



Science

CS Stage 6 program formats

Some interesting ideas for programming formats have been identified by workshop facilitators travelling around NSW during Term 3. Have a look at these five sample formats. If you have another idea, draw up a description and fax it in to the Science Unit so it can be shared with other teachers.

The learning activities of your program should be developed from:

- the syllabus elements (essentially *Column 2* with the *glossary* meaning of *Column 2* verbs, *Column 3* and statements from *Module 8.1*, and considering HSC assessment requirements)
- your teaching approach for the module, considering such things as the interests, abilities and prior learning of your students, resources and the learning environment
- the school/system requirements for such things as assessment, curriculum perspectives and literacy.

There should be some way to explicitly indicate in your program how you will link your learning activities and assessment to syllabus outcomes

1.

Syllabus content	Activity	Resources	Assessment
Col 2 dot pt/s • Col 3 dot pt/s • 8.1	(a) (b) (c)		
OUTCOMES			

2.

Column 1			
Column 3 •	Module 8.1	Column 2 • •	
Learning activities			
OUTCOMES			

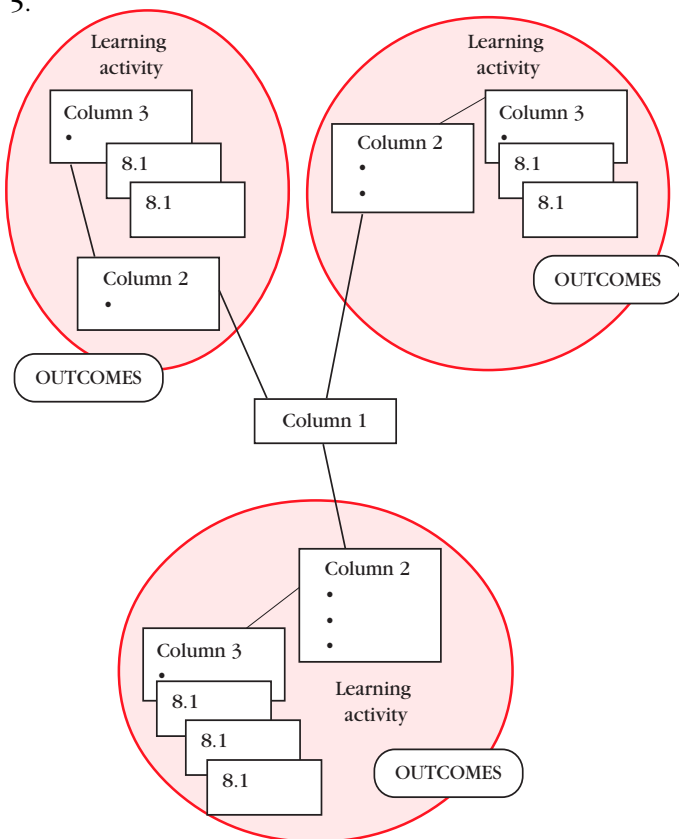
3.

Column 2	Learning activities/ resources	Column 3 and Module 8.1
• •	(i) (ii) (iii)	•
OUTCOMES		

4.

Column 3 •	Module 8.1
Column 2 • •	Learning activity (a) (b) (c) ↓ OUTCOMES

5.





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Stage 6 syllabuses in science

