

SCIENCE (COMBINED) CURRICULUM



- Future careers in NHS
- Future careers with AWE
- Careers in Chemistry including Chemical engineer, Forensic scientist, Food scientist
- Careers in Biology including Marine engineer, Climate scientist, Botanist
- Careers in Physics including Laser physicist, Astronaut, Acoustic engineer

EXAM PREPARATION AND RESPONSIVE REVISION OF THE SCIENCE CURRICULUM:

Key ideas in Biology

- Life processes
- Ecosystems
- Photosynthesis and respiration
- Evolution

Key Ideas in Chemistry

- Atoms and elements
- Periodic table
- Bonding and Chemical Reactions
- Conservation of energy in reactions

Key Ideas in Physics

- The use of models
- The concept of cause and effect
- Action at a distance
- The concept of proportionality
- Expressing physical laws and models in mathematical form

MAGNETS & ELECTROMAGNETS

- Permanent and Induced magnets
- The Motor Effect
- Electric Motors

PPEs

- INHERITANCE**
Inheritance and variation
Classification of living organisms
Genetic engineering
Selective breeding

WAVES

- Waves in air, fluids and solids
- The Electromagnetic spectrum
- Reflection and refraction of waves

CHEMICAL ANALYSIS

- Purity and formulations
- Paper Chromatography
- Tests for gases

ECOLOGY

- Biodiversity
- The impact of environmental change
- The effect of human interaction on ecosystems
- ORGANIC CHEMISTRY**
Hydrocarbons
Fractional Distillation
Uses and Cracking of Crude Oil

Zone 11 starts

YEAR 11

FORCES

- Contact and non contact forces
- Resultant forces
- Newtons Laws
- Speed and velocity equations
- Reaction time required practical
- Momentum

Zone 10 starts

YEAR 10

INFECTION & RESPONSE

- Communicable disease
- Plant disease

PARTICLE MODEL OF MATTER

- Density and pressure

ATOMIC STRUCTURE

- Radiation
- Hazards and uses of radioactive emissions and of background radiation

BONDING

- Structure and properties of matter
- States of matter
- Polymers
- Diamond, graphite, graphene and fullerenes
- Nanoparticles

ELECTRICITY

- Electrical current
- Potential difference and resistance
- Domestic uses and safety
- Energy transfers in everyday appliances

QUANTITATIVE CHEMISTRY

- Chemical measurements
- Conservation of mass and the quantitative interpretation of chemical equations
- Use of amount of substance in relation to masses of pure substances
- Yield and using concentrations of solutions

BIOENERGETICS

- Photosynthesis
- Respiration
- Metabolism

ENERGY CHANGES

- Exothermic and endothermic reactions
- Chemical cells and fuel cells

RATE & EXTENT OF CHEMICAL CHANGE

- Rate of reactions
- Reversible reactions and dynamic equilibrium

CHEMICAL CHANGES

- Reactivity of metals
- Reactions of acids
- Electrolysis

HOMEOSTASIS

- The human nervous system
- The brain
- Controlling blood sugar level
- The menstrual cycle and controlling fertility

CHEMISTRY OF THE ATMOSPHERE

- Evolution of Earth's atmosphere
- Carbon cycle
- Greenhouse gases

USING RESOURCES

- Potable water
- Life cycle assessments
- Recycling

ORGANISATION

- Digestive system
- Enzymes
- The heart and heart disease
- Cancer
- Plant tissues and transport systems

ENERGY

- Energy calculations
- Kinetic energy
- Gravitational potential energy, National energy resources

CHEMISTRY OF THE ATMOSPHERE

- Evolution of Earth's atmosphere
- Carbon cycle
- Greenhouse gases

ATOMIC STRUCTURE

- Elements and compounds separating mixtures
- Development of the periodic table
- The development of the model of the atom
- Size and mass of atoms
- Groups 1, 7, 0 and transition metals

CELL BIOLOGY

- Cell structure
- Specialisation
- Required practical microscopy
- Cell division

ENERGY

- Energy Stores
- Changes in energy stores
- Conservation of energy
- Energy calculations

BEING A SEISMOLOGIST

- Scalar and vector quantities
- Contact and non-contact forces
- Resultant forces
- Distance and displacement
- Acceleration, velocity time graphs, transverse and longitudinal waves, properties of waves, wave speed

MATHS IN SCIENCE

- Calculating mean, median and mode, gradients, significant figures, standard form, using graphs

ATOMIC STRUCTURE

- Elements and compounds separating mixtures, development of the periodic table, The development of the model of the atom, Size and mass of atoms, Groups 1, 7, 0 and transition metals

PHYSICS IN THE HOME

- Electrical circuits, domestic electricity, electrical safety, plugs and fuses

BEING A DOCTOR

- Eukaryotes and prokaryotes
- Animal and plant cells
- Culturing microorganisms, Communicable diseases
- Types of pathogens

BEING A LAB TECHNICIAN

- Reactions of acids with metals
- Neutralisation of acids and salt production, Soluble and insoluble salts

FUNDAMENTAL BIOLOGY

- Respiration, Photosynthesis
- Food webs/chains, Interdependence

FUNDAMENTAL PHYSICS

- Forces, Newton's Laws Force, mass and acceleration, Speed
- Distance-time graphs, Using formulae

FUNDAMENTAL CHEMISTRY

- Laboratory techniques, Particle theory, Atoms, elements and compounds
- Reactions of metals, Types of reactions

YEAR 9

ADAPTION & INHERITANCE

- Competition and adaption
- Adapting to change
- Variation
- Continuous and discontinuous variation
- Inheritance
- Natural selection
- Extinction

Guided Choices

YEAR 8

REACTIONS

- Chemical reactions
- Word equations
- Burning fuels
- Thermal decomposition
- Conservation of mass
- Exothermic and Endothermic

HEALTHY LIFESTYLE

- Nutrients
- Food tests
- Unhealthy diet
- Digestive system
- Bacteria and enzymes in digestion
- Drugs
- Alcohol
- Smoking

PERIODIC TABLE

- Metals and non metals
- Groups and periods
- Group 1 elements
- Group 7 elements
- Group 0 elements

ELECTRICITY & MAGNETISM

- Charging up
- Circuits and current
- Potential difference
- Series and parallel
- Resistance
- Magnets and magnetic field
- Electromagnets
- Using electromagnets

MOTION & PRESSURE

- Speed
- Motion graphs
- Pressure in gases
- Pressure in liquids
- Pressure on solids
- Turning forces

ACIDS

- Acids and alkalis
- Indicators and pH
- Neutralisation
- Making salts

METALS & ACIDS

- Acids and metals
- Metals and oxygen
- Metals and water
- Metal displacement reactions
- Extracting metals
- Ceramics
- Polymers
- Composites

BODY SYSTEMS

- Breathing
- Gas exchange

ECOSYSTEMS

- Photosynthesis
- Leaves
- Plants minerals
- Chemosynthesis
- Aerobic respiration
- Anaerobic respiration
- Food chains and webs
- Disruption to food chains and webs
- Ecosystems

THE EARTH

- The Earth and its atmosphere
- Sedimentary rocks
- Igneous and metamorphic rocks
- The rock cycle
- The carbon cycle
- Climate change
- Recycling

VARIATION

- Variation
- Continuous and discontinuous variation
- Adapting to change

HUMAN REPRODUCTION

- Adolescence
- Reproductive systems
- Fertilisation and implantation
- Development of a fetus
- The menstrual cycle

ELEMENTS, ATOMS & COMPOUNDS

- Elements
- Atoms
- Compounds
- Chemical formulae
- Polymers

PLANT REPRODUCTION

- Flowers and pollination
- Fertilisation and Germination
- Seed dispersal

ELECTRICITY

- Potential difference
- resistance
- Series and parallel circuits
- Current
- Charging up

SOUND

- Sound waves and speed
- Loudness and amplitude
- Frequency and pitch
- The ear and hearing

LIGHT

- Reflection
- Refraction
- The eye and vision
- Colour

PARTICLE MODEL

- The particle model
- States of matter
- Melting and freezing
- Boiling
- More changes of state
- Diffusion
- Gas pressure
- Inside particles

ENERGY

- Food and fuels
- Energy resources
- Energy and power
- Energy adds up
- Energy dissipation

CELLS

- Observing cells
- Plants and animal cells
- Specialised cells
- Movement of substances
- Uni-cellular organisms

MOVEMENT

- Levels of organisation
- The skeleton
- Joints
- Muscles

INTERDEPENDENCE

- Food chains and webs
- Disruption to food chains and webs
- Ecosystems
- Competition

EARTH STRUCTURE

- The structure of the Earth
- Sedimentary rocks
- Igneous and metamorphic rocks
- The rock cycle

SPACE

- The night Sky
- The Solar System
- The Earth
- The Moon and changing ideas

SEPARATING MIXTURES

- Pure substances and mixtures
- Solutions
- Solubility
- Filtration
- Evaporation and distillation
- Chromatography

FORCES

- Introduction to forces
- Balanced and unbalanced forces
- Speed
- Distance-time graphs
- Gravity

YEAR 7