

# VCE Studies 2005: Summary of changes

## Environmental Science and Physics

### Environmental Science

The *VCE Environmental Science Study design* has been reviewed and reaccredited for the period 2005–2008. It was distributed to schools in November 2004.

#### Summary of changes

The study design has been revised to provide greater clarity and specificity as to the depth and extent of study required.

#### Structure

Unit one now has three areas of study. All other units have two areas of study. For Units 1 and 4 each area of study has a specific outcome statement and a set of key knowledge and key skills bullet points. In Unit 2 Area of Study 2 has two outcomes. In Unit 3 Area of Study 2 has two outcomes.

#### Unit 1

Area of Study 1 and Outcome 1 remain unchanged. Area of Study 2 is entitled Environmental change and considers how the environment is changed naturally or by humans. Outcome 3 in the current study design becomes the outcome for this area of study. A third area of study has been introduced. It is entitled Ecosystems and deals with changes caused by natural or human-induced factors within ecosystems that are short or long term, cyclic or random occurrences. Outcome 2 in the current study design becomes the outcome for this area of study.

#### Unit 2

No changes have been made to Unit 2.

#### Unit 3

##### Area of Study 1: Energy and global warming

Outcome 1 has been re-worded as follows:

‘On completion of this unit the student should be able to describe the principles of energy, and relate them to the contribution of one fossil and one non-fossil energy source to the enhanced greenhouse effect.’

Revisions to the key knowledge include:

- the number of renewable and non-renewable energy sources to be studied has been reduced to include biomass, solar, hydro-electric, wind, coal, natural gas and nuclear

- ways of increasing energy efficiency replaces ways of releasing and using energy more efficiently
- specification of the options for reducing the enhanced greenhouse effect to be studied. These include National Greenhouse Strategy, Kyoto Protocol, increasing energy efficiency, emission trading and vegetation sinks.

##### Area of Study 2: Diversity in the biosphere

Outcome 2 has been re-worded as follows:

‘On completion of this unit the student should be able to describe the characteristics of biodiversity, and evaluate strategies to reduce the effects of threatening processes on one selected endangered animal.’

Revisions to the key knowledge include:

- methods of protecting environments and managing populations now require the study of wildlife corridors, urban environments, national parks, captive breeding programs, and remnant vegetation
- use of scientific data to establish biodiversity treaties, agreements and regulatory frameworks now requires the study of Convention on International Trade of Endangered Species (of wild flora and fauna)(CITES), Ramsar Convention, and the sections of the *Flora and Fauna Guarantee Act 1988* that apply to the protection of endangered animals.

Outcome 3 has been re-worded as follows:

‘On completion of this unit the student should be able to explain how scientific data is applied to the assessment of environmental risk in ensuring biodiversity.’

Revisions to the key knowledge include:

- assessment of biodiversity, including number of species, endemism, species diversity including the application of simple indices has been retained but a reference to ‘species richness and vegetation structure in ecological communities’ has been deleted.

The key skills have been revised to include:

- estimate qualitative significance in statistical data and the implications for conservation
- use qualitative methods to estimate the risk of extinction
- explain the factors identified as contributing to extinction
- apply simple indices to the measurement of impacts for wildlife management and conservation in terms of the risks.

Note: the following skills have been deleted from the key skills:

- describing Type I and Type II errors in statistical power calculations
- using methods that estimate the risk of extinction and examining the factors identified as contributing to extinction.

#### Unit 4

##### Area of Study 1: Pollution and health

The introduction now specifies that one pollutant (of local significance where possible) is to be studied in depth. The general characteristics of mercury and sulfur dioxide as pollutants are to be studied in less depth than the selected pollutant. (Note: examination of the direct and indirect effects on the health of humans and the environment of pollutants selected from, for example; arsenic, chlorofluorocarbons, lead, litter, oxides of nitrogen, tropospheric, ozone, mercury, phosphates, salt, sewage, sulphur dioxide has been deleted).

