



Senior Secondary Science – Information Sheet

What are the subjects in the senior secondary Australian Curriculum for Science?

There are **FOUR** senior secondary subjects for Science as part of the Australian Curriculum:

Biology – emphasises a systems approach to biological phenomena, connecting systems at sub-cellular scales to whole organisms systems and ecosystems, and exploring the relationships between structure and function, flows of matter and energy, and change and continuity.

Chemistry – focuses on the big ideas of chemical structure and properties, energy and reaction, developing understanding of chemical models and theories and culminating in an exploration of system equilibrium and synthesis.

Earth and Environmental Science – develops understanding of the Earth system model, and focuses on the formation, interaction and inter-dependencies of Earth's spheres, and how these interactions result in and impact Earth processes, environments and resources.

Physics – focuses on building understanding of the key concepts, models and theories that enable explanation and prediction of physical systems. Physics emphasises how models and theories have been developed; how they are applied, particularly in a range of technologies; and how they have been challenged and reconceptualised over time.

How are the senior secondary Australian Curriculum science subjects structured?

The senior secondary Australian Curriculum for each science subject specifies content and achievement standards:

- The content describes the knowledge, understanding and skills that are to be taught and learned within a given subject.
- The achievement standards describe the quality of learning (the depth of understanding, extent of knowledge and sophistication of skill) expected of students who have studied the content for the subject.

The curriculum for each senior secondary subject is organised into four units with the last two units cognitively more challenging than the first two. Each unit is designed to be taught in about half a 'school year' of senior secondary studies.

Content has been specified for each unit, and achievement standards are described for each pair of units, that is, Units 1 and 2, and Units 3 and 4.

The curriculum also includes a rationale and a set of aims for the subject, a description of how the subject is organised, how general capabilities and cross-curriculum priorities are represented, and a glossary of key terms used.

How do the senior secondary science subjects align with the F-10 Australian Curriculum?

Each of the Australian Curriculum science subjects builds upon students' science knowledge, understanding and skills acquired from Foundation to Year 10 (F-10). In particular, the science subjects continue to build students' *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, and each subject continues to develop the relevant 'key concepts' that structure the *Science Understanding* sub-strands in the F-10 Australian Curriculum: Science.

The senior secondary subjects continue to develop the general capabilities and cross-curriculum priorities introduced across Foundation to Year 10. Each subject includes a description of the opportunities for students to continue to develop their general capabilities and understanding of cross-curriculum priorities in ways that are relevant to the subject.

How do the senior secondary science subjects relate to each other?

The four Australian Curriculum science subjects develop similar *Science Inquiry Skills* and understandings of *Science as a Human Endeavour*.

The *Science Understanding* content in each of the science subjects is complementary. Where similar science contexts are included across subjects, they are framed with the understanding and analytical approach of the particular discipline. For example, *Biology* and *Earth and Environmental Science* both



Senior Secondary Science – Information Sheet

explore environmental change, but *Biology* views this in terms of effects on individual organisms and ecosystem dynamics, and *Earth and Environmental Science* in terms of interactions between the Earth's spheres.

The strong connections between the four science subjects also encourage students to appreciate the multi-disciplinary studies and/or careers that characterise contemporary science.

What are the mathematics demands of the senior secondary science subjects?

The content in each science subject has been developed with the assumption that students have achieved the Year 10 achievement standard for the Australian Curriculum: Mathematics, and have developed appropriate numeracy skills through the *Science Inquiry Skills* strand of the F-10 Australian Curriculum: Science.

Where additional mathematics requirements (beyond those of the Year 10 achievement standard) have been identified, these are highlighted in the Organisation section as requiring explicit teaching.

How do the senior secondary science subjects differ from senior secondary science courses in states and territories?

The Australian Curriculum science subjects contain content similar to that of state and territory science courses.

The Australian Curriculum science subjects place a greater emphasis on explicit teaching of *Science as a Human Endeavour* compared to some states and territories. The curriculum content is also expressed differently to many state and territory courses, with content written as *concepts* rather than *facts*, and a greater emphasis on understanding the role of models and the use of a range of representations in science.

As states and territories have continuing responsibility for pedagogy, assessment and reporting, their science courses may also include detailed eligibility requirements and assessment information, such as the inclusion of an extended scientific investigation.

What national and international curricula and research was drawn upon to develop the senior secondary science subjects?

In developing the senior secondary Australian Curriculum for Science, ACARA reviewed national and international science curricula, including that of the United Kingdom, Singapore, Ontario and New Zealand. ACARA's work was further guided by some key national and international references, including:

- International Baccalaureate Diploma subjects in the sciences
- *A Framework for K-12 Science Education: Practices, Crosscutting Concepts and Core Ideas* (Committee on Conceptual Framework for the New K-12 Science Education Standards; National Research Council, USA, 2012).
- *The Status and Quality of Year 11 and 12 Science in Australian Schools* (Goodrum et al, Australian Academy of Science, 2012).
- *Australian School Science Education National Action Plan 2008 – 2012* (Goodrum & Rennie, 2007).
- *Re-imagining Science Education: Engaging students in science for Australia's future* (Tytler, 2007).

In addition, as part of ACARA's curriculum development process and a focus on high standard quality curriculum, the senior secondary Australian Curriculum subjects were reviewed by eminent overseas experts and international curriculum authorities.