SET Portfolio
Learning Package

Environmental Elective
Introduction to Environmental Science
ENVI1038
This Learning Package is part of the study materials for ENVI1038 Environmental Elective, which is a course offered by the Science, Engineering and Technology Portfolio at RMIT University. It was written by:

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and is revised annually by the School of Applied Sciences SET Portfolio.

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Environmental Elective – Introduction to Environmental Science

Version 1 –10/2008
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Course Outline

Environmental Elective – Introduction to Environmental Science
Course Outline

Introduction

Course – Introduction to Environmental Science

Welcome to the course Introduction to Environmental Science

This course introduces students to basic concepts in Environmental Science and provides them with a specific background on the composition and structure of the Earth. Both the living and nonliving components will be studied and the interaction between these components investigated.

This course also discusses what impacts humans have had on the structure and function of Earth, particularly over the last few hundred years. The Australian environment is used extensively to illustrate the topics studied. The course will help develop the ability to think critically and will also improve written communication skills.

Course Development

Dr John Farrell

John has been teaching Environmental Science and Chemistry at RMIT for 20 years

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Address: 3.2.15
Dr Farrell has a BSc (Hons) and PhD in Chemistry
Conceptual Background

This course assumes that you have:

- Basic scientific literacy
- Ability to use computers

Progress Through the Course

Use the Planning and Time Management chart at the end of Course Outline to assist you in working through the course. The chart lists all your topics and their learning outcomes, and the activities and assessments to complete. Make sure you use the Time Management chart as a way of scheduling your time, and assessing your progress.

You will be studying this course over a suggested duration of 13 weeks (approximately 3 hours per week).

When you have completed the course Learning Guide, put aside some time for review before the examination. You will be informed of the examination time by your course coordinator via the Online Classroom.

Communicating with your Course Coordinator

Whenever you have a problem or a question, you will be able to contact your coordinator via email. The email contact is available through http://www.rmit.edu.au/ online using the Online Classroom.
Resources

Computer Access:

You will be able to have online access as a student of RMIT University. You will be given a generic password, which you can then change if you wish.

This will enable you to:

- Ask your coordinator questions via email
- Register and send your assessments when indicated in the Learning Guide
- Access programs online where indicated in the Learning Guide
- Talk to students at other campuses in forums or as part of a group activity
- Access announcements relevant to your study. Make sure you access announcements at least once a week.

Set Text and Resources:

Your set text for this course is:

- There are no set texts for this unit

Any other references specifically used in this Learning Package have been included in Resources.

Weblinks:

Throughout this course you will be directed to many websites to enhance your studies by using the resources of the Internet. While most of these websites are provided as additional to your study, we recommend that you look at them at least briefly. They have been selected for their quality and innovative approach to the material you are studying. You should find many of them to be illuminating if not fun.

If you are studying online you will be able to click on a weblink to go immediately to the website and the document of interest at that website. In a few cases you may be linked to a Home Page from which you will have to follow a number of prescribed steps to get to the document we would like you to look at.
If you are not studying online you will need to type in the weblink name (its URL) to your browser’s Location (Netscape) or Address (Internet Explorer) bar. You may find it useful to add the website to a Bookmarks (Netscape) or Favourites (Internet Explorer) folder for future reference after you have opened the website.

As with all websites there may be occasions when you try to open the website but are unable to do so. You should consider this no different to when you get busy tone when trying to make a telephone call. Your best advice is to wait a little while and try again. From time to time, however, websites do change and sometimes a resource is withdrawn. We will be monitoring all websites recommended during this course, and if any of them are permanently taken down we will advise you.

Further Reading:

The following provide additional references for exploration:

- RMIT (2007) Writing an essay, RMIT University Study and Learning Centre. Click on the link or copy and paste the following link into your internet browser: http://www.dlsweb.rmit.edu.au/lsu/content/2_AssessmentTasks/assess_pdf/super_essay.pdf
- RMIT, (2006) Differences between essays, journals and reports, RMIT University Study and Learning Centre. Click on the link or copy and paste the following link into your internet browser: http://www.dlsweb.rmit.edu.au/lsu/content/2_AssessmentTasks/assess_pdf/diffbet_reportsessays.pdf
- RMIT (2005) Essay Writing Tutorial, RMIT University Study and Learning Centre. Click on the link or copy and paste the following link into your internet browser: http://www.dlsweb.rmit.edu.au/lsu/content/2_AssessmentTasks/assess_tuts/essay_LL/index.html
- RMIT (2005) Case Study Tutorial, RMIT University Study and Learning Centre. Click on the link or copy and paste the following link into your internet browser:
Study Needs

Although studying can be difficult at times, you can help yourself by being organised and allocating specific times for your study. There are some general guidelines which may help you:

• Plan your week. Schedule the times when you will be working through the Learning Guide. Use the suggested time allocation in the chart above to estimate how long to plan for each session of study.

