

# **Jeanette Farrington**

# **Unit of Work**

# Managing the Great Barrier Reef

**Studies of Society and Environment Level 5** 

#### **Rationale**

The Great Barrier Reef is a strong symbol for a natural and wild Australian environment. The reef reminds Australians of a past long lost and a future we all hope for. It was a past, when Australia and Australians sacrificed much of their natural environment in the name of progress and economic development. The Australian wilderness was viewed as a resource to be tapped and exploited. Yet the reef remains. The reef has revealed that the Australian environment is not a 'lost-cause', that effective management can reduce or halt the effects a modern society has on its surroundings. It encapsulates an immense and dramatic beauty that is both respected and admired. The coral is delicate yet combines to form the largest natural living structure on earth. Despite its enduring nature, the Great Barrier Reef is no longer pristine, no longer safe. The threats to the reef continue to grow, as too does the damage being caused. But hand in hand with the increasing threat come increasing environmental awareness, both sociological and scientific in nature, on both local and global scales.

The Great Barrier Reef provides an effective 'yard-stick' from which to measure the state of the environment on every scale. Its sensitivity to small physical changes makes it an excellent indicator of global change. The reef, as a case study for environmental management, also serves as an excellent tool. It is a microcosm of the complex interactions between the wide variety of interested parties to a resource. It supports fishing and tourism directly, and indirectly competes with agricultural and mining industries. Local and indigenous communities, city, state and federal politicians also have interests and vested interests in the reef. More broadly, economics and environmental change on a global scale also have a part to play in this complex interrelated scenario.

This unit seeks to explore the physical environment of the Great Barrier Reef and the roles these parties play in the management of this natural environment. This case study exemplifies the process of environmental management which is occurring at smaller scales around Australia and the world. As such, an understanding of management of the reef can be applied to other scenarios.

#### **Global Aims**

Through the study of 'Managing the Great Barrier Reef' students will achieve a broad and in-depth understanding of ecological sustainability and the interrelationship between ecological systems and social structures. Students will view the Great Barrier Reef as an integral part of the global environment. In using the Great Barrier Reef as an example, students will develop a belief in the integrity of natural environments, their importance as the basic sources of life support, and the wise, equitable and sustainable use of resources. Students will understand the need for the

promotion and attainment of ecologically sustainable development; the complex nature of environments; and the need to protect environments for their intrinsic value, for their heritage value and as a resource to sustain life in the present and for future generations. Students will understand the value in acting ethically towards the environment by establishing and maintaining social, political and economic structures that are focused on finding quality of life in a world of limits.

The processes of investigating, reflecting and creating are highlighted to help students understand a range of systems, including those related to Australian political systems. Students are encouraged to reflect on and improve the investigative strategies they have used. The activities provide opportunities for students to use their understandings and communicate judgments about how some systems operate.

Students will develop skills in the use of the following social and environmental inquiry processes:

- investigating;
- creating;
- participating;
- communicating;
- reflecting.

Students will be able demonstrate an understanding of environmental systems on a global level, with particular focus on the Great Barrier Reef. They will understand how the human environment has impacted on reef. Furthermore, students will be able to understand the balance between economic and ecological sustainability of the Great Barrier Reef for future generations. Students will be able to demonstrate their achievements, through auditory, visual and kinesthetic ways to communicate geographical, environmental and social-environmental interactions.

#### **UOutcomes/Objectives**

#### **SOSE:**

#### **Time, Continuity and Change**

Students understand relationships between events in ancient and modern settings and can formally communicate these with reference to primary and secondary sources of evidence (for example aboriginal and heritage issues on the Great Barrier Reef). They also understand how ideas and the pace of change impact on different groups in different times and can use inquiry processes to evaluate historical heritages.

#### Core Learning Outcomes

TCC 5.2 Students represent situations before and after a period of rapid change.

#### **Place and Space**

Students understand the relationships within and between ecosystems (the Great Barrier Reef) in different place settings and can use geographical and environmental inquiry processes to investigate these relationships. They also understand the patterns of environments in Queensland, Australia and the Asia-Pacific and can apply values to evaluate the effects of decisions related to industries.

#### Core Learning Outcomes

- **PS 5.1** Students synthesise information from the perspectives of different groups identify patterns that constitute a region.
- **PS 5.2** Students design strategies for evaluating environmental impacts of a proposed project, highlighting relationships within and between natural systems.
- **PS 5.3** Students participate in geographical inquires to evaluate impacts on ecosystems in different global locations.
- **PS 5.5** Students evaluate ideas concerning sustainability to identify who may benefit and who may be disadvantaged from changes to the Queensland industry.

#### Discretionary learning outcomes

**PSD 5.6** Students apply ideas concerning the sustainability to suggest how natural social and built environments should interact in a preferred future.

#### Systems, Resources and Power

Students utilise the Great Barrier Reef to help understand some relationships between Australian and global systems and can use inquiry and decision-making processes to evaluate these relationships. They also understand some key features of Australia's economic, legal and political systems and their role in managing the Great Barrier Reef and can reflect on the value of social justice to suggest improvements to these systems.

#### **Core Learning Outcomes**

*SRP 5.1* Students evaluate the relationship between an ecological system and a government and/or economic system.

*SRP 5.3* Students use a structured decision-making process to suggest participatory action regarding a significant current environmental, business, political or legal issue.

#### **Science:**

This unit incorporates the following core content from the syllabus:

#### Life and Living

- Components of environments biotic/abiotic
- Types of environments aquatic/terrestrial
- Features of different environments
- Natural relationships
  - interactions between living things
    - predator/prey
    - food chains/webs
    - competition for resources

- interactions between living and non-living things to meet needs
- interactions between non-living things
  - effects on environments
- Human influence
  - changes in biodiversity conservation, preservation, introduced species
  - modification of habitat
    - agricultural practices irrigation, soil degradation
    - urbanisation
    - tourism/ecotourism

#### Earth and Beyond

- Using the Earth's environment
  - to obtain needs water
  - for human recreation waterways, roads, farms, built environment
- Caring for the environment
  - managing human impact on land, water and the atmosphere
- Information as a resource
  - for making predictions
  - for considering ideas of futures and sustainability

#### **Topic Selection**

The global aims, discussed above, have clearly placed this unit on 'Managing the Great Barrier Reef', within the scope of the Queensland SOSE syllabus at level 5. The unit plan table highlights each topic to be considered under the heading of 'Managing the Great Barrier Reef' and relates them to the relevant core learning outcomes of the SOSE Years 1-10 syllabus. The following table summarises this in highlighting the specific content studied within the unit and how it relates to the syllabus:

Specific	How the Specific Content Relates to the Syllabus
Content	(Broad and Key Learning Outcomes)
Coral Reef Ecosystems	<b>PS 5.5</b> Students evaluate ideas concerning sustainability to identify who may benefit and who may be disadvantaged from changes to a Queensland industry.
Architecture of the Great Barrier Reef	"Students understand the relationships within ecosystems and use geographical and environmental inquiry processes to investigate these relationships".
Biodiversity	"Students understand the relationships within ecosystems and use geographical and environmental inquiry processes to investigate these relationships".
Threats to the Great Barrier Reef	<ul> <li>SRP 5.1 Students evaluate the relationship between ecological system and a government and/or an economic system.</li> <li>PS 5.1 Students synthesise information from the perspectives of different groups to identify patterns that constitute a region.</li> <li>PS 5.5 Students evaluate ideas concerning sustainability to identify who may benefit and who may be disadvantaged from changes to the Queensland industry.</li> </ul>
Human Impacts on the Great Barrier Reef	<ul> <li>TCC 5.2 Students represent situations before and after a period of rapid change.</li> <li>PS 5.3 Students participate in geographical inquiries to evaluate impacts on ecosystems in different global.</li> <li>PS 5.5 Students evaluate ideas concerning sustainability to identify who may benefit and who may be disadvantaged from changes to a Queensland industry.</li> <li>SRP 5.1 Students evaluate the relationship between an ecological system and a government and/or economic system.</li> </ul>
Social and Economic Issues	<ul> <li>PS 5.1 Students synthesise information from the perspectives of different groups to identify patterns that constitute a region.</li> <li>PS 5.5 Students evaluate ideas concerning sustainability to identify who may benefit and who may be disadvantaged from changes to a Queensland industry.</li> <li>SRP 5.1 Students evaluate the relationship between an ecological system and a government and/or economic system.</li> </ul>
Political and Ecological Issues	PS 5.1 Students synthesise information from the perspectives of different groups to identify patterns that constitute a region.  SRP 5.1 Students evaluate the relationship between an ecological system and a government and/or economic system.  SRP 5.3 Students use a structured decision-making process to suggest participatory action regarding a significant current environmental, business, political or legal issue.
Environmental Management and Conservation	PS 5.2 Students design strategies for evaluating environmental impacts of a proposed project, highlighting relationships within and between natural systems.  PS 5.6 Students apply ideas concerning sustainability to suggest how natural, social and built environments should interact in a preferred future.  SRP 5.1 Students evaluate the relationship between an ecological system and a government and/or economic system.  SRP 5.3 Students use a structured decision-making process to suggest participatory action regarding a significant current environmental, business, political or legal issue.
Environmental Impact Assessment	PS 5.2 Students design strategies for evaluating environmental impacts of a proposed project, highlighting relationships within and between natural systems.  SRP 5.3 students use a structured decision-making process to suggest participatory action regarding a significant current environment, business, political or legal issue.
Carribean Reefs	<ul> <li>PS 5.3 Students participate in geographical inquiries to evaluate impacts on ecosystems in different global locations.</li> <li>SRP 5.1 Students evaluate the relationship between an ecological system and a government and/or economic system.</li> </ul>

# SOSE Curriculum: Unit of Work ~ Managing the Great Barrier Reef

24 Lessons (3 x 70 minute lessons per week)

Day Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	Introduce Unit		Coral Reef Ecosystem	Components and processes of the Great Barrier Reef	
2	Biodiversity on the Great Barrier Reef		Activity: Main aspects of the Great Barrier Reef	Activity: Great Barrier Reef excursion	
3	Threats to the Great Barrier Reef (media activity)		Threats to the Great Barrier Reef (video activity)	Threats to the Great Barrier Reef (video activity continued)	
4	Human impacts on the Great Barrier Reef		Human impacts on the Great Barrier Reef continued	Social and economics issues for the Great Barrier Reef	
5	Political issues and ecological sustainability		Environmental management and conservation - introduction	Environmental management and conservation – organisations and policy	
6	Environmental management and conservation – approaches		Environmental management and conservation – environmental impact assessment	Carribean reef ecosystems – Introduction	
7	Carribean reef ecosystems – Comparison		Main Assignment – Library Time	Main Assignment – Library Time	
8	Main Assignment – Library Time		Main Assignment – Library Time		

# SOSE Curriculum: Unit of Work ~ Managing the Great Barrier Reef 24 Lessons (3 x 70 minute lessons per week)

Phase	Learning Outcomes	References
Phase 1 Orientation 5 Periods Lesson 1	Core Learning Outcomes: All learning outcomes of this unit are mentioned in brief in this lesson. All learning outcomes will be met over the course of this unit.  Exposition: Introduction to unit: Overview of topics. Assessment. Excursion. Overview of Topics: Coral reef ecosystems Types of coral reefs Biodiversity Threats to the Great Barrier Reef Human impact on the Great Barrier Reef. Social and Economic issues of the Great Barrier Reef Political issues and Ecological sustainability Environmental Management and Conservation Assessment: Discussion of assessment pieces and criteria Excursion: Week 2 of term. Excursion form.  Discussion: What does the Great Barrier Reef mean to you?  Multimedia: Slide show introducing the Great Barrier Reef.  Activity: Individual Brainstorm: Great Barrier Reef. What do you think of, when you think of the Great Barrier Reef. Then students to discuss in class. Students write down all the points from class.	Slide show.  Handout: Overview of some of the topics and issues related to the Great Barrier Reef.
Phase 1 Lesson 2	Core Learning Outcomes:  PS 5.5 Students evaluate ideas concerning sustainability to identify who may benefit and who may be disadvantaged from changes to a Queensland industry.  Broad Learning Outcomes:  "Students understand the relationships within ecosystems and use geographical and environmental inquiry processes to investigate these relationships".  Exposition: Coral Reef Ecosystems:  Importance of ecosystems, to the environment and humans.  Why coral reefs are fragile.  Brief overview of threats to coral reef environments.  Location of coral reefs  Discussion: From text:  Why are coral reef ecosystems described as being fragile?	Text: Kleeman, Pask and Butler, pages 138-139.

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Text:
Kleeman, Pask and
Butler, pages
140-141.
Handout
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Text:
Beattie;
Text: Aplin;
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Text:
Kleeman, Pask and
Butler, page
143.

	<ul> <li>In addition illustrate how biodiversity changes from the south to north direction.</li> <li>Include maps, diagrams, and short sentences as a part of flow chart.</li> </ul>	
Phase 1 Lesson 5	Core Learning Outcomes. All learning outcomes stated for this unit are identified in this lesson.	www. Reefed.edu. au
	Exposition: Students introduced to main aspects of the Great Barrier Reef	Handout
	Activity: Virtual journey of the Great Barrier Reef  Exploration of Reefed web site (www.Reefed.edu.au)  Question sheet for exploring web site	
Phase 2	Core Learning Outcomes.	Excursion
Enhancing 12 Periods	All learning outcomes stated for this unit are identified in this lesson.	booklet.
Lesson 6	Exposition Students to get first hand experience of the Great Barrier Reef.	
	Activity: Excursion to the Great Barrier Reef.	
	Student work booklet	
Phase 2 Lesson 7	Core Learning Outcomes  SRP 5.1 Students evaluate the relationship between ecological system and a government and/or an economic system.	Handout: Newspaper articles
	<b>Discussion:</b> What are some of the threats to the Great Barrier Reef?	
	Exposition: Threats to the Great Barrier Reef:	
	Run-off	
	• Oil spills	
	• Tourism	
	<ul><li> Crown of Thorns Starfish</li><li> Global warming and Coral bleaching</li></ul>	
	Activity: Media Investigation:	
	Students to read a newspaper article dealing with one of the threats that affect the Great Barrier Reef.	
	• Students to individually write down the most important points of the article.	
	• Then students get into small groups and write down what they think are the most important aspects of the article.	
	• In addition students chose a spokesperson from each group to discuss to the class there article and the issues from the article.	
	Furthermore each group has a scribe to write down the points, while the speaker, speaks in class.  All students are appared to write down each groups points.	
	<ul> <li>All students are expected to write down each groups points.</li> <li>Homework to make sure newspaper article task is completed before next lesson.</li> </ul>	
Phase 2	Core Learning Outcomes	Video "The
Lesson 8	<b>PS 5.1</b> Students synthesise information from the perspectives of different groups to identify patterns that constitute a region.	Cutting Edge: Threats to
		Timeats to

	PS 5.5 Students evaluate ideas concerning sustainability to identify who may benefit and who may be disadvantaged from changes to the Queensland industry.  SRP 5.1 Students evaluate the relationship between an ecological system and a government and/or economic system.  Exposition: Threats to the Great Barrier Reef continue  Multimedia: Video "The Cutting Edge: Threats to the Great Barrier Reef"	the Great Barrier Reef"
	Activity: Question sheet based on videos	
Phase 2	Video continues	Video "The
Lesson 9	Activity: Question sheet based on videos	Cutting Edge: Threats to the Great Barrier Reef"
Phase 2 Lesson 10	Core Learning Outcomes  TCC 5.2 Students represent situations before and after a period of rapid change.	www. gbrmpa.gov. au
	<b>PS 5.3</b> Students participate in geographical inquiries to evaluate impacts on ecosystems in different global.	Handout
	<b>PS 5.5</b> Students evaluate ideas concerning sustainability to identify who may benefit and who may be disadvantaged from changes to a Queensland industry.	
	<i>SRP 5.1</i> Students evaluate the relationship between an ecological system and a government and/or economic system.	
	Exposition: Human Impact on the Great Barrier reef Table illustrating summary of major attributes on the Great Barrier Reef progressively developed during the class.	
	Discussion: Class discussion of the Table:  • What are the main attributes of the Great Barrier Reef?	
	Activity: Cause and Effect charts illustrating the impacts on the Great Barrier Reef and the response of the reef from these impacts. Preparation for the role play activity and debate - use of library resources - books, internet, journals, vertical file, video and films.	
Phase 2	Core Learning Outcomes	Handout
Lesson 11	<ul> <li>PS 5.1 Students synthesise information from the perspectives of different groups to identify patterns that constitute a region.</li> <li>PS 5.5 Students evaluate ideas concerning to identify who may benefit and who may be disadvantaged from changes to Queensland region.</li> </ul>	Main Assignment Work sheet and
	Exposition:	assessment Criteria

Human Impact continue

Requirements for main assignment introduced - environmental management report for the Great Barrier Reef.

#### **Discussion:**

Requirements for main assignment

#### **Activity:**

Role play activity and debate illustrating perspectives and competing interests of groups and individuals dealing with the Great Barrier Reef. Groups and Individuals of role play/debate activity:

- Politicians and economists
- Farmers
- Tourism operator
- Environmentalist
- Conservation manager of Great Barrier Reef
- Student
- Fisheries
- Marine Biologists/researcher

Students are to engage in a role play activity and debate demonstrating the perspectives and competing interests of groups and individuals dealing with the Great Barrier Reef.

#### Phase 2 Lesson 12

#### **Core Learning Outcomes**

**PS 5.1** Students synthesise information from the perspectives of different groups to identify patterns that constitute a region.

**PS 5.5** Students evaluate ideas concerning sustainability to identify who may benefit and who may be disadvantaged from changes to a Queensland industry.

*SRP 5.1* Students evaluate the relationship between an ecological system and a government and/or economic system.

#### **Exposition:**

Social, and Economic issues.

Social issues:

- Materialism
- Consumerism
- Cultural traits

Economic issues:

- Economic Growth
- Economic Growth and Environmental Protection
- Valuing the Great Barrier Reef and Resources

#### **Discussion:**

Discuss the interrelated nature of factors (social, economic and environmental) affecting the reef, utilising the compass rose as demonstration tool.

#### **Activity:**

Compass Rose

- Introduce the compass rose as a simple tool to enhance thinking about issues.
- Class to talk about each axis and what each compass point represents.
- Discuss diagonal points and the questions these imply.
- Talk about the environmental, social, economic and political factors

Handout

Text: Aplin

	that influence the various ways in which the Reef's resources are	
Phase 2	valued.  Core Learning Outcomes	Draft Reef
Lesson 13	Core Ecurining Outcomes	Water
	<b>PS 5.1</b> Students synthesise information from the perspectives of different groups to identify patterns that constitute a region.	Quality Protection Plan.
	<i>SRP 5.1</i> Students evaluate the relationship between an ecological system and a government and/or economic system.	www.thepre mier.qld.gov .au/reefwater
	<i>SRP 5.3</i> Students use a structured decision-making process to suggest participatory action regarding a significant current environmental, business, political or legal issue.	Text: Aplin
	Exposition	
	Exposition: Political issues and Ecological sustainability. Political issues:	
	Governments view on the Great Barrier Reef	
	<ul> <li>Government Acts and legislation Protecting the Great Barrier Reef</li> <li>Draft Water Quality Protection Plan</li> </ul>	
	Ecological sustainability	
	<ul><li>Definition of ecological sustainability</li><li>Balancing Human use and ecological sustainability</li></ul>	
	Baraneing Human use and ecological sustamability	
	<b>Discussion:</b> What is the Draft Reef Water Quality Protection Plan?	
	Activity: Students write a letter to the Queensland government illustrating their response on the Draft Reef Water Quality Protection Plan. In addition discuss in the letter what they think the government should do to achieve ecological sustainability for the environment and people	
Phase 2	Core Learning Outcomes	
Lesson 14	<b>PS 5.2</b> Students design strategies for evaluating environmental impacts of a proposed project, highlighting relationships within and between natural systems.	
	<b>PS 5.6</b> Students apply ideas concerning sustainability to suggest how natural, social and built environments should interact in a preferred future.	
	Exposition: Environmental Management and Conservation:	
	Reasons for conserving reef environments and ecosystems.	
	Global perspectives of environmental management practices dealing with coral reefs.	
	Activity:	
	Class brainstorm for conserving reef environments.  Individual Written Task: Are global management practices sufficient to	
Phase 2	protect coral reefs; why/why not?  Core Learning Outcomes	Handout
Lesson 15	<b>PS 5.2</b> Students design strategies for evaluating environmental impacts of	
	a proposed project, highlighting relationships within and between natural systems.	www. gbrmpa.gov. au
	<i>SRP 5.1</i> Students evaluate the relationship between an ecological system and a government and/or economic system.	

	<i>SRP 5.3</i> Students use a structured decision-making process to suggest participatory action regarding a significant current environmental, business, political or legal issue.	
	Exposition: Environmental Management and Conservation continue  • Environmental Organisations dealing with the Great Barrier Reef  • Great Barrier Reef Marine Park Authority  • Policy and Guidelines of GBRMPA	
	<ul> <li>Activity: Outline the policy of GBRMPA.</li> <li>Students to discuss what they think is Australia's role and responsibility in protecting in the Great Barrier Reef.</li> <li>Students to outline what they think should be the key polices and guidelines for protecting the Great Barrier Reef.</li> </ul>	
Phase 2 Lesson 16	Environmental Management and Conservation continue  Exposition:  General Management approaches for the Great Barrier Reef	Text: Kleeman, Pask and Butler, pages 150-
N a	Activity: Students are to use the library to work on their assignment.	153
Phase 2 Lesson 17	Core Learning Outcomes  PS 5.2 Students design strategies for evaluating environmental impacts of a proposed project, highlighting relationships within and between natural systems.	Handout. Text: Aplin
	<i>SRP 5.3</i> students use a structured decision-making process to suggest participatory action regarding a significant current environment, business, political or legal issue.	
	Exposition: Environmental Management and Conservation continue  Impact Assessment of the Great Barrier Reef  Steps in environmental impact assessment:  Status and scoping  Data collection  Consideration of Alternatives  Consideration of likely impacts  Review of proposed mitigation procedures  Screening  Communication  The decision  Post-project assessment	
	Activity: Students to create a short report on how they would conduct an environmental impact assessment on the Great Barrier Reef.	
Phase 3 Synthesising 7 Periods Lesson 18	Core Learning Outcomes  PS 5.3 Students participate in geographical inquiries to evaluate impacts on ecosystems in different global locations.	Text: Kleeman, Pask and Butler, pages 146-149
	<i>SRP 5.1</i> Students evaluate the relationship between an ecological system and a government and/or economic system.	170 177

	Exposition:	
	The Caribbean ecosystem case study.	
	Activity:	
	Case Study: The Caribbean: Coral reef ecosystems under threat.	
	Complete questions 1 - 6, from page 149, understanding the text.	
Phase 3	Core Learning Outcomes	Text:
Lesson 19	PS 5.3 Students participate in geographical inquiries to evaluate impacts	Kleeman,
	on ecosystems in different global locations	Pask and
		Butler, pages 146-149
	SRP 5.1 Students evaluate the relationships between an ecological system	140-149
	and a government and/or economic system.	
	Exposition:	
	The management of reef systems in the Carribean is introduced as a	
	comparison against the Great Barrier Reef.	
	A stimitum	
	Activity: Complete Case Study of the Caribbean	
	Library time for working on main assignment if time permits.	
Phase 3	Activity:	
Lesson 20	Library time to work on main assignment	
Phase 3	Activity:	
Lesson 21	Library time to work on main assignment	
Phase 3	Exposition:	
Lesson 22	Summary and Conclusions	
Lesson 22	Summary and Conclusions	
	Activity:	
	Library time to work on main assignment	
Phase 3	Activity:	
Lesson 23	Library time to work on main assignment	
Phase 3	New Topic	
Lesson 24	Assignment Due	

#### **Orientation Lesson Plan**

#### Using technology to explore the Great Barrier Reef

#### 1. Anticipatory Set:

For this lesson students will be engaging in virtual journey of the Great Barrier Reef. Show students how many web site exist on the Great Barrier Reef, then show them the web site they will be exploring for the lesson.

#### 2.(a) Objective (what):

To understand the complexity of the Great Barrier Reef, as well as the issues faced by the Great Barrier Reef, as a result of Human impacts.

#### **Rationale (why):**

The Great Barrier Reef is a complex ecosystem, it is important to understand the system, as today the reef faces many issues. It is important students understand the implications of human impacts, as well as current management practices used to save the reef. In addition this lesson incorporates the use of technology, so that students are subject to different learning experiences through the use of a virtual journey of the reef.

#### (c)"Your job will be to....."

take a virtual journey of the Great Barrier Reef by going to www.reefed.edu.au.

#### 3. Input – Auditory, Visual, Kinesthetic.

The virtual trip allows for students to have auditory, visual and kinesthetic input, by exploring the web site. A question sheet provides clues as to what direction students should be heading in as they explore the reef.

#### 4. Modelling.

As students take their virtual trip through the reef, they are expected to fill in a question sheet, which covers all aspects of the Great Barrier reef.

#### 5. Checking for understanding.

Students are asked to hand in there completed question sheet. Students are able to ask questions during the lesson and are continually monitored.

#### 6. Guided Practice.

Circulate around the class room as students work on there task, ask students what they are finding out, what they are thinking about in relation to the reef as they complete the task.

#### 7. Independent Practice.

Students are expected to complete the work sheet for homework, or for those who do not have access to the web at home, extra class time will be given. All students must hand in the work sheet, this means all students can be assessed in checking for understanding of the reef and the use of technology.

#### **Enhancing Lesson Plan**

#### Media Investigation: Threats to the Great Barrier Reef

#### 1. Anticipatory

Newspaper articles relating to development, tourism, farming, crown of thorns starfish, global warming and coral bleaching will be provided. This is to focus the attention of the students to think about possible threats which may impact on the Great Barrier Reef.

#### 2. (a) Objective (what)

How coral reef ecosystems function (ie their growth, reproduction and biodiversity), provide indicators of possible threats to the Great Barrier Reef.

#### (b) Rationale (why)

Students will need to understand why development, tourism, farming, crown of thorn starfish, global warming and coral bleaching pose a threat to the Great Barrier Reef, as well other additional threats. In addition to understand what impact and implications these threats are having on the Great Barrier Reef.

#### (c) "Your Job Will Be To..."

Understand impact these various threats have on the ecosystems of the Great Barrier Reef. You will need to write down what issues may impact on the Great Barrier Reef.

#### 3. Input - Auditory, Visual and Kinesthetic

Newspaper articles relating to threats to the Great Barrier Reef: Runoff, oil spills, tourism, crown of thorn starfish, global warming and coral bleaching. Students are to participate by suggesting what they think is a threat to the Great Barrier Reef, by putting their hand up and participating in class.

#### 4. Modelling - finished article/process

Students will begin reading a newspaper article on one of the issues which threaten the ecosystems of the Great Barrier Reef. As individuals students are write down the key points and what they think are the most important points of the article. Students then are required to form small groups, according to there selected issue, and write down together what they think are the most important issues of the article.

#### 5. Checking for understanding

Students are to choose a spokesperson from their group, to read out the key issues from their article. In addition another person will be a scribe and write their group's key issues from the article on the blackboard. All the students are expected to write down each group's, key issues from the black board.

#### **6. Guided Practice**

Circulate around the classroom to check the students are on trackk, during all aspects of the lesson, to insure understanding of the issues and the task.

#### 7. Independent Practice

Students are to make sure they have copied all the key issues of each article and from the blackboard. Students are to write any other threat they can think of which may affect the Great Barrier Reef. In addition students are to bring in any newspaper articles which relate to threats to the Great Barrier Reef, or write a paragraph on any media presentation which they have viewed, which may mention threats to the Great Barrier Reef.

#### **Synthesising Lesson Plan**

#### **Environmental Management Report of the Great Barrier Reef**

#### 1. Anticipatory Set:

A brief discussion on the Great Barrier Reef, discussing all aspects on what they have learnt so far, including the reef's ecosystem and environmental impact issues, to introduce students to their assessment task.

#### 2. (a)Objective (what):

Students synthesise their own knowledge and understanding of the topic by undertaking a environmental management research report.

#### (b) Rationale (why):

The aim of this lesson is for students to use their knowledge, understanding and research skills to undertake a environmental management report of the Great Barrier Reef. This report allows students to use the library for multiple uses, to illustrate their research skills. This report will occur over several lessons.

#### (c) "Your job will be to....."

to see yourself as a environmental manager of the Great Barrier Reef marine park. You will be conducting a research report on the state of the Great Barrier Reef, as well as addressing the best form of action to protect the Great Barrier Reef for future generations.

#### 3. Input - Auditory, Visual and Kinesthetic.

This is an individual task for students, to conduct their own research using multiple methods to do so. These methods include - use of books, reference collection, the internet, journals, maps, videos, slides and the vertical files.

#### 4. Modelling.

In this case the report will take several lesson to complete, which will be the finished article.

#### 5. Checking for understanding.

All students will be asked to discuss at the end of each lesson what research they have come up with and any ideas they have on their report.

#### 6.Guided Practice.

Circulate around the classroom/library. Demonstrate to students how to use the library's resources, help students with the use of the library resources. Available for questions in regards to report.

#### 7. Independent Practice.

Students will have several lesson to work on report, but are expected to complete some research during there own time, as well complete report during there own time.

#### **Lesson Plan**

#### A Virtual Trip to explore the Great Barrier Reef

#### 1. Anticipatory Set:

For this lesson students will be using technology to engage in a virtual journey of the Great Barrier Reef. Show students how many web sites exist on the Great Barrier Reef, then show them the web site they will be exploring for the lesson.

#### 2.(a) Objective (what):

To understand the complexity of the Great Barrier Reef, as well as the issues faced by the Great Barrier Reef, as a result of Human impacts.

#### **Rationale (why):**

The Great Barrier Reef is a complex ecosystem, it is important to understand the system, as today the reef faces many issues. It is important students understand the implications of human impacts, as well as current management practices used to save the reef. In addition this lesson incorporates the use of technology, so that students are subject to different learning experiences through the use of a virtual journey of the reef.

#### (c)"Your job will be to....."

take a virtual journey of the Great Barrier Reef by going to www.reefed.edu.au.

#### 3. Input – Auditory, Visual, Kinesthetic.

The virtual trip allows for students to have auditory, visual and kinesthetic input, by exploring the web site. A question sheet provides clues as to what direction students should be heading in as they explore the reef.

#### 4. Modelling.

As students take their virtual trip through the reef, they are expected to fill in a question sheet, which covers all aspects of the Great Barrier reef.

#### 5. Checking for understanding.

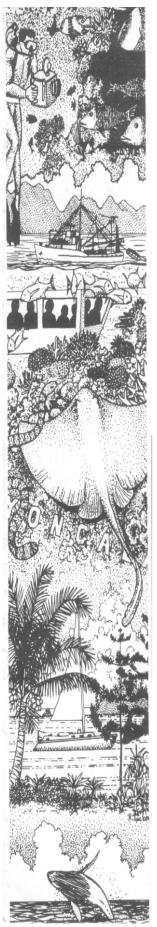
Students are asked to hand in there completed question sheet. Students are able to ask questions during the lesson and are continually monitored.

#### 6. Guided Practice.

Circulate around the class room as students work on there task, ask students what they are finding out, what they are thinking about in relation to the reef as they complete the task.

#### 7. Independent Practice.

Students are expected to complete the work sheet for homework, or for those who do not have access to the web at home, extra class time will be given. All students must hand in the work sheet, this means all students can be assessed in checking for understanding of the reef and the use of technology.

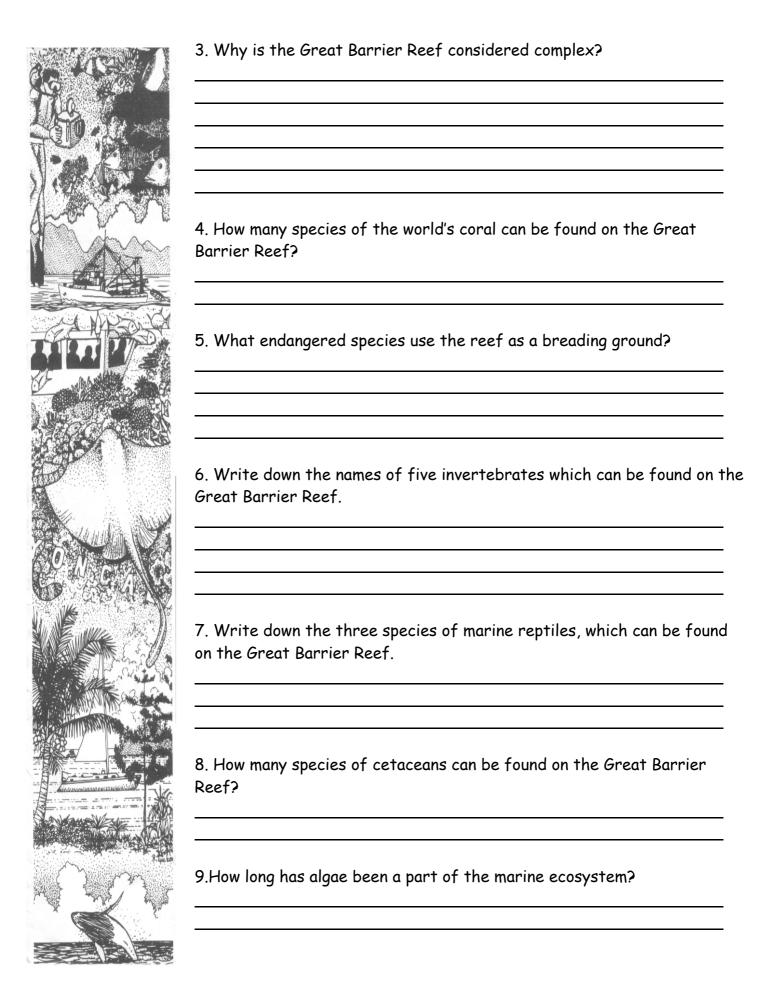


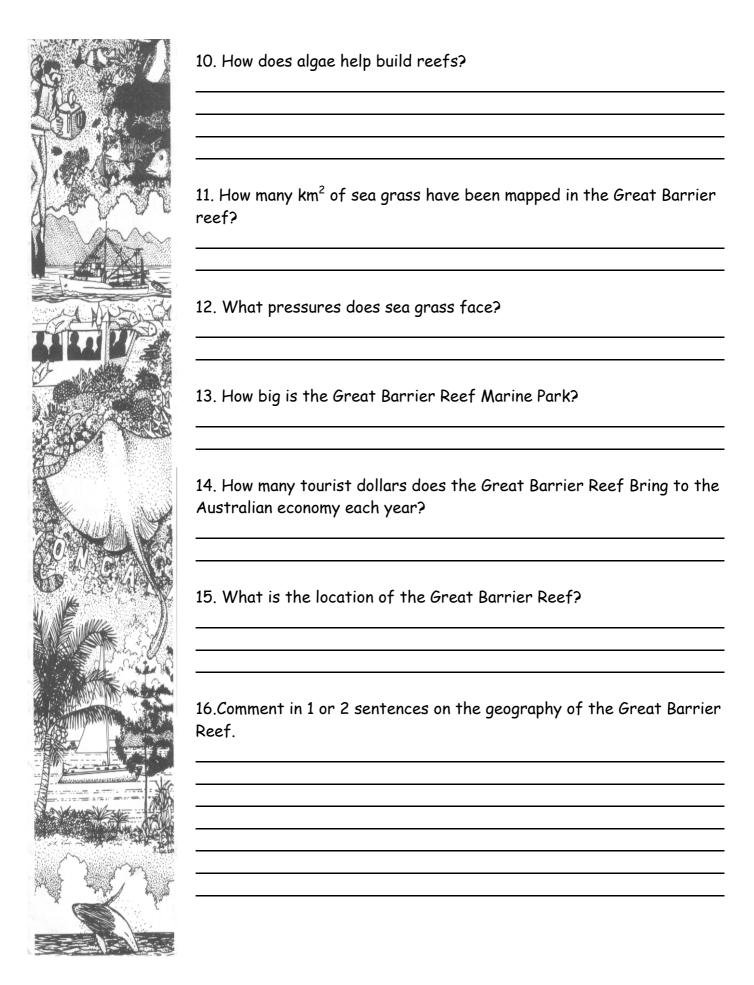
# Exploring the Great Barrier Reef - A virtual trip

To begin, go to www.reefed.edu.au ......

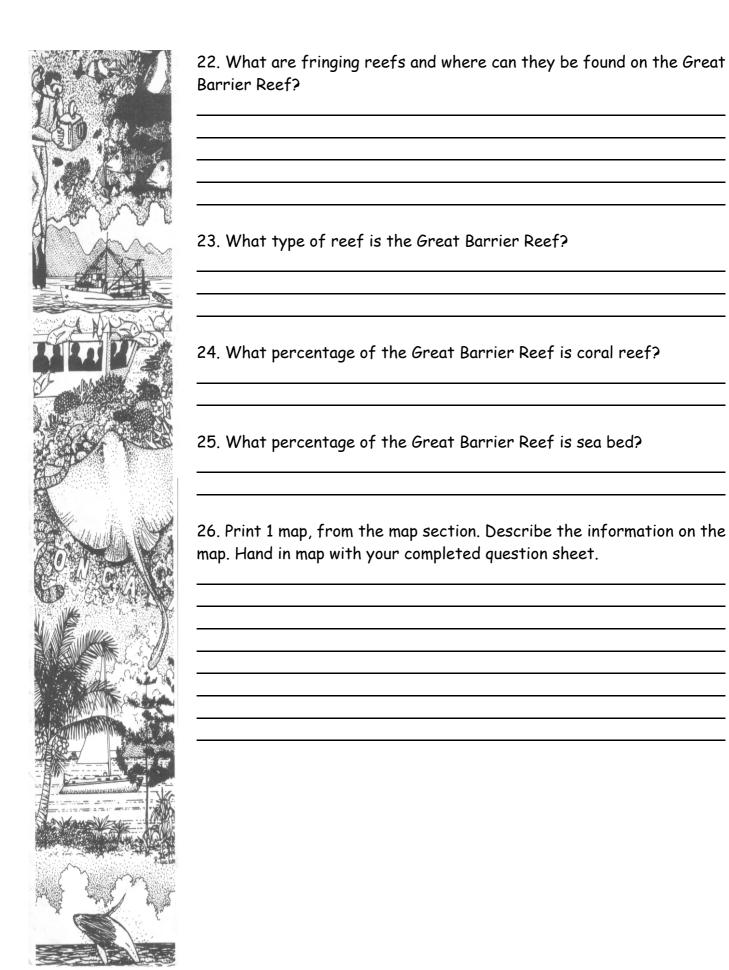
Welcome to Reefed, an educational web site designed to teach teachers and students about the Great Rarrier Reefl You are about to take a

virtual tour of the watching a movie	if the Great Barrier Reef! You are about to take a e Great Barrier Reef. To help you get started, begin by from the visual library. Then use the GBR explorer to eef. Along your way, you will need to complete a number luck!
Begin Here Click Students, se	elect the Visual library, then select the Movie library.
1. Chose a movie movie.	of your choice, write down the key points from the
begins	ts and click the GBR explorer to enter, now the journe wing questions along the way (filling the space
2. Write down the the Great Barrier	e names of some of the animals which can be found on Reef.









#### Compass Rose: Great Barrier Reef

#### **Natural**

- Why is the reef important?
- How is the Reef affected by land, coastal and ocean environments?
- What policies have been developed to meet the needs of the Reef?
- Have fishing activities had a major impact on the area?
- What pollutes water?
- Will the reef be protected for future generations?
- What will be the impact on the reef?
- Will the same resources be available to future generations?

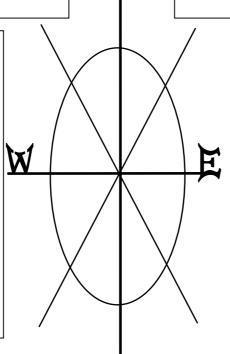
- What is the impact of economic activity on the reef?
- Are the economic activities sustainable?
- Would the economy survive without the natural environment?

#### Who decides?

- Who has access to decisionmaking?
- Who decides and on what criteria?
- How could one administer an overall reef conservation philosophy?
- What is the local policy on decision-making?
- Who has an interest in decision-making for the Reef?
- Why are decision-making structures likely to become more important in the future?
- How can I influence decisions

#### Economic

- Is tourism likely to become more important to the economy in future years? Why?
- List other economic opportunities?
- Do all groups in the community have equal access to economic opportunities?
- What additional uses might affect the Reef, other than those currently implemented? Would these other uses tend to benefit the economy, the environment, both or neither?



• What are the political implications?

• Who will have access to the coral reefs in 2020?

What attitudes do people have to:

- expanding tourism operations?
- habitat conservation?
- resource use?

#### Social

- Who uses the area and to what extent?
- What attitudes do people have towards this unique environment?
- In what ways are people organising themselves to influence change on the Reef?
- What motivates people to use the area more sensitively?

#### Resources

#### **Software:**

Web Browser (Internet Explorer)
Spreadsheet (Excel)
Word Processor (Word)
Image Processing/Multimedia Software (ArcSoft Photo Studio/MGI Photo Suite)
Presentation Software (PowerPoint)
CSIRO Ecotrekker

#### **Texts:**

Aplin, G. 1998, Australians and their Environment: An Introduction to Environmental Studies, Oxford University Press, Melbourne

• Illustrates how people use the environment. Demonstration of steps in conducting an EIA process. Biodiversity. Utilised for O.H.T (visual) in teaching and handouts. Assessing the environmental impacts on the reef.

Beattie, A. 1995, Biodiversity: Australia's Living Wealth, Reed Books, Chatswood.

• O.H.T's on biodiversity of environments and the Great Barrier Reef (visual).

Kleeman, M., Pask, R. & Butler, J. 2002, A Geography of Global Environments and Communities, Heinemann, Melbourne.

• Set text for students to use during course of unit. Including understanding the nature of topic, discussion, questions, case studies, copying diagrams.

Maxwell, W. 1968, Atlas of the Great Barrier Reef, Elsevier, Amsterdam.

• Illustration of maps showing the reef in greater detail, the different types of reefs.

#### **Handouts:**

Assessment Requirements and Unit Overview (Lesson 1)

• Criteria of assessment. Overview – what will be covered of the course of the unit.

Introduction to Coral Reef Ecosystems (Lesson 3)

• Words, pictures, diagrams describing the reef (visual).

Exploring the Great Barrier Reef: A Virtual Trip (Lesson 5)

• Students will be undertaking a virtual trip of the reef. Questions for students to follow and answer as they work their way through the virtual reef. Allows students to demonstrate understanding of what they learnt, how they use technology (auditory, visual and kinesthetic).

Excursion Booklet (Lesson 6)

• Activities for students to follow on excursion. Also contains information about the reef's environment – plants, animals, reefs, reef and coastal zones, human impacts (visual and kinesthetic)

• Includes short answer questions, drawing diagrams, mapping activity, group activities.

Media Clippings (Lesson 7) – Compiled from article available on the following website: http://www.reefed.edu.au/media/clippings/index.html

• Used as a lesson, for understanding threat to the Great Barrier Reef.

The Cutting Edge: Threats to the Great Barrier Reef Question Sheet (Lessons 8-9)

• A work sheet for students to follow as they watch the film. Tests students' understanding. Students will get the best out of film if they have something to follow (visual and auditory).

Environmental Attributes of the Great Barrier Reef (Lessons 10-11)

• Chart showing environmental attributes of the reef, e.g. water quality, state of the attribute, the pressure and from people (visual).

Compass Rose (Lesson 12) – Based on rose available on the following website: http://www.reefed.edu.au/downloads/SOSE.doc

• A teaching tool for students, showing the interrelationships of social, economic and environmental factors (visual and kinesthetic).

Draft Reef Water Quality Protection Plan (Lesson 13) – Material from http://www.thepremier.qld.gov.au/reefwater

• Current issues that the reef faces. Students get up to date information and see how things are changing in the current environment. Students feel they can directly participate in current issues, and evaluate how they feel about an issue

The Great Barrier Reef Marine Park Authority Policy (Lesson 15) – Material from http://www.gbrmpa.gov.au

• Understand policy and legislation that affects the management and sustainability of the reef.

Environmental Impact Assessment (Lesson 17)

• Demonstrate how to conduct an environmental impact assessment. How to apply it to the Great Barrier Reef.

#### **Overhead Transparencies:**

This visual teaching tool will be used for every exposition throughout this unit of study. They are an effective strategy, in that they provide significant factual information together with sufficient visual stimulus. They are especially effective for a unit on the Great Barrier Reef where non-textual elements are vital in teaching strategy. Figures, tables and graphs can be used, and the relevant components of them pointed out to every student (which cannot be done with handouts).

#### **Web Sites:**

http://www.reefed.edu.au

• educational web site, used as a teaching tool e.g. the virtual tour off the reef, media clippings

### http://www.gbrmpa.gov.au

• O.H.T for class, used for handouts, discussion (visual and kinesthetic).

#### **Assessment Plan**

The processes of investigating, reflecting and creating are highlighted to help students understand a range of systems, including those related to the ecological systems of the Great Barrier Reef. Students are encouraged to reflect on and improve the investigative strategies they have used. The activities provide opportunities for students to use their understandings and communicate judgments about how some systems operate.

The assessment links all the stated outcomes together, providing an opportunity to link what they have learnt to the assessment piece. All tasks over the course of the unit provide opportunity to display demonstration of the outcomes, as well as applying a numerous learning styles to meet the core learning outcomes. Formative assessment items together with informal opportunities to participate at every stage of the unit allow students to develop specific knowledge. The main assessment item draws these various knowledge kernels together. This not only encourages student to view the Great Barrier Reef as a single entity that operates as a whole, but also to consider the broad and interrelated nature of input, outputs and influences on the reef of both a natural and human influenced kind. The research report format with a role play component and a specified audience enables student to separate their own views or opinions from broader objective factors. The flexibility to present the information in a number of formats (both graphical and written) and to access a wide source of information (movies, video, book, internet) will allow students to benefit equally from auditory, visual and kinesthetic teaching strategies adopted throughout the unit.

Criteria sheets and student work sheets are given to students at the beginning of the unit of work, so they are aware throughout the unit of the criteria and what the assessment entails. This approach allows students to manage their own learning throughout the unit. By being forewarned of the assessment items, they can identify relevant information as it is initially discussed in class. This enhances their ability to become life long learners, and to work through the processes of orientation, enhancing and synthesising of outcomes.



# Year 10 SOSE Semester One, 2003

#### **Main Assessment**

# Managing the Great Barrier Reef: Environmental Impacts Report

#### **Research Assignment:**

Research report on managing the Great Barrier Reef.

#### **Conditions of Implementation:**

- 1. This assignment has been handed out on day one of teaching of this unit
- 2. Lessons 16 and 19-23 will be available for in-class work on the assignment

#### **Directions:**

- 1. Students will be required to provide evidence of continual work on the assignment
- 2. Length: 1000 words maximum. Tables, flow diagrams and bibliography are not included in the word count
- 3. Use 12 point font size, sub headings in 14 point font, 1 ½ line spacing
- 4. Keep a copy of the report on disc at home

#### **Due Date:**

**Task:** You are Environmental Manager, who has been employed by the Great Barrier Marine Park Authority. You have been requested to produce a research

report on the state of the Great Barrier Reef and on what the most appropriate strategies are for preserving the Great Barrier for future generations. Your report will be addressed to the community and to persons of the Great Barrier Reef Marine Park Authority.

The final report must include the following subheadings and sections. Be sure to use a variety of presentation methods in your report (eg graphs, maps, table diagrams etc)

Cover/Title Page

**Table of Contents** 

List of Figures

- 1. Introduction
  - What is the Great Barrier Reef?
  - Where is it Located? (Map)
  - A description of the reef landscape (including a brief description of how the reef formed, and reef types)
  - A Description of the reef's biodiversity (including major plant and animal species)
- 2. What environmental problems are faced by the Great Barrier Reef? (Table)
  - Identify each environmental impact
  - Identify how and what it affects on the reef
  - Identify who is responsible for each impact
- 3. What management practices (strategies) are available for addressing these environmental impacts?
  - Identify each strategy, who is responsible for implementing it, how would it be implemented?
  - (This is the major part of the assignment)
- 4. What strategy or combination of strategies would you recommend and why?

Criteria	A	В	C	D	E
Investigating/ Research/ Analysis	The student has an excellent understanding of the topic. Descriptions of the reef are concise and clear. Impacts on the Great Barrier Reef have been clearly identified and explained. Explanation of causes/effects are detailed.	The student has a good understanding of the topic. Descriptions of the report are generally good, although more detail and accuracy is needed. Most impacts have been identified and explained. Explanations of management practices are good, although consequences may need more work.	The student has a satisfactory understanding of the topic.  Descriptions require more detail. Identification of possible impacts requires more work – only some of the impacts have been identified. Explanations of management practices are satisfactory – but much more detail is required.	The student does not understand the topic. Explanations of the management practices and impacts are deficient.	The student does not understand the topic. Information is inaccurate and incomplete.
Creating/ Initiative/ Decision Making	The student has developed an excellent report that has used a comprehensive range of information to support decisions. Innovative and appropriate recommendations have been selected. These recommendations have been evaluated and justified competently. The student has used logical, well structured criteria to evaluate the recommendations.	The student has developed a good report that has used appropriate information to support decisions. The recommendations are generally logical. These recommendations have been suitably evaluated and justified. More criteria could be used for the evaluation process.	The student has developed an adequate report. Some of the information used for the decisions is not totally relevant. Some recommendations have been selected. These recommendations are not fully evaluated and justified. Suitable criteria have not been used properly.	The student has not developed an appropriate report. More detailed recommendations are necessary. More appropriate criteria are needed to help evaluate and justify recommendations.	The student has experienced difficulty in devising recommendations and developing criteria. Irrelevant information has been used. Evaluation and justification are incomplete or missing.
Communicating	The report has been written clearly and concisely. Relevant information has been gathered, recorded and organised effectively. Relevant and creative graphics have been used to support written work. This student has an excellent use of language skills and geographic terms. All information has been referenced in an appropriate manner.	The report has been written clearly. Information has been gathered and recorded appropriately. The student has adhered to most language conventions. Suitable graphics have been used in the report. Some sections require more organisation. Information used in the report has been referenced appropriately.	The report is satisfactory in most parts. Problems do exist with sentence structure, spelling and sometimes expression. The report format requires more consideration. Information needs to be organised in a logical manner. The student has not selected a suitable variety of graphics to support written work. Referencing require more effort.	The report has been presented with little attention to language skills. There are numerous spelling and punctuation errors. The report format has not been effectively use. Information requires careful organisation. The student needs to work on developing a variety of appropriate graphics and using a range of secondary sources.	The report has been presented with no attention to language skills. There are numerous spelling and punctuation errors. The report format has not been effectively used. Information is not organised. The student has not used appropriate graphics or secondary sources.