Modules and options

Biology	Chemistry	Earth & Environmental Science	Physics	Senior Science
<p>Preliminary: The Preliminary course is organised into four modules (each is 30 indicative hours except where shown otherwise in Biology)</p>				
<p>Modules</p> <ul style="list-style-type: none"> 8.1 Biology skills 8.2 The local ecosystem (25 indicative hours) 8.3 Patterns in nature (35 indicative hours) 8.4 Life on earth (30 indicative hours) 8.5 Evolution of Australian biota (30 indicative hours) 	<p>Modules</p> <ul style="list-style-type: none"> 8.1 Chemistry skills 8.2 The chemical earth 8.3 Metals 8.4 Water 8.5 Energy 	<p>Modules</p> <ul style="list-style-type: none"> 8.1 Earth & Environmental Science skills 8.2 Planet Earth and its environment: a five thousand million year journey 8.3 The local environment 8.4 Water issues 8.5 Dynamic Earth 	<p>Modules</p> <ul style="list-style-type: none"> 8.1 Physics skills 8.2 The world communicates 8.3 Electrical energy in the home 8.4 Moving about 8.5 Cosmic engine 	<p>Modules</p> <ul style="list-style-type: none"> 8.1 Senior Science skills 8.2 Water for living 8.3 Plants 8.4 Humans at work 8.5 The local environment
<p>HSC: The HSC course incorporates the study of three core modules and one option (each is 30 indicative hours)</p>				
<p>Modules</p> <ul style="list-style-type: none"> 9.1 Biology skills 9.2 Maintaining the balance 9.3 Blueprint of life 9.4 The search for better health <p>Options</p> <ul style="list-style-type: none"> 9.5 Communication 9.6 Biotechnology 9.7 Genetics: The code broken? 9.8 The human story 9.9 Biochemistry 	<p>Modules</p> <ul style="list-style-type: none"> 9.1 Chemistry skills 9.2 The identification and production of materials 9.3 The acidic environment 9.4 Chemical monitoring and management <p>Options</p> <ul style="list-style-type: none"> 9.5 Industrial chemistry 9.6 The biochemistry of movement 9.7 Shipwrecks and salvage 9.8 The chemistry of art 9.9 Forensic chemistry 	<p>Modules</p> <ul style="list-style-type: none"> 9.1 Earth & Environmental Science skills 9.2 Tectonic impacts 9.3 Environment through time 9.4 Caring for the country <p>Options</p> <ul style="list-style-type: none"> 9.5 Introduced species and the Australian environment 9.6 Organic geology – A non-renewable resource 9.7 Mining and the Australian environment 9.8 Oceanography 	<p>Modules</p> <ul style="list-style-type: none"> 9.1 Physics skills 9.2 Space 9.3 Motors and generators 9.4 From ideas to Implementation <p>Options</p> <ul style="list-style-type: none"> 9.5 Geophysics 9.6 Medical physics 9.7 Astrophysics 9.8 From quanta to quarks 9.9 The age of silicon 	<p>Modules</p> <ul style="list-style-type: none"> 9.1 Senior Science skills 9.2 Lifestyle chemistry 9.3 Medical technology – Bionics 9.4 Information systems <p>Options</p> <ul style="list-style-type: none"> 9.5 Polymers 9.6 Preservatives and additives 9.7 Pharmaceuticals 9.8 Disasters 9.9 Space science

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Earth and Environmental Science

Stage 6 *Earth and Environmental Science* appears on early anecdotal evidence to be shaping up as a popular course with senior students and teachers. Consider the following professional development opportunities for that course or for professional development related to earth science generally.



UNSW

Earth & Environmental Science

Teaching an integrated science subject: an in-service workshop for the preliminary modules 2 - 4 December 1999

This workshop will support teachers involved in the introduction of the new HSC Earth and Environmental Science (E&ES) course. The workshop recognises that E&ES may be taught by non-specialists with limited expertise in geology, biology or environmental science. It will present teaching strategies and printed and electronic resources to assist teachers to address syllabus content. A listing of text and web resources will be provided to registrants. The workshop focusing on the HSC year modules will follow in the year 2000. The course includes a field trip to examine the geology, environment and social aspects of either Port Hacking and Botany Bay or the Cumberland Plain and the Blue Mountains.

The course fee is \$150 (or \$60 per single day).

For further information contact Geoff Taylor, Convenor, School of Geology, University of NSW, NSW 2052

GeoSciEd III

The *Third International Conference on Geoscience Education* is coming to Sydney! GeoSciEd III will be hosted at the University of New South Wales from 17-21 January, 2000.

As well as a range of symposia, keynote speakers, poster sessions and a full-day field excursion, a special session of workshops for secondary science educators in NSW has been scheduled.



Workshops will include:

- using geological maps and computers in the classroom
- teaching the geoscience components of the Science Stages 4-5 syllabus
- teaching the Stage 6 Earth & Environmental Science syllabus.

Don't miss your opportunity to find out about exciting geoscience education projects from around the world!

For more information contact:

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 Internet <http://www.gsa.org.au>

or view the conference web site at www.agso.gov.au/geosciEd/

Bookmarks

For a set of science-related bookmarks to get you started on the Internet, e-mail Jim Scott at jimsci@ozemail.com.au



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Senior Science

Please read the following information in conjunction with the previous issue of CURRICULUM SUPPORT: Science, pp. 14-16. The material here could not be included then because of lack of space.

The assumed knowledge which is not addressed in recall statements (Preliminary Stage 6 Senior Science):

- 4.8.4e describe the role of the root, stem and leaf in maintaining flowering plants as functioning organisms (8.3)
- 4.6.1a identify situations or phenomena where different forms of energy are evident (8.4)
- 4.8.5a describe the role of the digestive, circulatory, excretory, skeletal and respiratory systems in maintaining humans as functioning organisms (8.4)
- 4.10b describe how producers, consumers and decomposers in Australian ecosystems are related, using food chains and food webs (8.5).