• Ask questions of your tutor and institution. Don’t wait until you feel swamped or overwhelmed. Ask questions when you first have a problem.

• Use your student group as a network and assistance. It has been proven many times that a group of students can help each other to keep motivated and working to schedule.

Course-specific Study Needs

Feedback will be provided in the following manner:

General comments of relevance to all students undertaking the course will be posted on the Course Discussion Board via the Online Classroom.

Specific comments of relevance to a particular group or student will be sent directly via Student Emails.
Submission of Assessment

You will be submitting your assessments and activities as indicated by the Learning Guide, through the Online Classroom. Your coordinator will provide feedback through the Online Classroom as well.

All work must be presented as specified in the instructions and guidelines in Assessment. You are required to be professional in both presentation and attitude, including meeting of deadlines. Please check the plagiarism statement in the Course Outlines online, and ensure that you follow the guidelines provided.

A schedule of when assessments are due can be found at the start of Assessments.

Plagiarism

RMIT University requires that you present your own work for assessment. The rules against plagiarism – representing the work of others (published or unpublished) as your own – are strict and will be enforced diligently. Here is the RMIT’s current plagiarism statement. Read it and make sure you understand its importance.

Plagiarism statement

Plagiarism is a form of cheating in assessment. Plagiarism may occur in oral, written or visual presentations. It is the presentation of the work, idea or creation of another person, without appropriate referencing, as though it is your own. Plagiarism is not acceptable. The use of another person’s work or ideas must be acknowledged. The penalties for cheating in assessment are severe, whether the cheating involves plagiarism, fabrication, falsification of data, copyright infringement or some other method. Penalties can include chargers of academic misconduct, cancellation of results and exclusion from your course. It is also a disciplinary offence for you to allow your work to be plagiarised by another student. You are responsible for keeping your work in a secure place.

Legal Office (university solicitor)

You can keep informed about the University’s plagiarism requirements at http://mams.rmit.edu.au/1oavdg0bdd1.pdf.
Evaluation Process

There is an evaluation form available at the Online Classroom on the RMIT website. Please complete and return as indicated at relevant times indicated by your coordinator. Your comments will assist us in improving and refining the materials and resources.

Feedback

Each Learning Outcome in this course is associated with a set of activities to help you master the knowledge and skills required. Some of these activities are self-assessment questions for which answers are provided so that you can assess your achievement throughout your study. We encourage you to attempt these questions before looking at the provided solutions, which you will find at the end of Learning Guide of this Learning Package. (For those studying online you will be able to link directly to the provided solution.)

In some cases activities will be exercises from your prescribed text book. Answers to these questions will, in most cases, be in your text book rather than in this Learning Guide.

You may be asked to prepare descriptive answers to some self-assessment questions. Since there is no one perfect answer to such questions, the provided answer will be an indication of a good response against which you can judge your own response. The provided answer may be a list of key points that your answer should cover, rather than a descriptive answer.
Use of Icons

The following icons have been used throughout this Learning Guide to indicate what you need to do next.

Reference/reading/resource/research – this may be printed and available in: Resources, an additional recommended text, audio or video tape or web site.

Individual Activity – may be self assessment questions, problem solving, demonstration, simulation, lab, checklist/short answer after reading, case study. Complete the activity following instructions given.

Group Activity – may be problem solving, lab, case study, demonstration. Complete the activity following instructions given.

Feedback – turn to Feedback section at end of : Learning Guide to check answers and responses for the activities.

Frequently Asked Questions – provides some responses to key areas students have highlighted as queries or difficulties.

Summary and Outcome Checklist – what has been learnt, in preparation for assessment

Assessment – must be achieved to pass topic or group of topics. Turn to : Assessment for details of assessment requirements.

