

THE CURRICULUM FRAMEWORK FOR SCIENCE

SCIENCE

Science should develop the skills and processes necessary for the basic understanding of scientific concepts in the world around us. The framework of study describes the topics which will be assessed in the areas of Biology, Chemistry and Physics. It is expected that, where possible, these topics will be approached through practical work and related to everyday experience.

Students will be expected to demonstrate:

- knowledge with understanding;
- application of scientific knowledge to explain everyday occurrences;
- knowledge of practical procedures;
- ability to present and process data;
- ability to perform simple calculations;
- correct use of scientific vocabulary and terminology.

BIOLOGY

Cells and Organisms

Students should:

- Bc1 investigate the characteristics of living organisms;
- Bc2 investigate animal and plant cells and understand the functions of the main components, define what is meant by a tissue, an organ and an organ system.

Humans as Organisms

Students should:

- Bh1 recognise the positions and know the functions of the major organ systems;
- Bh2 investigate nutrition, including balanced diets and the effects of deficiencies;
- Bh3 learn about the organs and basic functions of the alimentary canal;
- Bh4 learn about the components and basic functions of the circulatory system;
- Bh5 understand the relationship between diet, fitness and circulatory disorders;
- Bh6 learn about the structure and basic function of the component parts of the respiratory system; gas exchange and effects of smoking;
- Bh7 learn about respiration, including a definition and word equation.

Plants

Students should:

- Bp1 recognise the positions and functions of the major organs in flowering plants;
- Bp2 learn about photosynthesis, including a word equation for the process;
- Bp3 learn about the mineral requirements and the transport of water in flowering plants;
- Bp4 understand sexual reproduction in flowering plants including pollination, fertilisation, seed formation and dispersal.

Variation and Classification

Students should:

- Bv1 consider examples of variation within species and between species;
- Bv2 use keys to identify plants and animals;
- Bv3 classify living organisms into major groups;
- Bv4 understand that selective breeding can lead to new varieties.

Ecosystems

Students should:

- Be1 investigate adaptations of living things to their habitat or daily and seasonal changes;
- Be2 understand energy flow, food chains and food webs and use appropriate terminology;
- Be3 learn about factors affecting the size of populations;
- Be4 appreciate human influences on ecosystems.

CHEMISTRY

Materials

Students should:

- Cm1 become familiar with the symbols of common elements and understand that elements are made of atoms;
- Cm2 understand the idea of compounds and be able to name some common compounds including oxides, hydroxides, chlorides, sulphates and carbonates;
- Cm3 understand the differences between elements, mixtures and compounds;
- Cm4 understand the distinction between metals and non-metals;
- Cm5 investigate everyday materials and their physical properties.

States of Matter and Physical Change

Students should:

- Cs1 investigate solids, liquids and gases and their inter-conversion;
- Cs2 use simple kinetic particle theory to explain changes of state, dissolving and diffusion;
- Cs3 meet a variety of methods of obtaining pure substances from different mixtures;
- Cs4 understand the distinction between physical and chemical changes.

Chemical Change

Students should:

- Cc1 meet different chemical reactions and word equations, including formation of oxides from metals, neutralisation and displacement reactions;
- Cc2 investigate chemical reactions which are not useful e.g. rusting;
- Cc3 understand the idea of exothermic and endothermic reactions;
- Cc4 investigate the reactivity of metals (with oxygen, water and dilute acids), and a reactivity series and examples of displacement reactions;
- Cc5 describe neutrality, acidity and alkalinity and use indicators and the pH scale;
- Cc6 learn about neutralisation and its applications;
- Cc7 prepare some common salts by reactions of metals or metal carbonates with acid;
- Cc8 understand the effect of concentration, particle size, temperature and catalysts on the rate of reactions (qualitative only).

Periodic Table

Students should:

- Cp1 learn about the structure of atoms and relate this to the first twenty elements of the Periodic Table;
- Cp2 learn about trends in groups and periods.

PHYSICS

Measurement and Properties of Matter

Students should:

- Pp1 use appropriate apparatus for measurements;
- Pp2 understand the way that particles are arranged and move in solids, liquids and gases and be able to apply this;
- Pp3 understand the expansion of solids, liquids and gases;
- Pp4 determine the density of solids and liquids.

Forces and Motion

Students should:

- Pf1 calculate average speed and interpret simple distance / time graphs;
- Pf2 investigate the effect of forces on the motion and shape of objects;
- Pf3 appreciate the effect of a force on an area resulting in a pressure (qualitative treatment only);
- Pf4 explain pressure in gases and fluids (qualitative only).

Energy

Students should:

- Pe1 recognise the major sources of energy and alternative sources of energy such as solar and wind;
- Pe2 become familiar with energy as the ability to make things happen (do work) and its conversion and conservation;
- Pe3 learn about the thermal energy transfer processes of conduction, convection and radiation.

Light

Students should:

- Pl1 understand the rectilinear propagation of light, and how the propagation of light may be represented by rays;
- Pl2 apply the rectilinear propagation of light to shadow formation;
- Pl3 learn that non-luminous objects are seen because light scattered from them enters the eye;
- Pl4 investigate reflection at plane surfaces and understand the law of reflection;
- Pl5 investigate refraction at the boundary between air and glass or air and water;
- Pl6 know that white light can be dispersed to give a range of colours;
- Pl7 learn about colour addition and subtraction, and the absorption and reflection of coloured light.

Sound

Students should:

- Ps1 understand the properties of sound waves in terms of movement of air particles;
- Ps2 recognise the link between loudness and amplitude, pitch and frequency.

Magnetism

Students should:

- Pm1 investigate the properties of magnets;
- Pm2 investigate magnetic field patterns produced by a bar magnet;
- Pm3 construct and use an electromagnet.

Electricity

Students should:

Pc1 investigate conductors and insulators;

Pc2 learn about electrostatics and the concept of charge;

Pc3 interpret and draw circuit diagrams and design simple series and parallel circuits;

Pc4 understand how the number and common types of component, including cells, affect current;

Pc5 understand how current divides in parallel circuits;

Pc6 measure current in circuits.

TEST SPECIFICATION FOR SCIENCE

Science will be assessed using two papers. Each paper will be taken in a forty five minute session.

Questions will be set on the Biology, Physics and Chemistry sections of the Curriculum Framework in both papers.

Both papers will contain questions totalling 50 marks with a variety of response types including multiple choice and short answer. The questions will demand a variety of skills including recall and application of the concepts.

All the questions on both papers will be compulsory. As far as possible the questions will be arranged in difficulty through the paper in a repeating pattern of topic. On Paper 1 the pattern will be Biology, Chemistry, Physics and on Paper 2 the pattern will be Physics, Chemistry, Biology.