Key knowledge revisions include:

- general characteristics of mercury and sulfur dioxide as pollutants
- strategies that reduce the risk of pollutants affecting human health and the environment, with reference to one selected pollutant (of local significance where possible) replace factors that reduce the risk of pollutants affecting human health and the environment, through strategies such as environmental risk assessment and management, Australian Design Rules for motor vehicles
- the direct and indirect effects on the health of humans and the environment of one selected pollutant (of local significance where possible) replaces the direct and indirect effects on health of humans and the environment of the selected pollutant.

##### Area of Study 2: Applied environmental science

Key knowledge revisions include:

- assessment of the environmental impacts and environmental risks associated with one selected environmental science project preferably with local application replaces assessment of the environmental impacts and the environmental risks associated with one selected environmental science project
- assessment of the impact of ecotourism on the environment and the strategies required to manage ecotourism.

#### Assessment

Changes to the School-assessed Coursework assessment have been made to Unit 3 and Unit 4. Unit 3 changes:

- amend the wording of the assessment task for Outcome 2 to specify the content to be the focus of the task
- increase the range of assessment task for Outcome 3
- change the mark allocation for the assessment tasks for Outcomes 1 and 3 (see below).

Unit 4 changes amend:

- the first Outcome 1 assessment task so that it now reads 'A report on the findings of selected fieldwork and/or practical activities relating to pollutant(s)'
- an optional Outcome 2 assessment task so that it now reads 'An environmental management plan.'

For further information use website or contact Ann Osman, Curriculum Science Manager, tel (03) 9651 4512 or email osman.ann.e@edumail.vic.gov.au

The VCE Environmental Science 2005 professional development implementation workshops will be held in November 2004. Refer to page 6 of the November 2004 VCAA *Bulletin* for further information on dates and venues.

Outcomes	Marks allocated	Assessment tasks
<b>Outcome 1</b> Describe the principles of energy, and relate them to the contribution of one fossil and one non-fossil energy source to the enhanced greenhouse effect.	20	A written report of a practical activity
		<b>and</b>
	20	A report in annotated poster or multimedia format.
<b>Outcome 2</b> Describe the characteristics of biodiversity and evaluate strategies to reduce the effects of threatening processes on one selected endangered animal.	30	A report on one selected endangered animal presented in any one or combination of the following: <ul style="list-style-type: none"> <li>• a written report</li> <li>• an oral report</li> <li>• a multimedia presentation.</li> </ul>
<b>Outcome 3</b> Explain how scientific data is applied to the assessment of environmental risk in ensuring biodiversity.	30	Any one or a combination of the following: <ul style="list-style-type: none"> <li>• a written report</li> <li>• an oral report</li> <li>• a multimedia presentation</li> <li>• a written response to set questions</li> <li>• a report on data collected from fieldwork or other sources.</li> </ul>
Total	<b>100</b>	

## Physics

The *VCE Physics Study design* has been revised and reaccredited for the period 1 January 2005 to 31 December 2008. It was distributed to schools in November 2004 and replaces the study design distributed in 2003. Schools offering VCE Physics in 2005 should use the revised study design. This study design can be identified by the diagonal band across the cover which says ACCREDITATION PERIOD 2005–2008. This wording also appears on the spine of the study design.

In 2004 schools teaching Physics Units 1 and 2 used the 2003 study design. In addition, 31 schools trialled Units 3 and 4 from the 2003 study design. These trials resulted in the new version of the study accredited from 2005–2008. Changes are designed to clarify the depth and extent of study, to improve the sequencing of key knowledge and skills to provide a more cohesive teaching and learning sequence and to include specific formulae e.g. inverse square law in Unit 4.

### Structure

The rationale and organisation of the *VCE Physics Study design* as published in 2003 has been retained.

The structure of two core areas of study and a choice of one Detailed study in each unit is unchanged. New/emerging areas in physics have also been retained.