Additional reading and research to extend knowledge of key area

Evaluation – tool to gain student feedback on course content, structure and/or implementation issues
Generic Attributes of Graduates

The environmental courses in this elective at RMIT are designed to provide the community with graduates who:

- Communicate ideas with a well developed level of written communication
- Identify the factors necessary to aid a solution of an environmental problem
- Critically assess and evaluate factual information on environmental problems
- Are aware of the social and environmental implications of an environmental problem
- Are entrepreneurial and international in outlook and enjoy a challenge

This course integrates development and demonstration of these attributes into the various topics, indicated through outcomes stated at the beginning and statements in the Summary and Outcome Checklist for each topic.
## Planning and Time Management Guide: Environmental Elective - Introduction to Environmental Science

<table>
<thead>
<tr>
<th>Week(s) of study</th>
<th>Topic</th>
<th>Learning outcomes</th>
<th>Approx. hours</th>
<th>Activities</th>
<th>Assessment</th>
<th>Assessment submission week:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wk 1</td>
<td>The Biosphere</td>
<td>• List the four components of the biosphere and discuss their properties</td>
<td>2 Hours</td>
<td>Complete Activity 1 A</td>
<td>Hand Out Assessment 1: All Weblearn tests in the online Learning hub are made available in the first week of the semester Due end of week 13 11pm Friday Assessment 2: Essay on one topic in this course 50% due week 12 Friday at 5pm, hard copy via John Farrell’s pigeon hole (3.1.02); electronic copy</td>
<td>11pm Friday</td>
</tr>
</tbody>
</table>
Wk 2 | Ecosystem Structure | • Describe the scope of ecology in terms of the levels of organization it involves  
• List and describe the major components of an ecosystem | 2 Hours | Complete Activity 2 A |

Wk 3 | Energy Transfer | • Describe the flow of energy and matter through an ecosystem using feedback loops | 2 Hours | Complete Activity 3 A |

Wk 4 | Biogeochemical Cycling | • Describe the cycling of water, carbon, nitrogen, phosphorous, rock and sulfur in ecosystems  
• Discuss the connection between nutrient cycling and sustainability  
• Describe the interactions (Ecosystem services) that occur within an ecosystem and how they affect sustainability | 2 Hours | Complete Activity 4 A |

Wk 5 | Climate and Weather | • Discuss the factors responsible for the Earth's climate | 2 Hours | Complete |
| Wk 6 | Aquatic Biomes | • List the basic types of aquatic biomes on the Earth and describe the factors influencing the type of life contained in each aquatic biome  
• Identify and describe the characteristics of saltwater and freshwater biomes | 2 Hours | Complete Activity 6 A |
| --- | --- | --- | --- | --- |
| Wk 7 | Terrestrial Biomes | • Define the term biome and describe what constitutes an Australian biome  
• Describe how climate determines the major biomes on Earth  
• Discuss the characteristics of desert, grassland, forest, mountain biomes | 2 Hours | Complete Activity 7 A |
| Wk 8 | Minerals and Soil | • List and describe the Earth’s major natural resources  
• Describe the major geological processes that occur within the Earth and on its surface | 2 Hours | Complete Activity 8 A |
| Wk 9     | Human Impacts on the Environment | • Discuss growth of the global human population and the potential impacts to the environment  
• List the key environmental problems, and their root causes in both more-developed and less-developed countries  
• Compare and contrast the difference between Anthropocentric and ecocentric worldviews  
• Discuss the establishment of a sustainable society  
• Discuss how the different natural resources are being degraded or depleted by human intervention  
• List and describe the types of pollution caused | 2 Hours | Complete Activity 9 A |
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Objectives</th>
<th>Duration</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Human Impacts on the Atmosphere</td>
<td>- List and describe the types of pollution caused by human activity</td>
<td>2 Hours</td>
<td>Complete Activity 10 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Describe and explain how to control the different types of pollution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Human Impacts on the Biosphere</td>
<td>- Describe and explain the ways in which human activity affects biogeochemical cycles</td>
<td>2 Hours</td>
<td>Complete Activity 11 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Discuss the effect of human activity on aquatic biomes</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Discuss the impact of human behaviour on biodiversity</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Discuss the ways in which biodiversity can be maintained</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Discuss the impact of introduced species on an ecosystem</td>
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</tbody>
</table>
### Wk 12: Human Impacts on the Hydrosphere

- **Define water pollution, and discuss the types and sources of water pollutants**
- **Discuss the measurement of water quality**
- **Describe the effects of pollutants, including biological amplification and eutrophication on water quality**

