Year 10 Science Curriculum

Qualification: GCSE Combined Science Trilogy - AQA

Biology Subject Content: B1

CELL BIOLOGY

Cell structure:

- Eukaryotes and prokaryotes
- Animal and plant cells
- Cell specialisation
- Cell differentiation
- Microscopy

Cell Division:

- Chromosomes
- Mitosis and the cell cycle
- Stem cells

Transport in cells:

- Diffusion
- Osmosis
- Active Transport

ORGANISATION

Principles of organisation

Animal tissues, organs and organ systems:

- The human digestive system
- The heart and blood vessels
- Blood
- Coronary heart disease
- Health issues
- The effect of lifestyle on some non-communicable diseases

Chemistry Subject Content: C1

ATOMIC STRUCTURE AND THE PERIODIC TABLE

A simple model of the atom, symbols, relative atomic mass, electronic charge and isotopes:

- Atoms, elements and compounds
- Mixtures
- The development of the model atom
- Relative electrical charges of subatomic particles
- Size and mass of atoms
- Relative atomic mass
- Electronic structure

The Periodic Table:

- Introduction to the Periodic Table
- Development of the Periodic Table
- Metals and non-metals
- Group 0
- Group 1
- Group 7

BONDING, STRUCTURE AND THE PROPERTIES OF MATTER

Chemical bonds, ionic, covalent and metallic:

- Chemical bonds
- Ionic bonding
- Ionic compounds
- Covalent bonding

Physics Subject Content: P1

ENERGY

Energy changes in a system, and the ways energy is stored before and after such changes:

- Energy stores and systems
- Changes in energy
- Energy changes in systems
- Power

Conservation and dissipation of energy:

- Energy transfers in a system
- Efficiency
- National and global energy resources

ELECTRICITY

Current, potential difference and resistance:

- Standard circuit diagram symbols
- Electrical charge and current
- Current, resistance and potential difference
- Resisitors
- Series and parallel circuits

Domestic uses and safety:

- Direct and alternating potential difference
- Mains electricity

Energy transfers:

- Cancer

Plant tissues, organs and systems:
- Plant tissues
- Plant organ system

INFECTION AND RESPONSE

Communicable Diseases:
- Communicable diseases
- Viral diseases
- Bacterial diseases
- Fungal diseases
- Protist diseases
- Human defence mechanisms
- Vaccination
- Antibiotics and painkillers
- Discover and development of drugs

BIOENERGETICS

Photosynthesis:
- Photosynthetic reaction
- Rate of photosynthesis
- Uses of glucose from photosynthesis
- Aerobic and anaerobic respiration
- Response to exercise
- Metabolism

- Metallic bonding

How bonding and structure are related to properties of substances:
- The three states of matter
- State symbols
- Properties of ionic compounds
- Properties of small molecules
- Polymers
- Giant covalent structures
- Properties of metals and alloys
- Metals as conductors

Structure and bonding of carbon:
- Diamond
- Graphite
- Graphene and fullerenes

QUANTITATIVE CHEMISTRY

Chemical measurements, conservation of mass and the quantitative interpretation of chemical equations:
- Conservation of mass and balanced chemical equations
- Relative formula mass
- Mass changes when a reactant or product is a gas
- Chemical measurements

Use of amount of substances in relation to masses of pure substances:
- Moles
- Amounts of substances in equations
- Using moles to balance equations
- Limiting reactants

- Power
- Energy transfers in everyday appliances
- The National Grid

PARTICLE MODEL OF MATTER

Changes of state and the particle model:
- Density of materials
- Changes of state

Internal energy and energy transfers:
- Internal energy
- Temperature changes in a system and specific heat capacity
- Changes of heat and specific latent heat

Particle model and pressure:
- Particle motion in gases

ATOMIC STRUCTURE

Atoms and Isotopes:
- The structure of an atom
- Mass number, atomic number and isotopes
- The development of the model of the atom

Atoms and Nuclear radiation:
- Radioactive decay and nuclear radiation
- Nuclear equations
- Half-lives and the random nature of radioactive decay
- Radioactive contamination

Separate Sciences Pathway

Students opting to study separate Sciences will follow a similar pathway to that described above, however each of the concepts will be explored at greater depth.

