

Science Department

Key Stage 3

A compulsory subject throughout forms 1 to 3, the fundamental basis of the KS3 School Science programme aims to provide students with a solid foundation of studies - scientific knowledge and enquiry - leading on to the more specialized studies in Senior School.

This course for Key Stage 3 Science brings together proven approaches to the development of pupil's thinking skills and the requirements of the UK's National Curriculum for Science. Pupils should learn to "think about their thinking" whilst developing their knowledge and understanding of science within the context of the QCA Scheme of Work, which includes thinking skills. The order in which specific skills are introduced is based on many years' research into pupils' cognitive development.

KS3 Science is a modular course, with end of unit tests sat at the end of each module. The test scores are included along with a project, homework, quizzes, class work and presentations to make up the term grades. There is an end of year examination in science for KS3 students based on the final three units and key skills taught in the first three units.

Form 1

The Form 1 Syllabus has 6 topics..

Introduction

In the introduction to form 1 science we study the following topics:

- Safety in the laboratory
- Variables, values and relationships
- Different forms of presenting data such as tables and graphs,
- Problem solving,
- Concept maps
- The use of models to explain difficult concepts.

Ecology and classification:

In this topic we study:

- The characteristics of living organisms

- Vertebrate and invertebrate animals
- Taxonomy
- Using identification keys
- Causes of variation,
- Inheritance
- Genetic modification.
- What is Ecology?
- Producers
- Decomposers
- Classification of organisms
- The structure of plants
- Carbon and the Carbon cycle
- The Greenhouse effect
- The transfer of energy between organisms
- Recap on pyramids of numbers and energy
- How to study populations
- Predator and prey cycles

Electricity.

In this topic we study:

- Electrical symbols

- Making simple series and parallel circuits
- Measuring current in series and parallel circuits
- Using ammeters
- Resistance,
- Large and small scientific units.

- The reaction of acids and metals
- The chemical test for hydrogen, Carbon dioxide and Oxygen
- The reaction of acids with carbonates
- Writing word equations
- Combustion
- Fossil fuels.

Acids and bases

In this topic we study:

- Examples of everyday and laboratory acids and alkalis and their uses
- Different types of indicators
- The pH scale
- Neutralization reactions
- Applications of neutralization in the real world

Forces and their effects.

In this topic we study:

- Examples of forces and their effects (upthrust, friction, air and water resistance)
- Units of measurement
- Calculating speed
- Road safety
- Using distance/time graphs
- Density
- Stretching.

Cells and basic reproduction

In this topic we study:

- The structure and function of simple cells
- Using a microscope
- Measuring cells
- Specialized cells
- The organisation of tissues, organs and systems
- How cells divide.

Simple chemical reactions:

In this topic we study:

- What is a physical and a chemical reaction
- Reversible and irreversible reactions

Form 2

The Form 2 syllabus has 6 topics.

Introduction

In this topic we study:

- The role of Science in society
- Recap on safety in the laboratory
- Communicating in Science
- Recap on variables

Heating and Cooling

In this topic we study:

- Different temperature scales
- Different types of thermometers
- Heat and temperature
- Conduction of heat in solids, liquids and gases
- Expansion of solids, liquids and gases
- Convection
- Radiation
- Evaporation
- Energy conservation
- Changes of state

Atoms and elements, compounds and mixtures

In this topic we study:

- Elements as building blocks
- The concept of pure materials
- Atoms
- Symbols for the elements
- Classification of metals and non metals based on their properties
- The Periodic Table
- Compounds
- Models of atoms and molecules

- Formulae of compounds
- Differences between elements, compounds and mixtures
- The composition of air and their functions
- Separating air
- Changes of state
- Heating curves of pure substances and mixtures

Respiration

In this topic we study:

- Recap on digestion
- The structure of a cells including mitochondria
- Different types and sources of sugars
- Aerobic respiration
- Anaerobic respiration
- Rates of respiration
- The structure of the respiratory system
- Breathing
- The structure and function of the heart

Light and sound

In this topic we study:

- How light travels in straight lines
- The pinhole camera
- Transparent, translucent and opaque materials
- Reflection of light
- Refraction of light
- Dispersion and the spectrum
- Colours and mixing colours
- Optical illusions
- The structure and function of the eye
- Sound waves
- Echoes
- Speed of sound

Patterns of reactivity

In this topic we study:

- The reaction of metals with Oxygen
- The reaction of metals with water
- The reaction of metals with acids

- The Reactivity Series
- Introduction to the Periodic Table
- Displacement reactions of metals
- Alloys
- Further practice of word and symbol equations

Digestion and health

In this topic we study:

- The concepts of “Fit” and “Healthy”
- Body systems
- The skeletal system, including joints
- The respiratory system
- The effects of smoking on the body
- Drugs and addiction
- Alcohol
- The digestive system
- Diet and body image
- Defense against disease
- Cancer
- Stress

Form 3

The Form 3 syllabus has 6 topics

Energy and electricity

In this topic we study:

- Different types of energy
- The Law of Conservation of Energy
- Energy transformations
- Sankey diagrams
- Energy and power
- Electricity bills
- Power and efficiency
- Current and Voltage
- Transmitting electricity
- Generating electricity (renewable and non-renewable forms)

Plants and photosynthesis

In this topic we study:

- Photosynthesis

- Investigating photosynthesis
- Rate limiting factors
- Photosynthesis for storage
- Deficiency in plants

- The relationship between pressure, force and area
- Calculating pressure
- Pressure of liquids
- Applications of pressure in real life
- Turning moments

Use of chemistry

In this topic we study:

- What is Ammonia? Making fertilizer
- Lime cycle
- Sulfur & Sulfuric acid
- Photochemical Reactions
- Extracting Iron
- Extracting Zinc
- Separation of Petroleum & consequences of the environment

Genes and Inheritance

In this topic we study:

- The structure of genetic material (DNA, genes and chromosomes)
- Mendel and his work
- Sex cells
- Inherited diseases
- Environmental factors that affect inheritance
- The Human Genome Project
- Genetic engineering
- Evolution
- Artificial Selection
- Mutations
- Cloning

Pressure and Moments

In this topic we study:

- Recap of Forces
- Floating and sinking

Environmental chemistry

In this topic students:

- Learn that rocks, soils and building materials have a variety of chemical characteristics
- Learn that chemical weathering alters rocks and building materials over time
- Consider how the atmosphere and water resources are affected by natural processes and the activity of humans
- Consider how environmental conditions are monitored and controlled
- Distinguish between different environmental issues
- In scientific enquiry pupils:
- Consider how scientists work to monitor the environment
- Decide on the suitability of secondary sources for providing information on a particular question
- Consider how evidence for climate and environmental change needs careful interpretation
- Evaluate the evidence obtained
- Investigate environmental change using evidence from secondary sources