The mark allocation for School-assessed Coursework in Units 3 and 4 is also unchanged.

### Summary of changes

#### Units 1 to 4

In the introduction to each unit mathematical modeling now specifically includes calculations. Each unit also contains references to safe and responsible practices when using equipment and/or completing investigations. These references have been included in the introduction to each area of study and in the key knowledge and skills where appropriate.

#### Units 1 and 2

The areas of study and key knowledge and skills statements have been retained.

#### Unit 3

##### Area of Study 1: Motion in one and two dimensions

The key knowledge and skills now includes analysis of energy transfer from work done, elastic and inelastic collisions, and analyse energy transfer from work done by a constant force in one dimension.

##### Area of Study 2: Electronics and photonics

The key knowledge and skills now includes the operation of the transistor in terms of current gain. Reference to bandwidth has been deleted.

##### Area of Study 3: Detailed studies

The titles of two of the three detailed studies have been re-worded to better reflect the knowledge and skills required.

Detailed study 3.1 is now titled Einstein's special relativity

2.2 is now titled Investigating materials and their use in structures.

Detailed study 3.1: Einstein's special relativity includes in the key knowledge and skills, mass increase and  $m = m_0\gamma$  as part of model mathematically, time dilation and length contraction.

Detailed study 3.2: Investigating materials and their use in structures now also includes in the key knowledge and skills

- analysis of translational and rotational forces in structures
- application of conditions of equilibrium to analyse forces in structures
- using data to describe and predict performance of a simple structure under load.

Detailed study 3.3: Further Electronics specifies in the introduction that knowledge and understanding of the internal workings a transformer is not required.

#### Unit 4

Note the order of the first two areas of study has been reversed so that now Area of study 1 is Electric power. It includes in the key knowledge and skills the requirement for students to explain the use of transformers in an electricity distribution system.

Area of Study 2 is now Interactions of light and matter and includes in the key knowledge and skills:

- explanation of the production of incoherent light from wide spectrum light sources, including the Sun, light bulbs, and candles (descriptive) in terms of thermal motion of electrons. This dot point has been removed from the Photonics detailed study and re-worded to clarify the extent of study required
- calculations using  $p = h/\lambda$

#### Area of Study 3: Detailed studies

The titles of two of the three detailed studies have been re-worded to better reflect the knowledge and skills required.

Detailed study 3.1 is now Synchrotron and its applications  
2.3 is now Sound.

Detailed study 3.3 Sound also includes in the key knowledge and skills a reference to calculation of sound intensity at different distances from a source using inverse square law.

### Professional Development

A statewide professional development program was conducted in late August and September 2004. Participants were provided with a detailed summary of the revisions to the study design and sample of material developed by schools piloting Units 3 and 4 Physics in 2004.

See VCAA website [www.vcaa.vic.edu.au/vce/studies/physics/physicsindex.html](http://www.vcaa.vic.edu.au/vce/studies/physics/physicsindex.html) for these materials.

### Assessment Handbook for Units 3 and 4

Schools will also receive copies of the *VCE Assessment Handbook Physics 2005* which explains how performance descriptors can be applied to assess student work and provides examples of suitable student tasks.

The VCE Physics Assessment Handbook replaces the current assessment information contained in the *VCE Assessment Guide* and the *VCE Assessment Handbook Physics (pilot) 2004*.

For further information contact Ann Osman Curriculum Science Manager, tel (03) 9651 4512 [osman.ann.e@edumail.vic.gov.au](mailto:osman.ann.e@edumail.vic.gov.au)



Published by

**VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY**

41 St Andrews Place East Melbourne Victoria 3002 Australia

TELEPHONE +61 3 9651 4300 FACSIMILE +61 3 9651 4324

EMAIL [vcaa@edumail.vic.gov.au](mailto:vcaa@edumail.vic.gov.au)

WEB [www.vcaa.vic.edu.au](http://www.vcaa.vic.edu.au)

