

Science (1999)

Years 1 to 10 Sourcebook Guidelines (Part 1 of 8)

Note: The PDF version of this document has been split into sections for easier download. This file is Part 1 of 8.

Nature of the key learning area

Background

The Years 1–10 Science key learning area is informed by:

- *A Statement on Science for Australian Schools* (Curriculum Corporation 1994) and *Science — a Curriculum Profile for Australian Schools* (Curriculum Corporation 1994);
- contemporary models of science education;
- current views of science.

Curriculum programs for the Science key learning area should involve students and teachers working in partnership to plan meaningful experiences that promote learning. Useful contexts for these experiences reflect the interplay between science and society. Experiences that promote learning should provide opportunities for students to develop understandings of the concepts of science and the practices and dispositions associated with ‘working scientifically’.

In the syllabus, concepts are organised into five strands:

- Science and Society;
- Earth and Beyond;
- Energy and Change;
- Life and Living;
- Natural and Processed Materials.

In the syllabus ‘working scientifically’ (pp. 32–33) is described by three aspects: investigating, understanding and communicating. Each of these aspects has a number of possible components. Core learning outcomes at each level comprise selected components of ‘working scientifically’ together with conceptual understanding relevant to a particular stage of development.

Students ‘working scientifically’ explore and seek to make sense of the natural phenomena they experience. In particular, students:

- learn that science is both a process and a set of evolving ideas refined and elaborated through discussion;
- learn that science is a way of knowing about the world around them;
- learn to apply their understandings of social, cultural and historical factors as they consider the interactions between science and society;
- learn that science involves people around the world working in diverse communities gathering and communicating information to construct meaning about natural phenomena;
- develop the practices and dispositions related to posing questions and investigating hypotheses;

- use their intuition and imagination, and apply their conceptualisation, problem-solving and decision-making skills, as well as the methodical procedures of scientific investigation;
- generate and evaluate a range of models, hypotheses and scenarios through the use of lateral thinking and analogy, as well as through trend analysis of data, hypothesising and experimentation;
- develop an understanding of, and ability to utilise, concepts constructed by scientists.

Contribution to lifelong learning

The key learning area contributes to a general education by providing students with opportunities to learn through, and about, science. Students engage in activities through which they may develop the valued attributes of lifelong learners identified in the syllabus.

A lifelong learner is described as:

- a knowledgeable person with deep understanding;
- a complex thinker;
- a creative person;
- an active investigator;
- an effective communicator;
- a participant in an interdependent world;
- a reflective and self-directed learner.

The sourcebook modules support students' development of the valued attributes of lifelong learners by actively engaging them in problem-solving and decision-making strategies. The activities in the sourcebook modules assist students to become scientifically literate citizens through developing their understanding of the concepts of science and their ability to think and work in a scientific way.

Cross-curricular priorities

The Science key learning area incorporates the cross-curricular priorities of literacy, numeracy, lifeskills and a futures perspective.

Literacy

Students develop literacy skills as they engage in a range of science activities. As students investigate, understand and communicate they learn:

- to understand and use the codes and symbols of written and spoken texts;
- to spell science words accurately;
- to know the purposes, conventions and structure of language;
- to compose and make meaning from written and spoken texts as they comprehend and use the specialised language of science;
- to discriminate between everyday and scientific use of words and terms;

- to understand the purposes of different written and spoken texts as they select a genre appropriate to the text's purpose and audience;
- to recognise that written and spoken text is not neutral and will reflect interest, bias and, in some cases, personal agenda.

Students develop and communicate their scientific understandings through learning to engage with and use scientific information conveyed in a range of media, including manuals, pamphlets, posters, recipes, cartoons, videos, journals, diagrams, flow charts, magazine items, interviews and role-plays. They develop and apply critical literacy skills and develop an understanding of the historical, social and cultural aspects of science and of the interactions between science and society.

Numeracy

Students develop their numeracy skills by engaging in a range of science activities. As they investigate, understand and communicate, students develop a sense of number, measurement, data, space and algebra. Through engaging with scientific information and conducting their own scientific investigations, they learn to:

- tabulate numerical information;
- manipulate numerical information including the application of formulae, and assign appropriate units;
- present numerical information in graphs with appropriate scales and different starting points, and apply appropriate extrapolation and interpolation techniques;
- construct their own presentations;
- comment critically on the strengths and weaknesses of various forms of data collection, analysis and display;
- support an argument using mathematics;
- represent, describe and explain natural phenomena using mathematics.

Lifeskills

Students develop lifeskills as they engage in a range of science activities. As they 'work scientifically' and develop understandings about key concepts, students:

- begin to understand how personal identities and other aspects of growth are shaped by factors such as gender, disability, race, culture, religion, economic status and ethnic background;
- develop social skills as they work cooperatively or interact in other situations;
- develop self-management skills as they work both independently and cooperatively;
- critically evaluate issues such as the use of resources, sustainability and the applications of science.

Students 'working scientifically', individually and together, develop their personal, social, self-management and citizenship skills as they explore familiar and unfamiliar natural phenomena and objects. Problem-solving and decision-making strategies are developed concurrently. Students also develop competency in selecting and using tools and equipment appropriate to a task.

Skills of negotiation, turn taking, active listening and assertive speaking are developed in cooperative learning groups.

Futures perspective

During the compulsory years of schooling students also develop a futures perspective as they engage in a range of science activities. As students investigate, understand and communicate they acquire the ability to use futures tools such as:

- timelines;
- futures wheels;
- space–time grids.

They learn futures methodologies such as:

- environmental scanning;
- scenario construction;
- trend analysis;
- forecasting;
- modelling;
- critical review and analysis of discourse.

As students ‘work scientifically’ and integrate conceptual understandings from Science and Society and the other four strands, they use futures tools and methodologies to construct insights, data and knowledge about natural phenomena and the impact of science and human activity on people and the environment. They envision possible, probable and preferred futures. They suggest solutions and plan alternative courses of action.

References

Curriculum Corporation 1994, *A Statement on Science for Australian Schools*, Carlton, Vic.

Curriculum Corporation 1994, *Science — a Curriculum Profile for Australian Schools*, Carlton, Vic.