**2 Hours**

**Complete Activity 12 A**

**Assessment 2:** Essay on one topic in this course. 50% due week 12 Friday at 5pm, hard copy via John Farrell’s pigeon hole (3.1.02); electronic copy email to: john.farrell@rmit.edu.au

### Wk 13: Human Impacts on the Lithosphere

- **Discuss the environmental effects of agriculture - including soil erosion, soil salinisation, soil acidification, soil contamination, loss of fertility, and desertification**
- **Discuss how sustainable agricultural practices can avoid and/or mitigate their environmental impacts.**

**2 Hours**

**Complete Activity 13 A**

**Assessment 1:** All Weblearn tests in the online Learning hub are made available in the first week of the semester. Due end of week 13 11pm Friday
Assessment
## Assessment

### Schedule

<table>
<thead>
<tr>
<th>Topic covered</th>
<th>Major Assessment Task</th>
<th>Proportion of final assessment</th>
<th>Submission Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>----------------------</td>
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</tr>
<tr>
<td><strong>Hydrosphere Test 13: Human Impacts on the Lithosphere</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>All</strong></td>
<td>Assessment 2: Essay on Case Study</td>
<td>50 %</td>
<td>Wk 12</td>
</tr>
</tbody>
</table>
### Major Assessment 1: Web-Learn Tests

<table>
<thead>
<tr>
<th>DUE: Friday of week 13, by 5pm AEST (Australian Eastern Standard Time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 x Web-Learn Tests</td>
</tr>
<tr>
<td>Test 1: The Biosphere</td>
</tr>
<tr>
<td>Test 2: Ecosystem Structure</td>
</tr>
<tr>
<td>Test 3: Energy Transfer</td>
</tr>
<tr>
<td>Test 4: Biogeochemical Cycling</td>
</tr>
<tr>
<td>Test 5: Climate and Weather</td>
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<td>Test 6: Aquatic Biomes</td>
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<tr>
<td>Test 7: Terrestrial Biomes</td>
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<td>Test 8: Minerals and Soil</td>
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<td>Test 9: Human Impacts on the Environment</td>
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<td>Test 10: Human Impacts on the Atmosphere</td>
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<tr>
<td>Test 11: Human Impacts on the Biosphere</td>
</tr>
<tr>
<td>Test 12: Human Impacts on the Hydrosphere</td>
</tr>
<tr>
<td>Test 13: Human Impacts on the Lithosphere</td>
</tr>
<tr>
<td>50 %</td>
</tr>
</tbody>
</table>

- Each test consists of ten multiple choice questions chosen randomly from a test bank.
- You can download the questions and return to answer them at any time before the due date.
- It is recommended that you complete the web learn tests on a weekly basis, whilst you are reading the lecture notes.
Major Assessment 2: Essay on Case Study

<table>
<thead>
<tr>
<th>DUE: Friday of week 12, by 5pm AEST (Australian Eastern Standard Time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essay on Case Study</td>
</tr>
</tbody>
</table>

- The assessment should be written in the format of an essay
- The case study chosen should be a local issue, i.e. discuss specific issues relevant to the local experience or issue, rather than give a general overview of a topic
- Your discussion should give a balanced overview of your chosen case study (looking at all sides) that is related to the “Human Impacts on the Environment”, in particular the Biosphere.
- The report should be no longer than 1500-1800 words
- It is recommended that you allocate an hour a week to research, critically read and review, as well as write comprehensive comments and notes in your own words whilst conducting background reading on your topic. This will aide writing the essay.
- Refer to case study and essay tutorials in the further references section to aide writing of the essay
- An assessment guide is included in ‘Course Documents’ in the Online Learning Hub.
- A cover sheet and directions for submitting assignments is also in ‘Course Documents’ in the Online Learning Hub.
- The assessment question is located in the document ‘Unit Description in the ‘Introduction to Environmental Science’ folder in ‘Course Documents’
- Submit a hardcopy (with attached cover sheet) and an electronic copy to the course coordinator. Assignments will not be assessed until both forms are submitted by the due date, Friday of week 12, by 5pm AEST
Please refer to Blackboard for other details of this assessment and any adjustments of modifications to the assessment.
Learning Guide

You are now beginning the course. Please turn to Topic 1 and work your way through the sessions. Remember to use the chart in Course Outline if you are unsure about the next activity or section of work to complete.
**Topic 1: The Biosphere**

**Learning Outcomes**

Upon successful completion of this topic you will be able to:

- List the four components of the biosphere and discuss their properties

**Introduction to the Topic**

The four components of the ecosphere – atmosphere, biosphere, hydrosphere and lithosphere – are introduced and some of their properties discussed.

