

Cambridge Secondary 1

Science Curriculum Framework

Cambridge
Secondary 1



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Introduction

Welcome to the Cambridge Secondary 1 Science curriculum framework.

This framework provides a comprehensive set of progressive learning objectives for science. The objectives detail what the learner should know or what they should be able to do in science in each year of lower secondary education. They provide a structure for teaching and learning and a reference against which learners' ability and understanding can be checked.

The Cambridge Secondary 1 Science curriculum is presented in four content areas: *Scientific enquiry*, *Biology*, *Chemistry* and *Physics*. *Scientific enquiry* is about considering ideas, evaluating evidence, planning investigative work and recording and analysing data. The *Scientific enquiry* objectives underpin *Biology*, *Chemistry* and *Physics*, which are focused on developing confidence and interest in scientific knowledge. Environmental awareness and some history of science are also incorporated. The Cambridge Secondary 1 Science curriculum framework continues the journey from the Cambridge Primary Science framework and provides a solid foundation upon which the later stages of education can be built.

The Cambridge Curriculum is founded on the values of the University of Cambridge and best practice in schools. The curriculum is dedicated to developing learners who are confident, responsible, innovative and engaged. Each curriculum framework for English, mathematics and science is designed to engage learners in an active and creative learning journey.

Stage 7

Scientific enquiry

Ideas and evidence

- Be able to talk about the importance of questions, evidence and explanations.
- Make predictions and review them against evidence.

Plan investigative work

- Suggest ideas that may be tested.
- Outline plans to carry out investigations, considering the variables to control, change or observe.
- Make predictions referring to previous scientific knowledge and understanding.
- Identify appropriate evidence to collect and suitable methods of collection.
- Choose appropriate apparatus and use it correctly.

Obtain and present evidence

- Make careful observations including measurements.
- Present results in the form of tables, bar charts and line graphs.
- Use information from secondary sources.

Consider evidence and approach

- Make conclusions from collected data, including those presented in a graph, chart or spreadsheet.
- Recognise results and observations that do not fit into a pattern, including those presented in a graph, chart or spreadsheet.
- Consider explanations for predictions using scientific knowledge and understanding and communicate these.
- Present conclusions using different methods.

Biology

Plants

- Recognise the positions, and know the functions of the major organs of flowering plants, e.g. root, stem, leaf.

Humans as organisms

- Explore the role of the skeleton and joints and the principle of antagonistic muscles.
- Recognise the positions and know the functions of the major organ systems of the human body. Secondary sources can be used.
- Research the work of scientists studying the human body.

Stage 7

Biology (continued)

Cells and organisms

- Identify the seven characteristics of living things and relate these to a wide range of organisms in the local and wider environment.
- Know about the role of micro-organisms in the breakdown of organic matter, food production and disease, including the work of Louis Pasteur.
- Identify the structures present in plant and animal cells as seen with a simple light microscope and/or a computer microscope.
- Compare the structure of plant and animal cells.
- Relate the structure of some common cells to their functions. Secondary sources can be used.
- Understand that cells can be grouped together to form tissues, organs and organisms.

Living things in their environment

- Describe how organisms are adapted to their habitat, drawing on locally occurring examples. Secondary sources can be used.
- Draw and model simple food chains.
- Discuss positive and negative influence of humans on the environment, e.g. the effect on food chains, pollution and ozone depletion.
- Discuss a range of energy sources and distinguish between renewable and non-renewable resources. Secondary sources can be used.

Variation and classification

- Understand what is meant by a species.
- Investigate variation within a species. Secondary sources can be used.
- Classify animals and plants into major groups, using some locally occurring examples.

Stage 7

Chemistry

States of matter

- Show in outline how the particle theory of matter can be used to explain the properties of solids, liquids and gases, including changes of state.

Material properties

- Distinguish between metals and non-metals.
- Describe everyday materials and their physical properties.

Material changes

- Use a pH scale.
- Understand neutralisation and some of its applications.
- Use indicators to distinguish acid and alkaline solutions.

The Earth

- Observe and classify different types of rocks and soils.
- Research simple models of the internal structure of the Earth.
- Examine fossils and research the fossil record.
- Discuss the fossil record as a guide to estimating the age of the Earth.
- Learn about most recent estimates of the age of the Earth.

Physics

Forces and motion

- Describe the effects of forces on motion, including friction and air resistance.
- Describe the effect of gravity on objects. Secondary sources can be used.

Energy

- Understand that energy cannot be created or destroyed and that energy is always conserved.
- Recognise different energy types and energy transfers.

The Earth and beyond

- Describe how the movement of the Earth causes the *apparent* daily and annual movement of the sun and the stars.
- Describe the relative position and movement of the planets and the sun in the solar system.
- Discuss the impact of the ideas and discoveries of Copernicus, Galileo and more recent scientists.
- Understand that the sun and other stars are sources of light and that planets and other bodies are seen by reflected light.

Safety issues

An essential part of this programme is that learners develop skills in scientific enquiry. This includes the collection of primary data by experiment. Scientific experiments are engaging and provide opportunities for first hand exploration. However, they must, at all times, be conducted with the utmost respect for safety, specifically:

- It is the responsibility of the teacher in charge to adhere and conform to any national, regional and school regulation in place with respect to safety of scientific experimentation.
- It is the responsibility of the teacher in charge to make a risk assessment of the hazards involved with any particular class or individual when undertaking a scientific experiment that conforms to these regulations.
- Cambridge takes no responsibility for the management of safety for individual published experiments or for the management of safety for the undertaking of practical experiments in any given location. Cambridge only endorses support material in relation to curriculum content and is not responsible for the safety of activities contained within it. The responsibility for the safety of all activities and experiments remains with the school.

Policy frameworks

It is expected that schools will have their own sex education policy set within their national legislative framework and drawn up in consultation with parents. We are aware that these policies will be distinct and varied due to the diversity in tradition and culture enjoyed over our global network of schools. For this reason, the focus of the Secondary 1 curriculum is the factual and preparative aspects of sex education. It does not address attitudes and values or personal and social skills as we expect each school to make a judgement on how these aspects of sex education are addressed within their wider curriculum framework/obligations.

University of Cambridge International Examinations
1 Hills Road, Cambridge, CB1 2EU, United Kingdom
Tel: +44 (0)1223 553554 Fax: +44 (0)1223 553558
international@cie.org.uk www.cie.org.uk

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