Environmental Science
Written Examinations – June and November

There are no significant changes to the format and structure of this examination.

Teachers should refer to the *VCE Environmental Science Assessment Handbook 2005* for the examination description and revised examination criteria.

There have been some changes to the content of the study. Teachers should refer to the revised study design and the summary of changes published in the *VCAA Bulletin: Liftout 2, Issue 20 November 2004*.

The following advice is provided to demonstrate how new content, not covered in previous examinations, may be examined.

Previous examination papers 2001–2004 continue to provide relevant examples for other areas of the study.

JUNE EXAMINATION

Unit 3 Area of Study 2: Diversity in the biosphere

There are two significant changes to Unit 3 which will affect the examination – both are in Area of Study 2.

Outcome 2: *'Describe the characteristics of biodiversity, and evaluate strategies to reduce the effects of threatening processes on one selected endangered animal'*

This outcome will be tested in the examination by a generic question (or part of question), similar to the types of questions on recent examinations that have tested 'one fossil and one non-fossil energy resource' (Unit 3 Area of Study 1) or 'one selected pollutant' (Unit 4 Area of Study 1) or 'one selected environmental science project studied in depth' (Unit 4 Outcome 2).

An example is provided below.

Question 1

a. Name **one** endangered animal species you have studied this year. State a location where a population of this species could be found and describe the location.

3 marks

b. Outline the significance and value of this species in terms of biodiversity and ecosystem function.

2 marks

c. Describe the main threats to this animal's conservation status.

3 marks

d. Outline **two** strategies that could be used to protect a population of this species from a threat mentioned above in part **c.**

4 marks

e. Outline a plan for evaluating the effectiveness of the **two** strategies mentioned above in part **d.**

3 marks

Outcome 2 key knowledge point: '*Use of scientific data to establish biodiversity treaties, agreements and regulatory frameworks, including 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 an endangered animal'*

This point has been altered from listing a series of examples of treaties, to nominating the three that students should be familiar with in general terms.

The following is an example of a question based on this new area.

Question 2

Australia is a signatory to CITES.

a. Describe **one** threat to biodiversity that the CITES treaty guards against.

2 marks

b. Outline **two** practical actions the Australian Government could put in place to meet its obligations under CITES.

2 marks

c. Comment on the likely effectiveness of the two actions outlined in part **b.** above.

Outline a data gathering process which would allow for evaluation of the effectiveness of one or both of these actions.

4 marks

NOVEMBER EXAMINATION

Unit 4 Area of Study 1: Pollution and health

Outcome 1 key knowledge point: *'general characteristics of mercury and sulphur dioxide as pollutants'*

The following are examples of questions which examine knowledge of these two pollutants.

Question 1

Sulphur dioxide is best described as

A. a toxic salt.
B. a fossil fuel.
C. an unreactive gas.
D. a chemical compound.

Question 2

Which **one** of the following is a characteristic of sulphur dioxide under normal conditions?

A. yellow gas
B. corrosive solid
C. flammable liquid
D. colourless gas with a sharp, choking odour

Question 3

Which **one** of the following processes is a significant source of atmospheric sulphur dioxide?

A. acid rain
B. lightning strikes
C. combustion of natural gas during cooking
D. smelting of compounds of containing metals and sulphur

Question 4

Which **one** of the following environmental problems can be caused by sulphur dioxide?

A. acid rain

B. ozone depletion

C. nuclear radiation

D. heavy metal poisoning

Question 5

This question refers to the emissions released into the atmosphere from the chimneys of a large Australian coal-fired power station. One of the pollutants released into the air is mercury.

a. Explain why mercury is classified as an environmental hazard.

2 marks

b. Using your knowledge of the properties of mercury and likely transport mechanisms, describe where you would expect to find the greatest concentrations of mercury relative to the power station.

2 marks

The following table lists selected total annual emissions into the air from the power station smoke stacks.

Substance	mass (kilograms)
carbon dioxide	14 200 000 000
sulphur dioxide	74 000 000
oxides of nitrogen	33 000 000
particulate matter	1 800 000
carbon monoxide	1 700 000
mercury and compounds	300
lead and compounds	95
arsenic and compounds	30
cadmium and compounds	13

c. A student states that mercury emissions from the power station do not pose any risk to the environment, as they are so much lower than emissions of other pollutants such as carbon dioxide.

Comment on the validity of this statement from an environmental perspective.

2 marks

d. Mercury and cadmium are both heavy metals that can bioaccumulate.

Describe **two** tests that could be carried out near the power station to investigate whether bioaccumulation is occurring.

2 marks

e. Describe **two** actions that could be taken to lower concentrations of mercury in soil near the power station.

2 marks

Unit 4 Area of Study 2: Applied environmental science

Outcome 2 key knowledge point: *'Assessment of the impact of ecotourism on the environment and the strategies required to manage ecotourism'*

The following is an example of how this new area could be examined.

Question 1

Swimming with dolphins is a popular activity in Australia which is often described as ecotourism. In this activity, boats carry people out into areas where dolphins are most likely to be found. When dolphins are located, swimmers are provided with breathing equipment and allowed to enter the water with the dolphins.

a. Outline **one** positive impact this activity could have on the environment. Give reasons to support your response.

2 marks

b. Outline **one** negative impact this activity could have on the environment. Give reasons to support your response.

2 marks

c. Describe a process that could be used to monitor, evaluate and manage the impact of 'swimming with dolphins' on the marine environment.

4 marks