1  6.2.4.1  6.2.4.2  6.2.4.3 | 4.1.1.5  4.1.1.1  4.1.1.4  4.1.2  4.1.3  4.2.2.1  4.2.2.2  4.2.2.3  4.2.2.4  4.2.2.5  4.2.2.7  4.4.2.3 |
| Practical activities | A selection of laboratory-based experiments. | | A selection of laboratory-based experiments. | | Entry level certificate.  Energy in food investigative activity. | | Entry level certificate  Which kettle has the most power?  Required practical 15: use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits.  Required practical 16: use circuit diagrams to construct appropriate circuits to investigate the I-V characteristics of a variety of circuit elements, including a filament lamp, a diode and a resistor at constant temperature. | Required practical 1 - using a microscope to observe, draw and label a selection of plant and animal cells.  Required practical 3 - use qualitative reagents to test for a range of carbohydrates, lipids and proteins.  Required practical 4 - investigate the effect of pH on the rate of reaction of amylase enzyme. |
| CAREER | Nurse.  Metal industry | | Climatologist, | | Biologist.  Conservation officer.  Ecologist.  Laboratory technician.  Lecturer or teacher.  Marine biologist.  Medical representative.  Microbiologist. | | Astronomer.  Clinical scientist, medical physics.  Lecturer/academic.  Nanotechnologist.  Radiation protection practitioner.  Research scientist.  Teacher.  Sound engineer | Biologist.  Conservation officer.  Ecologist.  Laboratory technician.  Lecturer or teacher.  Marine biologist.  Medical representative.  Microbiologist. |
| Assessment | Summative, formative assessment | | Summative, formative assessment | | Formative assessments | | Formative assessments | GCSE Trilogy Mock biology paper |
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| SUM1 TOPIC | Plant reproduction, universe, light | Evolution, Earth resources, pressure | 3.1.3 How the body fights disease?  3.1.4 How the body is coordinated? | Magnetism and electromagnetism  (with additional content)  Different types of waves  (with additional content) | How the body fights disease?  (with additional content)  How the body is coordinated? (with additional content) |
| Key Focus | Plant organs, fertilisation, and seed dispersal.  The solar system. Days, seasons, and years. The moon and its phases.  Reflection, refraction, and dispersion. | Natural selection, biodiversity, and extinction.  Extraction of metals, smelting and electrolysis.  Pressure calculations, buoyancy and sinking. | 6. White blood cells and vaccination.  7. Medical drugs.  8. Automatic control systems in the human body.  9. Hormones.  10. Uses of hormones in controlling fertility. | Poles of a magnet. Magnetic fields.  Electromagnetism.  Transverse and longitudinal waves.  Types of electromagnetic waves.  Properties of electromagnetic waves. Ray diagrams.  Uses and applications of electromagnetic waves. | Types of disease  Fungal and protist diseases  Antibiotics and painkillers.  Discovery and development of drugs.  Reflex arc.  Homeostasis  Control of blood glucose concentration.  Type 1 and 2 diabetes. |
| Specification  reference | 9.2  7.2  4.2 | 10.3  7.4  1.4 | 4.3.1.6  4.3.1.7  4.5.2  4.5.3.1  4.5.3.3  4.5.3.4 | 6.7.1.1  6.7.1.2  6.7.2.1  6.6.1.1  6.6.2.1  6.6.2.2  6.6.2.3  6.6.2.4 | 4.1.1.1  4.1.1.4  4.1.2  4.1.1.5  4.1.3  4.2.2.1-4.2.2.5  4.2.2.7  4.4.2.1  4.3.1.2  4.3.1.3  4.3.1.1  4.3.1.2  4.3.1.4  4.3.1.5 |
| Practical activities | A selection of laboratory-based experiments. | A selection of laboratory-based experiments. |  | Required practical 20: make observations to identify the suitability of apparatus to measure the frequency, wavelength, and speed of waves in a ripple tank and waves in a solid and take appropriate measurements.  Required practical 21: investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface. | Required practical 6- plan and carry out an investigation into the effect of a factor on human reaction time. |
| CAREER | Astrologist, groundkeeper | Historian, geologists | Biologist.  Conservation officer.  Ecologist.  Laboratory technician.  Lecturer or teacher.  Marine biologist.  Medical representative.  Microbiologist. | Astronomer.  Clinical scientist, medical physics.  Lecturer/academic.  Nanotechnologist.  Radiation protection practitioner.  Research scientist.  Teacher.  Sound engineer | Biologist.  Conservation officer.  Ecologist.  Laboratory technician.  Lecturer or teacher.  Marine biologist.  Medical representative.  Microbiologist. |
| Assessment | Formative assessments | Formative assessments | ELC Component 1 – Biology: The human body examination | ELC Component 6 – Physics: Electricity, magnetism, and waves examination |  |
| SUM2 TOPIC | Variation, acids and alkalis, sound | Inheritance, chemical energy, wave properties and effects | 3.4.1 Reactions of acids  (with additional content)  3.4.2 Energy and rate of reaction  (with additional content) | 3.3.1 Atoms, elements and compounds  (with additional content)  3.3.2 How structure affects properties  (with additional content) |  |
| Key Focus | Environmental and genetic variation.  Indicators, neutralisation  Uses of acids and alkalis.  Pitch, loudness, and echoes. The structure of the ear. | Inherited characteristics, chromosomes, genes, and DNA.  Exothermic and endothermic reactions.  Speed, frequency, and wavelength. Transverse and longitudinal waves. | The reactivity series: Reactions of Group 1 and transition metals with water and dilute acid; formation of ions; Reactivity series.  Displacement reactions. Test for Hydrogen.  Neutralisation of acids and salt production: Addition of nitric acid; ions, formulae, and symbol equations.  The pH scale and neutralisation.  Soluble salts: details of salt production. Test for carbon dioxide.  Test for oxygen.  Test for chlorine.  Exothermic and endothermic reactions: Reaction profiles and activation energy.  Rates of chemical reactions.  Catalysts.  Calculating rates of reaction including use of graphs.  Collision theory and activation energy.  Reversible reactions and dynamic equilibrium. | Development of the model of the atom and Periodic table.  Relative electrical charges of subatomic particles.  Size and mass of atoms. Relative atomic mass. Electronic structure.  Groups 0, 1, and 7.  Chemical bonds and properties of ionic, covalent, and metallic substances.  Graphene and fullerenes. |  |
| Specification  reference | 1.1  6.1  4.1 | 10.4  6.4  4.3  4.4 | 5.4.1.2  5.8.2.1  5.3  5.4.2.2  5.4.2.4  5.4.2.3  5.8.2.3  5.8.2.2  5.8.2.4  5.5.1.1  5.5.1.2  5.6.1.2  5.6.1.4  5.6.1.1  5.6.1.3  5.6.2 | 5.1.1.2 – 5.1.1.7  5.2.1  5.2.2.3  5.2.2.4  5.2.3.3 |  |
| Practical activities | A selection of laboratory-based experiments. | A selection of laboratory-based experiments. | Component 4: Chemistry – Chemistry in our world, Outcome 4  Investigative activity: Does the concentration of a substance affect the speed of a reaction?  Required practical 8: Preparation of a pure, dry sample or a soluble salt from an insoluble oxide or carbonate, using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution.  Required practical 11: Investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produces and a method involving change in colour or turbidity. |  |  |
| CAREER | Singer, doctor/nurse | Surfer, doctor/nurse | Analytical Chemist.  Accountant/ Auditor.  Chemical Engineer.  Chemical Development Engineer.  Lecturer.  Environmental Chemist.  Forensic Researcher.  Forensic Scientist | Analytical Chemist.  Accountant/ Auditor.  Chemical Engineer.  Chemical Development Engineer.  Lecturer.  Environmental Chemist.  Forensic Researcher.  Forensic Scientist |  |
| Assessment | Summative, formative assessment | Summative, formative assessment | Formative assessments | Formative assessments |  |
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