**Background Skills and Knowledge**

Basic scientific literacy

**Session 1.1 The Biosphere**

**Learning Outcomes**

Upon successful completion of this session, you will be able to:

- List the four components of the biosphere and discuss their properties

---

**Activity 1 A**

**The Biosphere**

Read

PowerPoint presentation: The Biosphere located in the online learning hub under the Course Documents in the Environmental Elective – Introduction to Environmental Science

Version 1 - 10/2008
Summary and Outcome Checklist

The four components of the ecosphere – atmosphere, biosphere, hydrosphere and lithosphere – were introduced and some of their properties discussed.

Tick the box for each statement with which you agree:

I can now...

☐ List the four components of the biosphere and discuss their properties

Assessment

This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 2: Ecosystem Structure

Learning Outcomes

Upon successful completion of this topic you will be able to:

- Describe the scope of ecology in terms of the levels of organization it involves
- List and describe the major components of an ecosystem

Introduction to the Topic

Life is organised into ecological levels that are governed by the laws of matter and energy. The flow of energy and the cycling of matter sustain ecosystems. Like any system, an ecosystem, has a structure and function and is subject to various feedback mechanisms.

Background Skills and Knowledge

Basic scientific literacy

Session 2.1 Ecosystem Structure

Learning Outcomes

Upon successful completion of this session, you will be able to:

- Describe the scope of ecology in terms of the levels of organization it involves
- List and describe the major components of an ecosystem
Activity 2A

Ecosystem Structure

Read

Power point presentation: Ecosystem Structure located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

Summary and Outcome Checklist

Life is organised into levels – organisms, population, community, ecosystem and ecosphere. Some of the characteristics of each of these levels were discussed. The law of conservation of matter and the two laws of energy were introduced. The cycling of matter and flow of energy sustains ecosystems. An ecosystem is subject to various positive and negative feedback mechanisms.

Tick the box for each statement with which you agree:

I can now...

☐ Describe the scope of ecology in terms of the levels of organization it involves

☐ List and describe the major components of an ecosystem

Assessment

This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 3: Energy Transfer

Learning Outcomes

Upon successful completion of this topic you will be able to:

• Describe the flow of energy and matter through an ecosystem using feedback loops

Introduction to the Topic

The flow of matter through an ecosystem from producers to consumers and detritivores leads to the concept of a food web. Energy, biomass and number pyramids are discussed for various types of ecosystems.

Background Skills and Knowledge

Basic scientific literacy

Session 3.1 Energy Transfer

Learning Outcomes

Upon successful completion of this session, you will be able to:

• Describe the flow of energy and matter through an ecosystem using feedback loops
Activity 3 A

Energy Transfer

Read
Power point presentation: Energy Transfer located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

Watch
Short video (2 minutes) on how an ecosystem works at the following link:
http://au.youtube.com/watch?v=LLifx8Eppbo&NR=1

Summary and Outcome Checklist

Following the flow of energy through an ecosystem allows us to identify various trophic levels – producers, primary consumers or herbivores, secondary consumers or carnivores, tertiary consumers, and detritivores - in a food web. Energy pyramids show that only 10% of the available energy is transferred from one trophic level to the next in terrestrial ecosystems. Biomass and number pyramids reveal more about different types of ecosystems.

Tick the box for each statement with which you agree:

I can now...

☑ Describe the flow of energy and matter through an ecosystem using feedback loops
**Assessment**

This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 4: Biogeochemical Cycling

Learning Outcomes

Upon successful completion of this topic you will be able to:

- Describe the cycling of water, carbon, nitrogen, phosphorous, rock and sulfur in ecosystems
- Discuss the connection between nutrient cycling and sustainability
- Describe the interactions (Ecosystem services) that occur within an ecosystem and how they affect sustainability

Introduction to the Topic

The cycling of nutrients – water, carbon, nitrogen, phosphorous, rock and sulfur – through the ecosphere, and the way in which human activity impacts upon these cycles is discussed.