Collated list of recall statements (Preliminary Stage 6 Senior Science):

- Recall the importance of water as a solvent (8.2)
- Recall that aqueous mixtures can be described in terms of solute, solvent and solution (8.2)
- Recall that living things are made of cells (8.2)
- Recall the water cycle in terms of processes involved (8.2)
- Recall the role of the root, stem and leaf of plants (8.3)
- Recall the role of the respiratory system (8.4)
- Recall the role of the skeletal system (8.4)
- Recall the roles of photosynthesis and respiration in ecosystems (8.5)
- Recall how producers, consumers and decomposers are related using food chains and food webs (8.5)
- Recall some adaptations of living things to factors in their environment (8.5)
- Recall a range of human impacts on the local environment (8.5).

Teaching and learning of science

Invitation for you to have your say!

The Federal Government has commissioned a study to investigate the status and quality of the teaching and learning of science in primary and secondary schools in Australia. The study will be carried out by Associate Professors Denis Goodrum and Mark Hackling from Edith Cowan University and Professor Leonie Rennie from Curtin University of Technology, in collaboration with the Australian Science Teachers Association (ASTA), the professional body of science teachers, the Australian Academy of Science (AAS) as the peak body representing scientists, and the Curriculum Corporation (CC) as the curriculum development agency of the state education systems.

Input from teachers and other interested people will enhance both the ideal and actual pictures of science teaching and learning. You are invited to provide written feedback about the status and quality of the teaching and learning of science in Australian schools. While you are free to express your thoughts as you wish, there may be value in your considering the following questions with respect to primary or secondary schools:

1. What are the characteristics of quality teaching and learning of science in our schools?
2. What do you see actually happening in our schools?
3. What are the factors that inhibit quality teaching and learning of science?
4. How can these factors be addressed so as to improve the teaching and learning of science?

In considering these questions you may wish to examine the issues from the perspective of the student, the teacher, the school or the system.

Your written comments may be forwarded by December 31, 1999 to:

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Teaching and Learning of Science Project
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CS Internet site reviews, Stage 6

Access excellence activities exchange

<http://www.accessexcellence.org/AE/>

Teachers wishing to broaden their repertoire of biology practical work will find this site invaluable. Most useful is **Activities-to-go**, which presents activities developed by teachers. Searching this section under Life sciences will access suggestions for new ways of teaching key concepts, many of which rely on open-ended, student-centred approaches, covering areas including: cell structure; diversity; ecology; adaptations; reproduction; genetics; and evolution. Titles such as **Candy DNA replication**, **Easter egg genetics**, **The kingdom of pasta**, and **Rat islands**, are just a few of the innovative approaches presented. The **Fellows collection** describes the best activities developed since 1994. Useful links are also provided, but exploration is required to justify the curriculum relevance of these. It is a rewarding site, well worth investigating. J. Morgan

User level:	Professional
KLA:	Science
Syllabus:	2U Biology; Science Stages 4-5
SCIS subjects:	Biology – Study and teaching
Key words:	Activities exchange; excellence; practical work
Publisher:	Genentech Inc. USA
Review date:	7/9/99
Evaluation:	Highly recommended

Environment Australia – Biodiversity group home page

<http://www.biodiversity.environment.gov.au/index.htm>

Information about Australian ecosystems and introduced species is provided at this site. **Environments** links to worthwhile information on the conservation and management of terrestrial and marine areas. **Plants and animals** provides information on causes of endangerment and fact sheets on endangered Australian species. Also on this page is **Management of plants and animals**, which provides general information on introduced species,

and details about feral animals and environmental weeds. This includes history, impacts, and control methods for a range of species, such as cats, goats, pigs, foxes, rabbits, bitou bush, and mimosa. The site is particularly relevant to the core topic, ecology, and the electives, *The Australian environment* and *Human environmental impacts*, of senior biology. J. Morgan

User level:	Stage 5, Stage 6, Professional
KLA:	HSIE; Science; TAS
Syllabus:	Agriculture 7-10; 2U Agriculture; 2U Biology; Geography Stages 4-5; Science Stages 4-5
SCIS subjects:	Biodiversity – Study and teaching
Key words:	Australia; biodiversity; environment
Publisher:	Environment Australia, Department of the Environment and Heritage
Author:	Australian Nature Conservation Agency
Review date:	7/9/99
Evaluation:	Highly recommended

Resources for agriculture teachers

The publication *CURRICULUM SUPPORT for Teaching in TAS 7-12* provides teaching ideas and updates on resources and events for all teachers of technology subjects, including agriculture.