Links to the current separate Science Specifications can be found below:

Biology: https://www.aqa.org.uk/subjects/science/gcse/biology-8461

Chemistry: https://www.aqa.org.uk/subjects/science/gcse/chemistry-8462

Physics: https://www.aqa.org.uk/subjects/science/gcse/physics-8463

Year 11 Science Curriculum

Qualification: GCSE Combined Science Trilogy - AQA

Biology Subject Content: B2

HOMEOSTASIS AND RESPONSE

Homeostasis

The human nervous system

Hormonal Coordination:

- Human endocrine system
- Control of blood glucose concentration
- Hormones in human reproduction
- Contraception
- The use of hormones to treat infertility
- Negative feedback

INHERITANCE, VARIATION AND EVOLUTION

Reproduction:

- Sexual and asexual reproduction
- Meiosis
- DNA and the genome
- Genetic inheritance
- Inherited disorders
- Sex determination

Variation and evolution:

- Variation
- Evolution
- Selective breeding
- Genetic engineering

Chemistry Subject Content: C2

THE RATE AND EXTENT OF CHEMICAL CHANGE

Rate of Reaction:

- Calculating rates of reaction
- Factors which affect the rates of chemical reactions
- Collision theory and activation energy
- Catalysts

Reversible reactions and dynamic equilibrium:

- Reversible reactions
- Energy changes and reversible reactions
- Equilibrium
- The effect of changing conditions on equilibrium
- The effect of changing concentration
- The effect of temperature changes on equilibrium
- The effect of pressure changes on equilibrium

ORGANIC CHEMISTRY

Carbon compounds as fuels and feedstock:

- Crude oil, hydrocarbons and alkanes
- Fractional distillation and petrochemicals
- Properties of hydrocarbons
- Cracking and alkenes

Physics Subject Content: P2

FORCES

Forces and their interactions:

- Scalar and vector quantities
- Contact and non-contact forces
- Gravity
- Resultant forces

Work done and energy transfer Forces and

elasticity

Forces and Motion:

- Describing motion along a line
- Forces, accelerations and Newton's Laws of motion
- Forces and braking

Momentum:

- Momentum is a property of moving objects
- Conservation of momentum

WAVES

Waves in air, fluids and solids:

- Transverse and longitudinal waves
- Properties of waves

Electromagnetic Waves:

- Types of electromagnetic waves

The development of understanding of genetics and evolution:

- Evidence of evolution
- Fossils
- Extinction
- Resistant Bacteria

Classification of living organisms

ECOLOGY

Adaptations, interdependence and competition:

- Communities
- Abiotic factors
- Biotic factors
- Adaptations

Organisation of an ecosystem:

- Levels of organisation
- How materials are cycled

Biodiversity and the effect of human interaction on ecosystems:

- Biodiversity
- Waste management
- Land Use

Deforestation
Global warming
Maintaining biodiversity

CHEMICAL ANALYSIS

Purity, formulations and chromatography:

- Pure substances
- Formulations
- Chromatography

Identification of common gases:

- Test for hydrogen
- Test for oxygen
- Test for carbon dioxide
- Test for chlorine

CHEMISTRY OF THE ATMOSPHERE

The composition and evolution of the Earth's atmosphere:

- The proportions of different gases in the atmosphere
- The Earth's early atmosphere
- How oxygen increased
- How carbon dioxide decreased

Carbon dioxide and methane as greenhouse gases:

- Greenhouse gases
- Human activities which contribute to an increase in greenhouse gases in the atmosphere
- Global climate change
- The carbon footprint and its reduction

Common atmospheric pollutants and their sources:

- Atmospheric pollutants from fuels
- Properties of electromagnetic waves
- Uses and applications of electromagnetic waves

MAGNETISM AND ELECTROMAGNETISM

Permanent and induced magnetism, magnetic forces and fields:

- Poles of a magnet
- Magnetic fields

The Motor Effect:

- Electromagnetism
- Fleming's left-hand rule
- Electric motors

SPACE PHYSICS (Separate Science Only) Solar system; stability of orbital motions; satellites (physics only)

- The solar system
- Lifecycle of a star
- Natural and artificial satellites
- Red shift

	• Properties and effects of atmospheric pollutants ***USING RESOURCES*** Using the Earth's resources and obtaining potable water: • Using the Earth's resources and sustainable development • Potable water • Waste water treatment • Alternative methods of extracting metals Life cycle assessment and recycling: • Life cycle assessment • Ways of reducing the use of resources	

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