Background Skills and Knowledge

Basic scientific literacy

Session 4.1 Biogeochemical Cycling

Learning Outcomes

Upon successful completion of this session, you will be able to:

- Describe the cycling of water, carbon, nitrogen, phosphorous, rock and sulfur in ecosystems
- Discuss the connection between nutrient cycling and sustainability
- Describe the interactions (Ecosystem services) that occur within an ecosystem and how they affect sustainability
Activity 4 A

Biogeochemical Cycling

Read
Power point presentation: Biogeochemical Cycling located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

Summary and Outcome Checklist

The major nutrient cycles – water, carbon, nitrogen, phosphorous, rock and sulfur – have been discussed in terms of the major storehouses and processes. The effect of human behaviour on these cycles has been discussed.

Tick the box for each statement with which you agree:

I can now...

☐ Describe the cycling of water, carbon, nitrogen, phosphorous, rock and sulfur in ecosystems

☐ Discuss the connection between nutrient cycling and sustainability

☐ Describe the interactions (Ecosystem services) that occur within an ecosystem and how they affect sustainability

Assessment

This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 5: Climate and Weather

Learning Outcomes

Upon successful completion of this topic you will be able to:

- Discuss the factors responsible for the Earth's weather and climate

Introduction to the Topic

What factors determine the climate of a particular region?

Background Skills and Knowledge

Basic scientific literacy

Session 5.1 Climate and Weather

Learning Outcomes

Upon successful completion of this session, you will be able to:

- Discuss the factors responsible for the Earth's weather and climate

Activity 5 A

Climate and Weather

Read

Power point presentation: Climate and Weather located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder
Summary and Outcome Checklist
Climate is determined by the re-distribution of heat from the equator to the poles by the movement of air and water masses. Tick the box for each statement with which you agree:
I can now...
☐ Discuss the factors responsible for the Earth’s weather and climate

Assessment
This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 6: Aquatic Biomes

Learning Outcomes

Upon successful completion of this topic you will be able to:

- List the basic types of aquatic biomes on the Earth and describe the factors influencing the type of life contained in each aquatic biome
- Identify and describe the characteristics of saltwater and freshwater biomes

Introduction to the Topic

The characteristics of various fresh- and salt-water biomes are discussed.

Background Skills and Knowledge

Basic scientific literacy

Session 6.1 Aquatic Biomes

Learning Outcomes

Upon successful completion of this session, you will be able to:

- List the basic types of aquatic biomes on the Earth and describe the factors influencing the type of life contained in each aquatic biome
- Identify and describe the characteristics of saltwater and freshwater biomes
Activity 6 A
Aquatic Biomes

Read
Power point presentation: Aquatic Biomes located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

Summary and Outcome Checklist
The characteristics of various saltwater ecosystems – oceans, estuaries, wetlands, barrier islands, coral reefs – and freshwater ecosystems – lakes, streams and rivers are discussed.

Tick the box for each statement with which you agree:

I can now...

☐ List the basic types of aquatic biomes on the Earth and describe the factors influencing the type of life contained in each aquatic biome

☐ Identify and describe the characteristics of saltwater and freshwater biomes

Assessment
This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 7: Terrestrial Biomes

Learning Outcomes

Upon successful completion of this topic you will be able to:

- Define the term biome and describe what constitutes an Australian biome
- Describe how climate determines the major biomes on Earth
- Discuss the characteristics of desert, grassland, forest, mountain biomes

Introduction to the Topic

The characteristics of various terrestrial biomes are discussed.

Background Skills and Knowledge

Basic scientific literacy

Session 7.1 Terrestrial Biomes

Learning Outcomes

Upon successful completion of this session, you will be able to:

- Define the term biome and describe what constitutes an Australian biome
- Describe how climate determines the major biomes on Earth
- Discuss the characteristics of desert, grassland, forest, mountain biomes
Activity 7 A
Terrestrial Biomes

Read
Power point presentation: Terrestrial Biomes located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

Summary and Outcome Checklist
The characteristics of deserts, grasslands, forests, and mountains were discussed.

Tick the box for each statement with which you agree:

- I can now...
  - Define the term biome and describe what constitutes an Australian biome
  - Describe how climate determines the major biomes on Earth
  - Discuss the characteristics of desert, grassland, forest, mountain biomes

Assessment
This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 8: Minerals and Soil

Learning Outcomes

Upon successful completion of this topic you will be able to:

- List and describe the Earth’s major natural resources
- Describe the major geological processes that occur within the Earth and on its surface
- Describe the types and supply of mineral resources
- Describe the profile, texture, color and structure of soils

Introduction to the Topic

The theory of plate tectonics is introduced, followed by a discussion of the geological history of Australia. There is also a discussion of mineral resources, and the characteristics of soils.

Background Skills and Knowledge

Basic scientific literacy

Session 8.1 Minerals and Soil

Learning Outcomes

Upon successful completion of this session, you will be able to:

- List and describe the Earth’s major natural resources
- Describe the major geological processes that occur within the Earth and on its surface
- Describe the types and supply of mineral resources
- Describe the profile, texture, color and structure of soils
Activity 8 A

Minerals and Soil

Read

Power point presentation: Minerals and Soil located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

Summary and Outcome Checklist

The theory of plate tectonics was introduced with a discussion of the types of plate boundaries that can occur, and a geological history of the Earth and Australia. Various types of mineral resources were discussed. Various examples of soil profiles were provided, followed by a summary of soil properties – texture, structure and colour. Australian soils were discussed as an example.

Tick the box for each statement with which you agree:

I can now...

- List and describe the Earth’s major natural resources
- Describe the major geological processes that occur within the Earth and on its surface
- Describe the types and supply of mineral resources
- Describe the profile, texture, color and structure of soils

Assessment

This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 9: Human Impacts on the Environment

Learning Outcomes

Upon successful completion of this topic you will be able to:

- Discuss growth of the global human population and the potential impacts to the environment
- List the key environmental problems, and their root causes in both more-developed and less-developed countries
- Compare and contrast the difference between Anthropocentric and ecocentric worldviews
- Discuss the establishment of a sustainable society
- Discuss how the different natural resources are being degraded or depleted by human intervention
- List and describe the types of pollution caused by human activity
- Describe and explain how to control the different types of pollution

Introduction to the Topic

What are some of the ways in which we are impacting on the planet, and what are the underlying causes of these impacts?

Background Skills and Knowledge

Basic scientific literacy

Session 9.1 Human Impacts on the Environment

Learning Outcomes

Upon successful completion of this session, you will be able to:
- Discuss growth of the global human population and the potential impacts to the environment
- List the key environmental problems, and their root causes in both more-developed and less-developed countries
- Compare and contrast the difference between Anthropocentric and ecocentric worldviews
- Discuss the establishment of a sustainable society
- Discuss how the different natural resources are being degraded or depleted by human intervention
- List and describe the types of pollution caused by human activity
- Describe and explain how to control the different types of pollution

**Activity 9 A**

**Human Impacts on the Environment**

Read

Power point presentation: Human Impacts on the Environment located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

**Summary and Outcome Checklist**

Three underlying causes – population, affluence and technology – are identified as responsible for our environmental impact, and the problems of overpopulation and over-consumption are discussed.

Tick the box for each statement with which you agree:

I can now...
- Discuss growth of the global human population and the potential impacts to the environment
- List the key environmental problems, and their root causes in both more-developed and less-developed countries
- Compare and contrast the difference between Anthropocentric and ecocentric worldviews
- Discuss the establishment of a sustainable society
- Discuss how the different natural resources are being degraded or depleted by human intervention
- List and describe the types of pollution caused by human activity
- Describe and explain how to control the different types of pollution

Assessment

This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 10: Human Impacts on the Atmosphere

Learning Outcomes

Upon successful completion of this topic you will be able to:

- List and describe the types of pollution caused by human activity
- Describe and explain how to control the different types of pollution

Introduction to the Topic

Various types of air pollution, their causes, effects, and how they might be controlled, are discussed.

Background Skills and Knowledge

Basic scientific literacy

Session 10.1 Human Impacts on the Atmosphere

Learning Outcomes

Upon successful completion of this session, you will be able to:

- List and describe the types of pollution caused by human activity
- Describe and explain how to control the different types of pollution
Activity 10 A

Human Impacts on the Atmosphere

Read
Power point presentation: Human Impacts on the Atmosphere located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

Summary and Outcome Checklist

Industrial and photochemical smog, indoor air pollution, acid rain, particulates, ozone destruction and the greenhouse effect were discussed in terms of their causes, effects, and how they might be controlled.

Tick the box for each statement with which you agree:

I can now...

☐ List and describe the types of pollution caused by human activity

☐ Describe and explain how to control the different types of pollution

Assessment

This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 11: Human Impacts on the Biosphere

Learning Outcomes

Upon successful completion of this topic you will be able to:

- Describe and explain the ways in which human activity affects biogeochemical cycles
- Discuss the effect of human activity on aquatic biomes
- Discuss the impact of human behavior on biodiversity
- Discuss the ways in which biodiversity can be maintained
- Discuss the impact of introduced species on an ecosystem

Introduction to the Topic

The ways in which humans impact upon ecosystems is considered

Background Skills and Knowledge

Basic scientific literacy

Session 11.1 Human Impacts on the Biosphere

Learning Outcomes

Upon successful completion of this session, you will be able to:

- Describe and explain the ways in which human activity affects biogeochemical cycles
- Discuss the effect of human activity on aquatic biomes
- Discuss the impact of human behavior on biodiversity
- Discuss the ways in which biodiversity can be maintained
- Discuss the impact of introduced species on an ecosystem
Activity 11 A

Human Impacts on the Biosphere

Read
Power point presentation: Human Impacts on the Biosphere located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

Summary and Outcome Checklist

Human impact on different types of ecosystems, nutrient cycles, food webs, and on biodiversity were considered.

Tick the box for each statement with which you agree:

I can now...

☑ Describe and explain the ways in which human activity affects biogeochemical cycles
☑ Discuss the effect of human activity on aquatic biomes
☑ Discuss the impact of human behaviour on biodiversity
☑ Discuss the ways in which biodiversity can be maintained
☑ Discuss the impact of introduced species on an ecosystem

Assessment

This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 12: Human Impacts on the Hydrosphere

Learning Outcomes

Upon successful completion of this topic you will be able to:

- Define water pollution, and discuss the types and sources of water pollutants
- Discuss the measurement of water quality
- Describe the effects of pollutants, including biological amplification and eutrophication on water quality

Introduction to the Topic

Water supply and demand, water pollution, water quality, eutrophication, and sewage treatment are discussed.

Background Skills and Knowledge

Basic scientific literacy

Session 12.1 Human Impacts on the Hydrosphere

Learning Outcomes

Upon successful completion of this session, you will be able to:

- Define water pollution, and discuss the types and sources of water pollutants
- Discuss the measurement of water quality
- Describe the effects of pollutants, including biological amplification and eutrophication on water quality
Activity 12 A

Human Impacts on the Hydrosphere

Read
Power point presentation: Human Impacts on the Hydrosphere located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

Summary and Outcome Checklist

The supply and demand of water for human needs were discussed, as was water pollution and measurement of water quality. The problems of biological amplification and eutrophication were considered. Sewage treatment and other forms of pollution control were investigated.

Tick the box for each statement with which you agree:

I can now...

☐ Define water pollution, and discuss the types and sources of water pollutants
☐ Discuss the measurement of water quality
☐ Describe the effects of pollutants, including biological amplification and eutrophication on water quality

Assessment

This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.
Topic 13: Human Impacts on the Lithosphere

Learning Outcomes

Upon successful completion of this topic you will be able to:

- Discuss the environmental effects of agriculture - including soil erosion, soil salinisation, soil acidification, soil contamination, loss of fertility, and desertification
- Discuss how sustainable agricultural practices can avoid and/or mitigate their environmental impacts.

Introduction to the Topic

The impacts that humans make on the lithosphere, particularly the soil, are discussed.

Background Skills and Knowledge

Basic scientific literacy

Session 13.1 Human Impacts on the Lithosphere

Learning Outcomes

Upon successful completion of this session, you will be able to:

- Discuss the environmental effects of agriculture - including soil erosion, soil salinisation, soil acidification, soil contamination, loss of fertility, and desertification
- Discuss how sustainable agricultural practices can avoid and/or mitigate their environmental impacts.
Activity 13 A

Human Impacts on the Lithosphere

Read
Power point presentation: Human Impacts on the Lithosphere located in the online learning hub under the Course Documents in the Introduction to Environmental Science folder

Summary and Outcome Checklist

Soil erosion, soil salinisation and acidification, soil contamination, and loss of soil fertility as a result of agriculture, mining, and urbanisation were discussed.

Tick the box for each statement with which you agree:

I can now...

☐ Discuss the environmental effects of agriculture - including soil erosion, soil salinisation, soil acidification, soil contamination, loss of fertility, and desertification

☐ Discuss how sustainable agricultural practices can avoid and/or mitigate their environmental impacts.

Assessment

This topic will be assessed as part of the Major Assessment task: 1 (see: Assessment for more detail). This aims to ensure understanding of key concepts prior to undertaking the end of the semester examination.