Each agriculture teacher in a school should receive a copy of this publication.

If insufficient numbers are being provided to your school, please send a fax on school letterhead identifying the number of copies of *CURRICULUM SUPPORT for Teaching in TAS 7-12* currently received by your school and the number you wish to receive.

The fax should be sent to Peter Robinson, Manager, Planning and Coordination Unit, at the Curriculum Support Directorate on (02) 9886 7571.



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Stage 6 Special Program of Study

For students with special education needs

From 2001, HSC students with special education needs following a Special Program of Study (SPS) will be eligible for the award of the Higher School Certificate.

Special Program of Study courses

Students who meet the SPS eligibility requirements will be able to undertake Board-developed Life Skills courses, regular Board-developed courses and/or Board-endorsed courses.

Board-developed Life Skills will be 2 unit, 240-hour courses. The following courses have been endorsed and are currently being developed:

- English Life Skills
- Mathematics Life Skills
- Personal Development, Health and Physical Education Life Skills
- Citizenship and Society Life Skills
- Science Life Skills
- Creative Arts Life Skills
- Technological and Applied Studies Life Skills
- Workplace and Community-based Learning Life Skills.

Industry Curriculum Framework courses include

- Tourism and Hospitality
- Business Services (Administration)
- Retail Operations
- Primary Industries
- Information Technology
- Metal and Engineering
- Construction.

Students entered for an SPS may undertake the Industry Curriculum Framework courses either:

- under regular course arrangements, or
- by units of competency selected through the individual transition planning process from a 240-hour course (for example, 7 units of competency rather than 12 units over 240 hours, including 70 hours of work placement).

Eligibility requirements

Students who meet the SPS eligibility requirements are students with disabilities in special schools, support classes or regular classes.

The eligibility requirements for the SPS are that:

- students generally will have completed at least 4 Life Skills courses for the School Certificate
- students' planning must be undertaken through an individual transition planning process
- under special circumstances students will be allowed access to Stage 6 Special Program of Study courses, e.g. if the student has:
 - a deteriorating condition;
 - undertaken regular syllabuses in Stage 6 but has experienced **significant** difficulty.

Decisions about whether to enrol students in Special Program of Study courses for Stage 6 will be made by the school. The principal will be required to certify on the Preliminary and HSC entry forms that individual transition planning for each student entering for Life Skills courses in Stage 6 has occurred.

Note: The majority of eligible students will have an intellectual disability.

Pattern of study

Students undertaking an SPS follow the same pattern of study requirements for the HSC as other students. These are a minimum of:

- at least 6 units of Board-developed courses
- at least 2 units of Board-developed English
- at least 3 courses of 2 unit value
- at least 4 subjects.

Please refer to the HSC Calendar of Events for the Special Program of Study Events in November and December. (<http://www.newhsc.schools.nsw.edu.au>)

Curriculum Support in 2000

Subscriptions

CURRICULUM SUPPORT is available free of charge to teachers in NSW government schools.

It is available on subscription to teachers in non-government schools, to libraries and to others.

See your principal for a copy of the flier with details of how to subscribe, subscription rates and an application form.

As subscriptions determine the number of copies printed, we would be grateful to receive your order and cheque no later than Friday 25 February, 2000.

Evaluation fax sheet

Fax back to: 9886 7571

Your views on this year's CURRICULUM SUPPORT (Science)

We would appreciate your views on this year's four editions of **CURRICULUM SUPPORT** and, in particular, the HSC supplement.

Please take some time to complete this page and fax it back to us so we can plan for next year's **CURRICULUM SUPPORT**.

LOOKING BACK OVER 1999	Strongly agree	Agree	Disagree	Strongly disagree
CURRICULUM SUPPORT keeps me well informed about current developments in my area of teaching.				
CURRICULUM SUPPORT provides me with many useful and practical ideas for teaching in my area.				
The HSC supplement has been a useful source of information on resources and ideas to assist me to plan for new HSC courses next year.				
It is important that all teachers have a personal copy of CURRICULUM SUPPORT for their area of teaching.				

LOOKING FORWARD TO 2000	Strongly agree	Agree	Disagree	Strongly disagree
I would like to see CURRICULUM SUPPORT changed in terms of				
• layout				
• size				
• design				
• content				

I would like next year's **CURRICULUM SUPPORT** to address the following issues in my KLA/area of teaching (please specify):

I would like next year's HSC supplement to provide me with information and ideas on the following areas (please specify):

Other comments or suggestions: