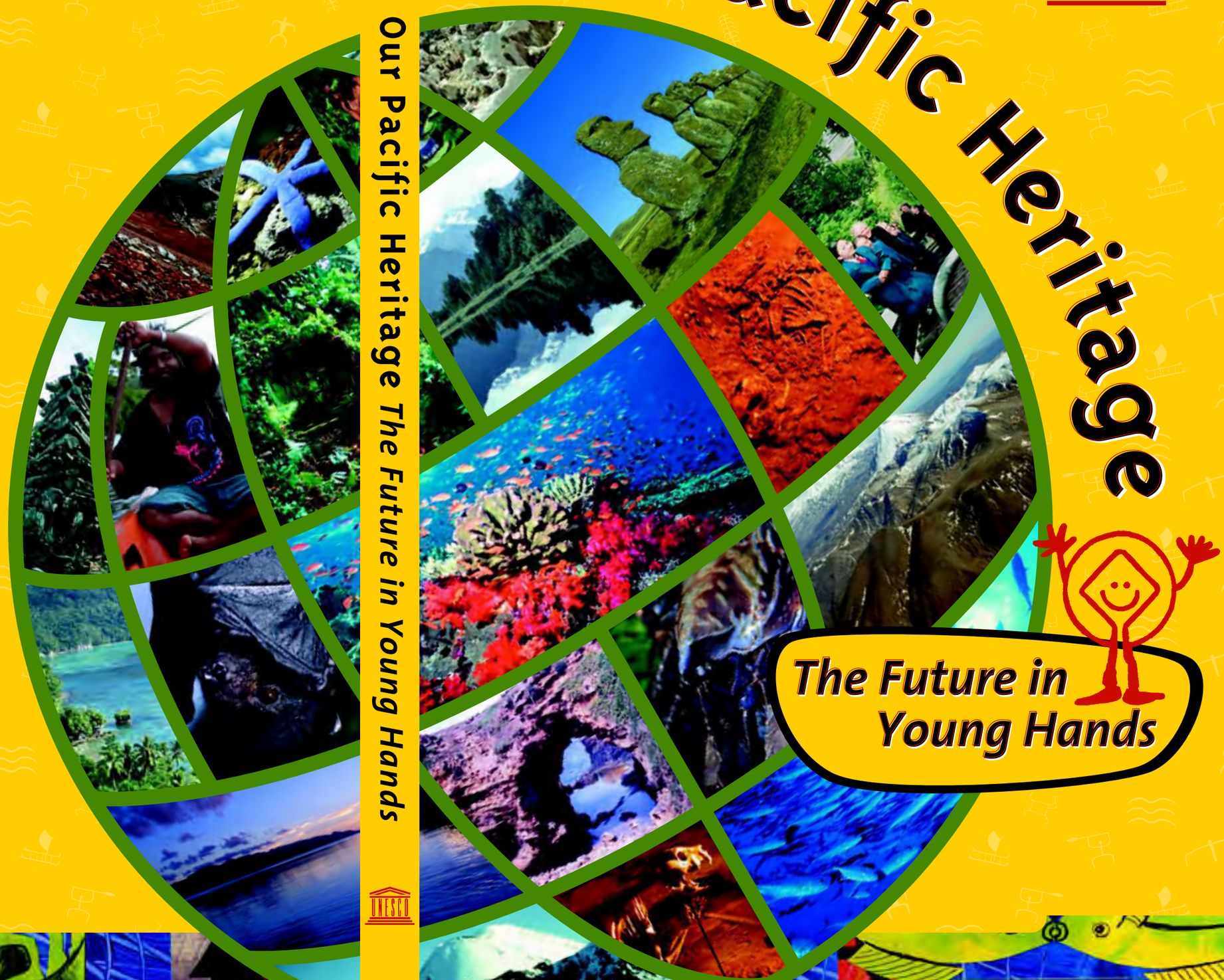
Our Pacific Heritage



The Future in Young Hands

Our Pacific Heritage The Future in Young Hands

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Original Concept

This kit is based on: *World Heritage in Young Hands: To Know, Cherish and Act: An Educational Resource Kit for Teachers*, first published by the United Nations Educational, Scientific, and Cultural Organisation (UNESCO), Paris, France, copyright © UNESCO 1998, 2002.

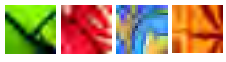
Foreword

UNESCO's Associated Schools Project (ASPnet) network is an important network in the Pacific. ASPnet teachers and students have, over the years, worked together on a number of projects of special importance, not only for the Pacific but also for the world. This resource is another contribution to the very good work of the Pacific ASPnet.

The resource is for teachers and students and aims to develop knowledge about the Pacific's natural and cultural heritage. The resource will make an excellent contribution to students' awareness that cultural heritage includes heritage that is both tangible and intangible. It is more than places and buildings: cultural heritage is also about the values and beliefs of the people of those places. Throughout the Pacific, the places of special value often have both natural and cultural significance. These linked values are commonplace, and the separation into natural and cultural seems artificial. This is an opportunity to promote the "Pacific" perspective on heritage and our value systems.

This resource builds on a previous UNESCO kit, *World Heritage in Young Hands*. It has been rewritten to reflect the special heritage features of the Pacific. The UNESCO Office in Āpia, especially the Cultural Adviser, Mali Voi, and I as Education Adviser, thank all who have contributed to its development. We especially thank Bede Cooper and Elspeth Wingham for their leadership of the project. We hope all Pacific Associated Schools will enjoy using the resource, and we trust that the knowledge and skills gained will contribute to the preservation of the special heritage of the Pacific.

Edna Tait
Director
UNESCO Office for the Pacific States, Āpia



Preface

Tribute to classroom teachers: the pioneers of World Heritage Education

Over the past centuries, much of our heritage has been irretrievably lost. We have witnessed, and continue to witness, the destruction and deterioration of irreplaceable treasures due to natural disasters, wars, extreme poverty, industrialisation, and pollution. Other underlying causes of this prolonged and continuing tragedy are ignorance, indifference, lack of care, and lack of appreciation.

By adopting the World Heritage Convention (1972), the international community committed itself to preventing the disappearance of our precious and unrenewable cultural and natural heritage. Since its adoption, over 788 sites in over 134 countries around the world have been inscribed upon the World Heritage List, to which, every year, more sites are added. Each site is of universal value and constitutes an intrinsic part of our universal civilisation. Each site endangered or destroyed would be an irreplaceable loss for all of humanity. The future of our remaining heritage will depend largely on the decisions and actions of the present generation of young people, who will soon become the leaders and decision makers of tomorrow.

Hence, in response to Article 27 of the World Heritage Convention, which declares that "States Parties to this Convention shall endeavour by all appropriate means, and in particular by educational and information programmes to strengthen appreciation and respect by their peoples of the cultural and natural heritage", UNESCO's World Heritage Centre launched in 1994 the UNESCO Young People's World Heritage Education Project "World Heritage in Young Hands" through the Associated Schools Project Network (ASPnet).

One of the achievements of this Project has been the production, testing, and evaluation of a resource for teachers, *World Heritage in Young Hands*. This has become a valuable tool for teachers in sensitising young people to the importance of preserving their local, national, and world heritage, for providing them with the necessary skills to do so, and for instilling in them a lifelong commitment to this worthy endeavour.

ASPnet teachers have played a most useful role in developing World Heritage education and in making educational resource materials available. Therefore, I pay a special tribute to them, as well as to other teachers and heritage specialists throughout the world, for their pioneering contributions. The *World Heritage in Young Hands* publications are largely due to these teachers' special efforts, and I commend them for their creativity and innovation, which not only stimulate the interest and participation of young people in World Heritage protection but also enhance the learning processes in schools and in communities.

Education is the key to personal fulfilment, development, conservation, peace and well-being. Through education, young people can find new ways to build commitment and strengthen action in favour of preserving our cultural and natural heritage, our tangible and intangible heritage, and our local and world heritage. Their efforts will benefit not only the present generation but also the generations of the future.

World Heritage is not a static concept. Each year, the World Heritage Committee meets to inscribe more sites on the World Heritage List. World Heritage education is also a dynamic process, which embodies the four pillars of learning for the twenty-first century – learning to know, learning to do, learning to be, and learning to live together. It is also closely related to the promotion of quality education as outlined by the "Education for All" Framework for Action adopted by the World Education Forum in Dakar, Senegal, in April 2000.

World Heritage education advocates the reaffirmation of identity, mutual respect, dialogue, unity in diversity, solidarity, and a positive interaction among the cultures of the world. I hope that this material will be widely used by classroom teachers throughout the curriculum – by teachers of history, science, geography, art, mathematics, language, and other subjects and fields of study. By using this material, by developing additional material, and by enriching their classroom practices, teachers can help to mobilise today's youth in ways that bring the peoples of the world closer together in a climate of trust, mutual appreciation, and solidarity.

Koïchiro Matsuura
Director-General of UNESCO

Contents

Introduction

An aerial view of the northern coast of Rennell, where the former reef crests are clearly visible. East Rennell is listed as a World Heritage Site for its natural values.

Photo: P. Ryan

Welcome to *Our Pacific Heritage: The Future in Young Hands*, which has been prepared as part of the UNESCO Young People's World Heritage Education Project.

Launched by the UNESCO World Heritage Centre and the Associated Schools Project Network (ASPnet) in 1994, the World Heritage Education Project aims to develop innovative educational approaches in support of World Heritage conservation by enabling students to:

- Learn more about the cultural and natural sites of outstanding universal value inscribed on the World Heritage List as well as the sites that are significant in a local, national, or regional sense.
- Acquire new skills to help conserve these sites, including those that are protected by the UNESCO World Heritage Convention.
- Forge new attitudes and a lifelong commitment to preserving our local, national, and World Heritage for present and future generations.
- Play an instrumental role in safeguarding the tremendous cultural and natural diversity of the world through local, national, regional, and international co-operation.

Following the release of *World Heritage in Young Hands* in 1998, it seemed clear that a Pacific extension to that resource would be of value to teachers and students in the Pacific region. This kit is the result of a collaborative effort, led by New Zealand and ably supported by Australia, Fiji, Sāmoa, and the Solomon Islands. We hope that the ASPnet in the Pacific region will help to create opportunities for additional units to be developed and added to this resource over time.

Bede Cooper, Jane Gregg Robberds, and Elspeth Wingham
Editors

Acknowledgments

This resource is the result of several years of work that involved many institutions and individuals. As editors of *Our Pacific Heritage*, we hereby express our gratitude to all, not only for their specific contributions but above all for sharing our enthusiasm and for believing that this pioneering work in World Heritage Education could be accomplished.

A number of individuals, who gave so generously of their expertise, time, and energy when the text was being prepared, deserve to be singled out for special thanks:

Robin Slow, Simone Cooper, Monica Cooper, and Jane Gregg Robberds (New Zealand)

Adrian Orgill and Rebecca McCartney (Australia)

Jiutatia Kubuabola, Pulotu Rika, and Lorima Voravora (Fiji)

Linda Puia Tamaika (Solomon Islands)

Aniseko Fruean and Andrea Wuttke (Sāmoa).

As editors of *Our Pacific Heritage*, we are deeply indebted to the New Zealand National Commission for UNESCO and the UNESCO Office for the Pacific States, in Āpia, who endorsed our efforts in many ways, including the provision of addtional financial resources.

We are also most grateful to the large number of organisations that have supported the development of this resource kit. In particular we acknowledge the assistance given by the Christchurch City Council (New Zealand), the Department of Conservation (New Zealand), Parks Victoria (Australia), Aboriginal Affairs Victoria, Department of Victorian Communities (Australia), Taronga and Western Plains Zoos (Australia), the Museum of Sāmoa (Sāmoa), the Department of Lands, Surveys, and Environment (Sāmoa), and the Ministry of Education (Fiji).

We further wish to acknowledge the original editors of the *World Heritage in Young Hands* educational resource kit for teachers, which has served as a basis for this *Our Pacific Heritage* kit. Some sections of the original text and activity sheets have been used in *Our Pacific Heritage*.

We also acknowledge the Government of the Netherlands for their financial assistance towards the publication of this resource and the Royal Ministry of Foreign Affairs of Norway, who will fund professional development for teachers in the Pacific to facilitate the introduction of this resource. Had it not been for their very generous contribution and faith in the development of *Our Pacific Heritage*, we would not have been able to produce this resource to the same standard.

Photographic acknowledgment is given beside the photographs. Every effort has been made to contact all copyright holders. The publishers will be happy to make good in future editions any errors or omissions brought to their attention.

Suggestions for Using This Resource

The ultimate goal of this resource is to inspire and reinforce young people's commitment to preserving our natural and cultural heritage. It is also designed to bridge the gap between school and society by offering stimulating activities that promote involvement in the community.

This resource is suitable for use in both primary and secondary schools. Each section or unit closely matches each country's curriculum requirements, including the achievement objectives.

These units have been written to allow teachers to use either a multidisciplinary (integrated) approach or to focus on just one or two subject areas.

We suggest that teachers wanting to sensitise young people to the importance of conserving local and World Heritage could opt for an integrated approach.

Each unit provides teachers with background information and a range of student activities. And although each unit focuses on a specific location, teachers should find that the Suggested Student Activities can be easily adapted to the sites, locations, and situations they would like their students to study.

The suggested student activities concentrate on six main lines of action:

Discussion

Visual sessions

Research

Site visits

Exercises

Role playing

For some units (Understanding World Heritage; Port Campbell National Park: The Shipwreck Coast; Harakeke: A Symbol of a Pacific Nation; Restoring the Bexley Wetland: A Local Heritage Site; East Rennell World Heritage Site; 'O le Pūpū Pu'e National Park: Sāmoa's First National Park; and National Heritage and Cultural Identity), additional items have been included in the kit. Teachers may wish to add further items, such as photographs, posters, maps, and brochures, to the units they select for teaching.

Understanding World Heritage

Authors:

Elspeth Wingham and Bede Cooper

New Zealand

Intended age group: 10–17 years

Category: World and national heritage – natural and cultural

UNESCO

Since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed ...
UNESCO's Constitution

UNESCO, the United Nations Educational, Scientific, and Cultural Organisation, was born on 16 November 1945. For this specialised United Nations agency, it is not enough to build classrooms in devastated countries or to publish scientific breakthroughs. Education, Social and Natural Science, Culture, and Communication are the means to a far more ambitious goal: to build peace in the minds of people.

Today, UNESCO works as a laboratory of ideas and a standard setter to forge universal agreements on emerging ethical issues. The Organisation also serves as a clearing house – that disseminates and shares information and knowledge – while helping the Member States to build their human and institutional capacities in diverse fields. In short, UNESCO promotes international co-operation among its 190 Member States and six Associate Members in the fields of education, science, culture, and communication.

UNESCO works to create the conditions for true dialogue based upon respect for commonly shared values and the dignity of each civilisation and culture. This role is critical, particularly in the face of terrorism, which constitutes an attack against humanity. The world urgently requires global visions of sustainable development based upon the observance of human rights, mutual respect, and the alleviation of poverty, all of which lie at the heart of UNESCO's mission and activities.

The World Heritage Convention

Awareness of our heritage

What is heritage?

We can think of heritage in many ways: those elements passed on to us by our ancestors, what we live with now, and what we will pass on to future generations to learn from, enjoy, and marvel at.

In a dictionary, you will find "heritage" defined as something that has been inherited.

Heritage:

- That which has been or may be inherited ...
- The fact of inheriting; hereditary succession ...
- Anything given or received to be a proper possession ...
- An inherited lot or portion ...

  (*Shorter Oxford Dictionary*)

Another way of thinking about heritage is to focus on those places and objects we wish to keep safe. These are natural and cultural places or objects that we value because they come from our ancestors, are beautiful, or may be scientifically important and irreplaceable. They may be a source of inspiration for us. They may even help to form our identities.

In many ways, our heritage reflects the lives of our ancestors and survives today only because of the special efforts we make to preserve it.

Can you imagine your local area without heritage? Think about this question in terms of the place where you and your students live. What elements in your area represent the past, the present, or the future? What things should be preserved? What could be replaced? What do you believe is irreplaceable?

The world is made up, in many ways, of both cultural and natural heritage. In your local region, you may know of archaeological and rock-art sites, a church, a sacred site, a historic place, or an old village. These elements are all part of your cultural heritage.

You may live close to a forest or a magnificent coastal area. This is part of your natural heritage. This heritage is an immovable heritage (that is, it cannot be easily moved). On the other hand, heritage objects such as coins, botanical samples, paintings, statues, or archaeological artefacts are examples of a movable heritage (which can be easily moved from one place to another).

Suggested Student Activity 1

The Meaning of Heritage

Objective:

For students to understand the meaning, value, and types of heritage

Movable heritage

Show the students an object you own (for example, a photograph, a piece of jewellery, a family Bible, an adze, a tapa cloth, or a fine mat) that has been passed down to you through the generations and that you cherish and value. Explain that the object is an example of movable heritage because it can be easily moved and transported.

Your students could:

- Find out about an object that they value and say why they want to conserve it.
- Bring an object that they value to class and create a temporary class museum by putting these objects on display. Discuss what makes these objects valuable to the students and why they might want to pass them on to their descendants.
- Find out whether their country has laws protecting movable cultural heritage.

Explain that UNESCO administers an international convention concerning the protection of movable cultural heritage (the Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property, 14 November 1970).

The interior of Nauru is made up of rock pinnacles. The spaces between them have been mined to remove phosphate. It is one of the most exploited environments in the world.

Photo: Elspeth Wingham

Immovable heritage

Explain that the sites inscribed on the UNESCO World Heritage List are all immovable heritage, meaning that they cannot be easily moved. Give examples.

Your students could:

- Describe sites that they have seen or studied (in their own country and other countries) and explain how they have learnt about them. They could use examples such as remarkable architecture, unique landforms, spectacular natural beauty, or rare species of plants and animals.
- List local natural sites that they wish to keep intact and then discuss why it's important to protect these sites.

Serious threats to the survival of our heritage

Our cultural and natural heritage is fragile and has been greatly threatened, particularly over the last hundred years. For example, during the First and Second World Wars, many old towns and villages in Europe were destroyed. Important cultural monuments were damaged or destroyed.

Our heritage is also threatened by increasing urbanisation, poverty, natural disasters, and pollution. Greater levels of mass tourism also threaten many heritage monuments and sites. However, neglect is one of the biggest barriers to the survival of our heritage throughout the world.

Some traditions still remain strong on Nauru, such as catching frigate birds. There are rituals associated with this activity: the birds are usually caught at sea using a length of cord weighted at one end.

Photo: Elspeth Wingham

The World Heritage Conservation Process

The conservation of World Heritage is a long-term process and involves a number of important steps. At the beginning of this process, a country commits itself to World Heritage conservation by becoming a State Party to the Convention and then nominating sites for inclusion in the World Heritage List.

This is the nomination process:

1. A country becomes a State Party by signing the World Heritage Convention and pledging to protect its cultural and natural heritage.
2. A State Party prepares a tentative list of cultural and natural heritage sites on its territory that it considers to be of outstanding universal value.
3. A State Party selects sites from its tentative list for nomination to the World Heritage List.
4. The completed nomination document is sent to the UNESCO World Heritage Centre.
5. The UNESCO World Heritage Centre checks that the nomination is complete and sends it to IUCN (the World Conservation Union) and ICOMOS (the International Council on Monuments and Sites) for evaluation.
6. Experts from IUCN and/or ICOMOS visit the nominated sites to evaluate their protection and management.
7. ICOMOS and/or IUCN evaluate the nominations using the cultural and natural heritage criteria.
8. ICOMOS and/or IUCN make an evaluation report.
9. The final decision is made by the twenty-one-member World Heritage Committee. The nominated site is inscribed, deferred, or rejected.

Criteria for selecting World Heritage Sites

These criteria are essential aspects of World Heritage conservation and should be kept in mind at every stage of any work in World Heritage education.

Establishing the World Heritage List presents a major challenge to the international community: how can one site, group of sites, or monument be judged appropriate to form part of the World Heritage? In other words, what constitutes the outstanding universal value or World Heritage value of a cultural or natural site?

The World Heritage Committee has developed the Operational Guidelines for the Implementation of the World Heritage Convention over many years. These guidelines explain how to nominate a site for inclusion in the World Heritage List and detail the criteria that apply.

The criteria

The Operational Guidelines include the following six criteria. These criteria should be applied when selecting cultural heritage monuments, groups of buildings, or sites to be considered as part of World Heritage.

Nominated cultural sites should demonstrate one or more of the following qualities:

- They represent a masterpiece of human creative genius.
- They exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town planning, or landscape design.
- They bear a unique, or at least exceptional, testimony to a cultural tradition or to a civilisation that is living or that has disappeared.
- They are an outstanding example of a type of building or architectural or technological ensemble or landscape that illustrates [a] significant stage[s] in human history.
- They are an outstanding example of a traditional human settlement or land use that is representative of a culture (or cultures), especially when it has become vulnerable under the impact of irreversible change.
- They are directly or tangibly associated with events or living traditions, with ideas, with beliefs, or with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should justify inclusion in the List only in exceptional circumstances and in conjunction with other criteria, cultural or natural.)

Equally important is the authenticity of the cultural heritage, the integrity of heritage sites, and their protection and management.

Cultural landscapes

Cultural landscapes represent the “combined works of nature and humanity”. They fall into three main categories:

1. The most easily identifiable is the clearly defined landscape designed and created intentionally by people. This includes garden and parkland landscapes constructed for aesthetic reasons, which are often, but not always, associated with religious or other monumental buildings and ensembles.

2. The second category is the organically evolved landscape. This results from an initial social, economic, administrative, and/or religious purpose and has developed its present form by association with, and in response to, its natural environment. Such landscapes reflect that process of evolution in their form and component features. They fall into two sub-categories:

   - A relict (or fossil) landscape in which an evolutionary process has come to an end, either abruptly or over a period of time. Its significant distinguishing features are, however, still visible.
   - A continuing landscape that retains an active social role in contemporary society, that is closely associated with the traditional way of life, and where the evolutionary process is still active. It also shows significant evidence of its evolution.

3. The final category is the associative cultural landscape. These sites are included on the World Heritage List because of their powerful religious, artistic, or cultural associations with the natural environment. These sites may not have any evidence of remaining material culture.

Ancient taro terraces in New Caledonia.

Photo: Christophe Sand

Criteria for selecting natural World Heritage Sites

The Operational Guidelines include four criteria for the selection of natural heritage sites of World Heritage value. The sites must meet at least one of the criteria. They must:

- Be outstanding examples representing major stages of Earth's history, including being a record of life forms, of significant ongoing geological processes in the development of land forms, or of significant geomorphic or physiographic features.
- Be outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, freshwater, coastal, and marine ecosystems and communities of plants and animals.
- Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.
- Contain the most important and significant natural habitats for in situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

Equally important is the integrity of the natural heritage and its protection and management.

Criteria for selecting mixed cultural and natural World Heritage Sites

Mixed cultural and natural World Heritage sites have both outstanding natural and cultural values and so are included on the World Heritage List according to a combination of cultural and natural heritage criteria.

Applying the criteria

The criteria are applied rigorously to prevent the World Heritage List from becoming too long or turning into a simple checklist of all the places that countries would like to see included on it.

Heritage can be of local, national, regional (for example, the Pacific), and/or international importance. All countries, from the largest, like Australia, to the smallest, like Nauru, have sites of local and national interest that they can be proud of. The World Heritage Convention encourages a State Party to the Convention to identify and protect its heritage, whether it is on the World Heritage List or not.

Suggested Student Activity 2

Identifying World Heritage Sites in Your Region

Objective:

For students to become aware of World Heritage Sites in the Pacific

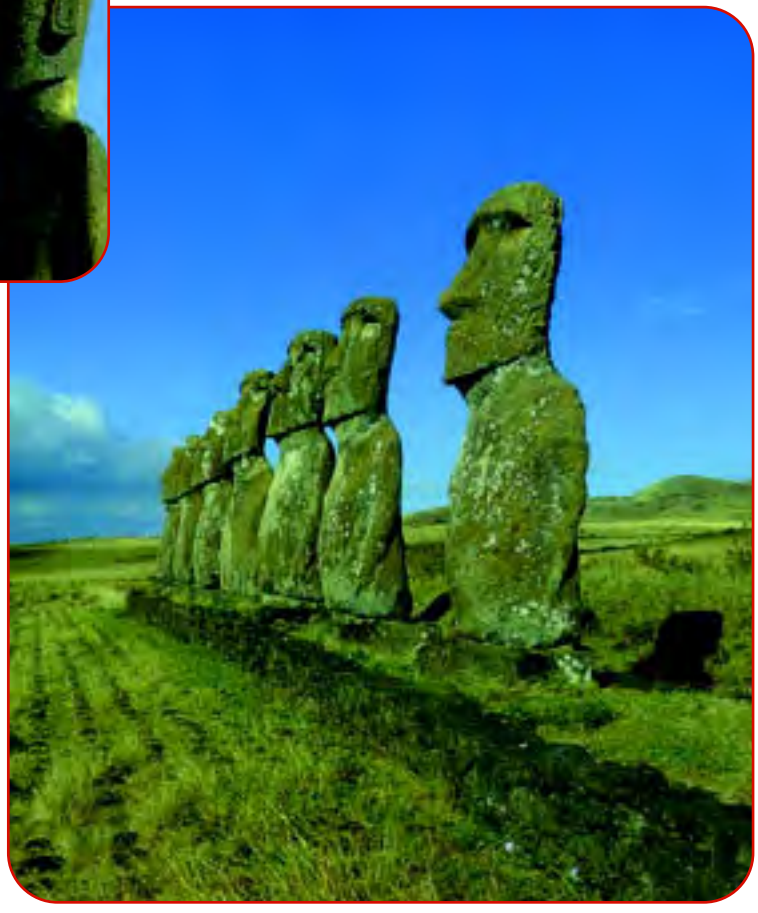
Use the Student Activity Sheet on the next page to complete this task. Make a photocopy for each student if possible.

Your students could:

- List five World Heritage Sites located in the Pacific region.
- Find out which institutions or authorities are responsible for implementing the World Heritage Convention in their country (for cultural heritage and for natural heritage).
- Find out what links exist between their country and UNESCO, for example, a National Commission for UNESCO.

Rapa Nui (Easter Island) – Moai with their distinctive topknots (pukao) of red scoria.

Photo: UNESCO Photo Library



Colossal statues carved out of volcanic rock.

Photo: UNESCO Photo Library

Identifying World Heritage Sites in Your Region

The World Heritage map in this kit lists the countries that are State Parties to the World Heritage Convention as well as the sites that have so far been included on the World Heritage List.

Find five World Heritage Sites located in the Pacific region. Write their names and geographical locations in the boxes below and indicate whether they are cultural sites, natural sites, or mixed cultural and natural sites.

Discuss your findings.

Name of World Heritage Site	Year of inscription on the World Heritage List	State Party (country)	Type of site (cultural, natural, or mixed cultural and natural)

Suggested Student Activity 3

Nomination of Cultural and Natural Sites

Objective:

To assist students to understand the process of nominating sites for inscription on a heritage protection list

You could use the following guidelines for students and the student activity sheet to involve the class in preparing a nomination of local or regional heritage for a national heritage list or register.

Your students could:

- In small groups, study the guidelines for students for the Nomination of Cultural and Natural Sites and then complete the nomination form.
- Use these presentations of the nominated sites as a wall display or gather them together as a booklet. They could send a copy of the booklet to their local or regional authorities with their greetings and comments from any meeting with a local or national heritage group.

Traditionally inspired sculpture at the Cook Islands National Auditorium at Avarua on Rarotonga.

Photo: Elspeth Wingham

Guidelines for Students

Nomination of cultural and natural sites

Nomination of a site located in your country to your national heritage list, inventory, or register

Your country has decided to draw up a list of national cultural and natural heritage sites. Your class has been asked to prepare one or more nominations of local cultural and/or natural sites for this list. This activity will involve both class time and extra-curricular work (for example, visits to sites).

Guidelines for preparing a nomination

The description section of the nomination form should contain:

- A description of the site and a list of its main features and characteristics (for example, the types of trees and animals for natural sites and the types of buildings and archaeological or geographical features for cultural sites).
- The history of the site.
- Maps.
- Photographs.
- A brief reference list containing the main sources of information about the site.

The justification section should contain:

- The reasons why this site is considered to be of national importance. If your country has criteria for determining whether a site is of national importance, use these to assess the site.

The conservation section could contain the following information about who is responsible for looking after the site:

- Whether the local people conserve the site themselves or a local, regional, or national organisation is involved.
- Whether the people looking after the site have the ability to preserve the site.
- Whether these people have enough money and expertise.
- Whether there is a law to protect the site.

The comparison section should contain:

- Details of similar sites in your country and in your region.
- An evaluation of the site's present state of preservation compared with similar sites in your country.
- An assessment of whether the site is in danger of becoming so deteriorated that it cannot be saved. For example, for a natural site, you need to ask whether some of the plant or animal species are in danger of extinction.

Nomination of Cultural and Natural Sites

Name of country where the site is located:

Names of the people who prepared this nomination:

Date:

Name of site:

Geographical location of the site:

Description of the site:

Justification for including the site on list of national cultural and natural heritage

Criteria met:

Conservation of the site:

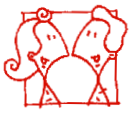
Comparison with similar sites:

Suggested Student Activity 4

Meeting of the National Heritage Committee

Objective:

To help students understand the decision-making process in nominating heritage sites



Your students could:

Play the roles of members of the National Heritage Committee. The committee is studying the local and regional sites proposed by the class to determine whether they should be added to the national heritage list.

They should:

- Elect a chairperson and two vice-chairpersons, who will prepare the discussion and lead the debate; and elect a recorder, who will summarise the debate.
- In groups, study one site and then make a recommendation to the entire committee as to whether the site be preserved and included on a national heritage list or register.
- Study the nomination form and say whether:
  - the site is of local, national, regional, or international value
  - the site is well preserved
  - there is adequate legal protection of the site
  - there are adequate plans for the management and conservation of the site
  - the local people have been consulted as to whether they agree with the nomination of the site.
- Present the group evaluations in open discussion to decide which of the sites are of national value. They should vote to decide which sites should be added to the national heritage list. Then they should decide whether one or two of these sites should be added to the World Heritage List, according to the criteria of outstanding universal value.

The Ha'amonga Trilithon on Nuku'alofa in Tonga, which is the ancient gateway that people passed through to enter the royal courtyard.

Photo: Elspeth Wingham

Suggested Student Activity 5

Distinctive Building Styles as Expressions of Identity

Objective:

To ask students to reflect on their identity by studying their physical heritage (such as surrounding buildings, monuments, and national parks)

Your students could:

- Describe the qualities of their country's or region's buildings, monumental heritage, and national parks and comment on whether any of these are local, national, or World Heritage sites. They should mention the interrelationships between their culture and the building materials, the building pattern (how the buildings are located in towns and villages), the natural resources used (for example, stone from local quarries), and the physical landscape (for example, a town built around a lake).
- Discuss whether they think that their cultural identity is reflected in the way their houses are built and in the materials used.

The Bai of Airai, which is the last traditional meeting house remaining on Babeldoab, Palau.

Photo: Elspeth Wingham

The tree house from a traditonal village on Tanna, Vanuatu, which is being used during initiation ceremonies for young men.

Photo: Elspeth Wingham

Role Play in the Classroom

Local and World Heritage conservation involves many challenging and complex issues. These include questions around:

- The decision to add new sites to the World Heritage List.
- The choice of different preservation materials and methods of preservation.
- Development (such as the demolition of old houses, the development of tourism, and building new roads).
- Site inspection.
- Promotional campaigns.
- The priority of funds for support between sites.

Through role play, the students should come to a better understanding of these heritage conservation issues and learn more about making appropriate decisions.

To begin:

- You could divide the class into small groups and ask each group to reflect on and research the position of the group or character they will play.
- You could help further by showing your students where to find the necessary information or data. Alternatively, you could prepare profile cards describing each interested party and give one card to each group of students.

After the research has been completed:

- Each group needs to discuss its position.
- They should then choose one student to take part in the role play.

In the role play:

- Each player defends the position of his or her group.
- The rest of the students act as the jury or committee and vote to reach a decision.

To allow your students to thoroughly understand the role-playing process, you could take the following steps:

- Establish the nature of the conservation challenge facing the heritage site.
- Have the students represent different interest groups and present possible ways of dealing with the challenge.
- Ensure that the students evaluate the solutions presented.
- Guide the students to democratically choose the best solution.
- Encourage the students to decide how to implement the solution.
- Organise the students to evaluate the consequences of their choice.

The Peaceful Resolution of Conflict

Sometimes conflicts arise in the processes associated with heritage conservation. These conflicts can be caused, for example, by disputes over ownership, by war, or by development proposals. It's important that disputes be resolved peacefully and through creative, fair solutions.

Role play can be useful in providing young people with non-violent conflict resolution skills, helping them to explore the issues from different points of view and to understand the importance of compromise.

You could prepare a scenario to examine conflict resolution, such as a development plan versus the protection of a local heritage or World Heritage Site. You could divide the class into groups and give each group a specific role, such as development manager, traditional custodian of a site, heritage curator, local mayor, local construction worker, or tourist.

You could give the following checklist to all the groups to help them prepare for the negotiation. The goal is to find a solution that's comfortable for everyone, now and in the future.

Checklist for debating conservation issues through peaceful resolution using role play:

- Concentrate on the issue, not the speaker.
- Try to put yourself in your opponents' positions and remember that one group may have several interests.
- Let your opponents speak freely about their thoughts and feelings. Listen to them carefully.
- Try to understand your opponents and find out what their main arguments are.
- Ask key questions and avoid sweeping statements.
- Make sure that your opponents understand what you want to say.
- Don't get lost in details.
- Find solutions that will give all the groups some satisfaction, if possible.
- Don't threaten your opponents.
- Don't give in under pressure.
- Make surprising and positive contributions.
- Solve the conflict in stages, tackling the most difficult questions progressively.
- Co-operate to prevent new conflicts.
- Agree on ways to solve future conflicts.

You should remain in the background to observe but be ready to assist if required.

Suggested Student Activity 6

Local Council Decides on the Future of a Historic Part of Town

Objective:

To assist students to better understand the implications of development for heritage conservation

Organise a role play in the classroom based on the following hypothetical situation:

The local council has drafted a development plan for the centre of the town where you live.

The town centre is quite old and includes some of the remaining traditional houses of your region. These houses are important reflections of your local area's identity. However, they are quite run down. They do not have running water or toilets, and these important amenities cannot be installed.

If the development plan goes ahead, it will mean that the oldest part of town will be destroyed and modern houses will be built. Some members of the local council are in favour of the proposed development plan; other local politicians are clearly against it. Today, the parties concerned must meet to decide whether the plan should be supported.

Divide the class into the following groups:

- A local council group in favour of the plan
- A local council group against the plan
- Citizens who live in the old part of the town
- Experts (such as architects and town planners)
- Representatives of the media
- A chairperson to moderate the debate
- A secretary to write a report of the meeting.

You could prepare profile cards that describe the position each party is to adopt. Alternatively, your students could develop their own profile for the party they have been assigned to.

Each group should then discuss its position and select one student to act as its spokesperson. The spokesperson would present his/her group's argument as well as defend the group's position.

The chairperson should set the order of speaking and ensure that each speaker can put forward his/her group's position in an orderly manner.

At the conclusion of the role play, the chairperson can sum up the proceedings and see if an agreement can be reached about what should be done.

Tourism Management of Local and World Heritage Sites

A major challenge for local heritage and World Heritage conservation is to allow people to visit sites without this causing adverse effects. Increasingly, sites that are beautiful and are well preserved because of their inaccessibility are becoming targets for tour operators. Consequently, each site requires proper tourism management.

One example of a fragile heritage site that is threatened by visitor numbers is the Great Wall of China. This famous site was inscribed on the World Heritage List in 1987. At present, the most popular part of the Great Wall, visited by millions of local and foreign tourists every year, is the section that was built in brick and stone near Beijing during the Ming dynasty.

However, spectacular early remains, some two thousand years old, can also be seen in the Gobi Desert in Gansu province. The arid conditions of the desert have preserved these fragile materials, which include mud-built forts and piles of reeds used for lighting as beacon flares to warn of attacks from nomads from the north. This part of the Great Wall has been visited by relatively few tourists, but an increase in the numbers of visitors may endanger the fragile remnants of this site.

Another breathtaking World Heritage natural site is Te Wahipounamu in south-west New Zealand. Its natural beauty has been well preserved because New Zealand is geographically isolated and so has been able to conserve its rich, unique biodiversity.

Recently, however, factors like the tourist boom and improved world transportation systems have allowed great numbers of tourists to go to New Zealand. At the time Te Wahipounamu was nominated as a World Heritage Site, there was a great deal of discussion about building a highway through the Te Wahipounamu site to link two towns, Haast and Milford, and so facilitate tourist access.

This proposal presents a number of advantages and disadvantages. These issues can be further examined in the suggested student activity Building a Highway through a World Heritage Site.

Great Wall of China.

Source: World Heritage Photo Library, UNESCO

Suggested Student Activity 7

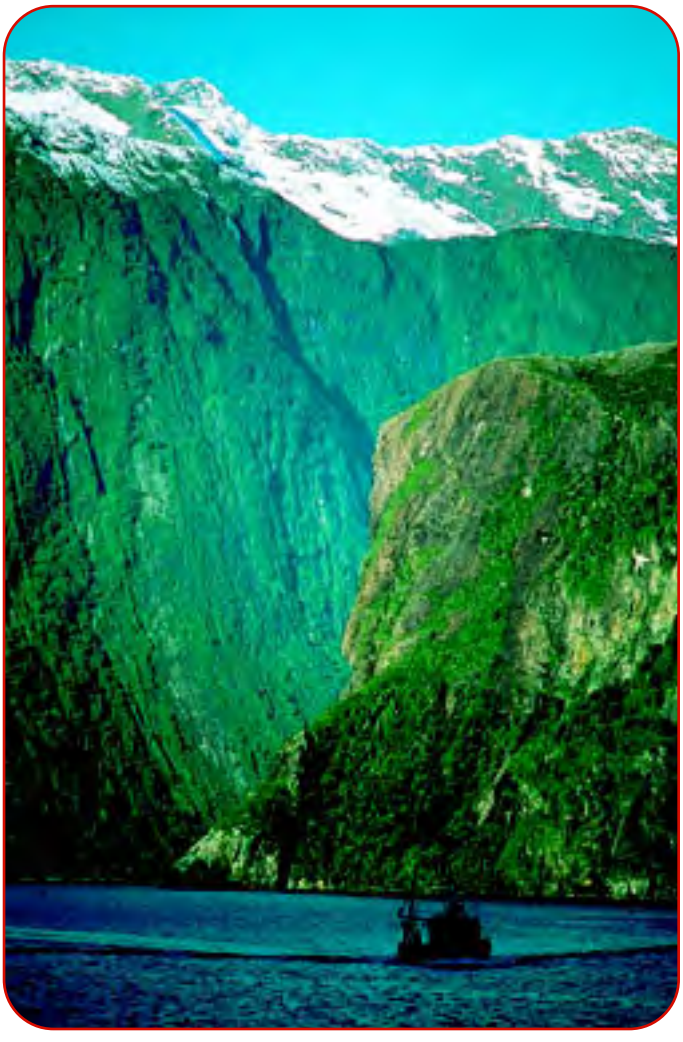
Building a Highway through a World Heritage Site

Objective:

To assist students to understand the diversity of interests and views in relation to development, tourism, and World Heritage

Your students could:

- Work in five groups and use the student activity sheet entitled Building a Highway through a World Heritage Site to match the statement with the appropriate character. Each group could further develop their own statement.
- Designate one member from each group to take part in a debate to defend the views of their character. Each group should also select one member to serve as part of a jury that will decide whether the road should be built or not. Discuss the decision made.



Te Wahipounamu, New Zealand.

Source: World Heritage in Young Hands, *page 119*

Photo: F. Dondau

Building a Highway through a World Heritage Site

1. "The last thing New Zealand needs is more roads into the wilderness. It would have a horrendous impact on an otherwise pristine area and would be an economic lemon. It just changes the way tourists get to that part of New Zealand rather than attracting more tourists – not that we need more, anyway. It'll never happen." Director, Forest and Bird Protection Society

2. "Essentially, we see this as the answer to increasing tourism on the West Coast. This road would take the place of everything we have lost in terms of logging and mining in recent years. If just 10 percent of the buses going to Milford were to come up the West Coast, it would double our tourism industry." General Manager, Westland District Council

3. "A road along the valley floors would cause considerable disturbance to delicate swamp ecosystems, and a road along the foothills would be likely to cause considerable scenic disruption." Forest Service Ranger

4. "The landscape and scenery is quite outstanding. It would add a whole new dimension to New Zealand, as well as international, tourism. Part of the deal would be for tourists to be self-contained in their cars from Haast to Milford." Transport Minister

5. "On balance, we can see no harm in the proposal, providing the feasibility study does not indicate that the costs to the nation will be excessive. It could benefit tourism and the communities of South Westland and Fiordland that derive a considerable part of their income from it." Newspaper Editor

Source: Greymouth High School, New Zealand

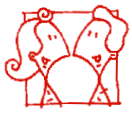
Reflection of forest, mountains, and snow at Lake Matheson, South Westland, which is within the Te Wahipounamu World Heritage Site, New Zealand.

Photo: J. Preece

Student Activity Sheet

Further Suggestions for Student Activities

Art



- Design a tourism campaign, including posters, to attract visitors to a site.
- Design and, if possible, produce site information leaflets for tourists.
- Draw, paint, or visit a site and then develop images sketched on site into abstract art, designs for clothing, or other artworks.
- Design a poster concerning the need to conserve a local, national, regional, or World Heritage Site by researching past images of the site, the reasons for its inscription as a site, and whether tourist activity has changed it.

Geography/History

- Discuss whether the site has been a tourist destination for a long time and consider why or why not.
- Discuss whether the history of the site makes it relevant to local, national, regional, or world tourism.
- Interview people who manage heritage sites to learn about the positive and negative effects of tourism on the conservation of heritage sites.
- Suggest how to vividly explain the history of the site to tourists.
- Study the erosion of sites caused by visitors and discuss solutions, such as alternative routes.

Language/Literature

- Write information leaflets for a range of tourist groups, including local and international tourists or visitors with special needs or interests.
- Write advertising slogans for a site.
- Debate the value of heritage sites and the possible threats to them from tourism. This activity could also involve role play.
- Translate site information into other languages.
- Study a range of advertising leaflets concerning local, regional, national, or World Heritage Sites.
- Research references to any site mentioned in a novel or story and discuss how extracts of literary texts could be included in brochures and documentation for tourists.

Mathematics

Use graphs, pie charts, or statistics to discuss tourist trends and their likely implications for local or World Heritage Sites. Calculate and record the results of questionnaires or surveys.

Students from Greymouth High School explore the glacier at Te Wahipounamu – southwest New Zealand.
Source: World Heritage in Young Hands, *page 126*

Photo: Rob Roney

Visits to Sites

An exciting feature of local and World Heritage education is the opportunity it offers to get young people out of their classrooms and into their communities or even other countries. For optimum impact, these visits need careful planning, effective organisation, and good follow-up activities.

Site excursions

One of the culminations of local and World Heritage education is a visit to a site. The following practical steps can lead to a site visit being a memorable experience for both you and your students.

Preparation

Good preparation is essential for any successful site visit. This involves:

- The teacher(s) making a preparatory visit to the site.
- Preparing a before-and-after questionnaire that will measure the change in students' knowledge, attitudes, skills, and behaviour about the site and its conservation.
- Preparing the students for special types of activities, such as recreating the past, telling stories and legends about the site, or making drawings of it.
- Planning the work that you will ask the students to do as a follow-up to their visit.

Pre-visit

Try to involve a team (as large as possible) of teachers from as many disciplines as possible to help prepare the students for their visit. For example:

- A history teacher could provide information about the site throughout the ages.
- A geography teacher could point out the site's locational and geographical features.
- A language teacher could provide special texts (literary, poetic, or dramatic).
- An art teacher could invite the students to draw pictures or produce scale models of the site.
- A maths teacher could ask the students to calculate how a cultural site has been built or to estimate the approximate numbers of species a natural site contains.

- A science teacher could talk to the students about possible threats to the site from, for example, tourism, pollution, epidemics, invasive species, deforestation, or neglect.

Ask whether the site has an education officer who could assist in planning the visit.

If some educational material has already been produced about the site, use it with your students before the visit. Gather all the practical information needed (such as the price of admission, the opening and closing hours, whether taking photographs is permitted, and whether food or snacks, souvenir shops, toilets, and first aid are available) and check whether all the students can be accommodated at the same time or should be divided into groups.

Prepare the student activity sheets entitled Local or World Heritage Site Visit for the students to complete during the site visit and collect all the materials and equipment you need for the visit, such as writing and drawing paper, cameras, and pencils.

If you have a digital camera available, you could record the visit and produce an online presentation.

IUCN expert Bing Lucas (from New Zealand) carrying out the evaluation of the Jiuzhaigou Valley in China in 1992.

Photo: UNESCO Photo Library

The site visit

Plan for a variety of activities during the site visit, such as making drawings and/or taking photos (if you have a camera), carrying out interviews (with the site guides or among the students themselves), preparing an individual student's journal of the visit, and allowing for rest and recreation. Bring a small gift and have students present it to the site manager to say thank you before you leave.

The follow-up to the visit is just as important as the preparations. Following up allows students to assimilate their experiences and to share them with others.

Here are some suggestions for following up:

- Discuss with your students what they saw and learned, including what they liked most and least.
- Encourage your students to undertake research projects on the site. The research topics might include how to improve the presentation of the site to promote tourism while also protecting it.
- Have the students examine the possible threats to the site as well as the possible remedies for these.
- Have the students make proposals for young guides to help with tourist management.
- Display photographs taken during the visit.
- Invite your students to write an article on their visit for a school and/or a local or national newspaper.
- Ask your students to propose other site visits and involve these students in preparing for future visits of other classes or schools.

Local or World Heritage Site Visit

To be completed by each student before, during, and directly after a visit to a heritage site.

Name of site:

Name of student: Date of the site visit:

Before the visit:

Write down your expectations for the visit (what you want to discover and learn about).

During the visit:

- Make a drawing of a feature or part of the site that you particularly appreciate (using a separate sheet of paper).
- Record some facts and figures that you learned about the site (using a separate sheet of paper).
- Report on your sensory discoveries. Describe what you heard and what you smelled when you closed your eyes. Describe the aspect of the site that made the biggest impact on you:

Sound:

Smell:

Sight:

Student Activity Sheet

After the visit:

Write about your feelings after the visit. Were your expectations fulfilled? Why/why not?

Please explain:

Local or World Heritage Site Visit

Why do you think that this site is important?

Final comments:

Signature: _____ Date: _____

World Heritage in the Pacific

By 2003, there were twenty-three World Heritage Sites that had been included on the World Heritage List in the Pacific, including those in Australia and New Zealand. The sites are distributed very unevenly across the Pacific. Australia has fifteen World Heritage sites, but one of these sites, Heard and McDonald Islands, is in the Southern Ocean, and so it is not included in the Pacific sites. New Zealand has three World Heritage Sites, and some other countries in the Pacific have one World Heritage Site each.

These include:

The Solomon Islands
The United States of America
Ecuador
Indonesia
United Kingdom
Chile
East Rennell
Hawai'i Volcanoes National Park
The Galapagos Islands
Lorentz National Park
Henderson Island in the Pitcairn Group
Rapa Nui or Easter Island

Birds on Henderson Island.

Photo: G. McCormack

Henderson Island in the eastern South Pacific is one of the few atolls in the world with its ecology practically unaltered by humans. Its isolated location permits the study of the dynamics of insular evolution and natural selection. It is particularly notable for the ten plants and four land birds that are endemic to the island. Masked boobies, *Sula dactylatra*, occur on Henderson Island, which is a World Heritage Site in the Pitcairn group.

Suggested Student Activity 8

World Heritage Sites in the Pacific

Objective:

To help students identify the locations and types of World Heritage Sites in the Pacific

Your students could:

- Look at the enclosed World Heritage poster in this kit, which divides the world into four regions, and find countries in the Pacific that have sites. They could then record the names of the World Heritage Sites (using the table on the following page), including those in New Zealand, Australia, and Papua-Indonesia/Papua New Guinea. The students need to use two maps: "The Americas" to cover the West Pacific and "Asia Pacific" to cover the East Pacific. A copy of the poster is included in this kit. It shows the location of all the World Heritage Sites.

- Use the key on the poster to find the symbols for natural, cultural, and mixed sites. For each site, they could record whether it is a cultural, natural, or mixed site. They could add up the number of sites in each category. You could then ask if there are approximately equal numbers of sites or if there are more natural than cultural sites. You could ask them to explain this.
- Use the map enclosed in this kit, or a list of Pacific countries, to find the symbol that shows when a country ratified the World Heritage Convention. They could record the year that the different Pacific countries ratified the Convention and note and comment on the Pacific countries that have become State Parties to the World Heritage Convention but do not have a World Heritage Site. They could then discuss the possible barriers to Pacific countries having sites included on the World Heritage List. The enclosed "Reference Map of Oceania" could be used for the above activity.

Galapagos Islands – eagle and turtle.

Photo: UNESCO/F. Polking

World Heritage Sites in the Pacific

Complete the following table.

No.	Country	Name of site	Cultural	Natural	Mixed
1	New Zealand	Te Wahipounamu		Yes	
2	Solomon Islands	East Rennell		Yes	
3	Australia	Uluru-Kata Tjuta National Park	Yes	Yes	Yes
4	Chile	Rapa Nui National Park	Yes		
5					
6					
7					
8					
9					
10					
11					
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19					
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21					
22					

Recognition of Pacific Cultural Heritage

Over three thousand years ago, the people of the Pacific used their outstanding skills in navigation and boat building to sail vast distances across the Pacific Ocean and start new settlements. Their places of departure and arrival and the names of their canoes and of the people and their tribes are all well known throughout the Pacific Islands because of the strong oral tradition.

In the future, there may be a group of World Heritage Serial Sites to recognise the skills of the Pacific navigators. A serial site has more than one geographical location and is linked by a common theme. There may be a group of World Heritage Serial Sites that links the departure points of the waka moana (ocean-going vessels) and their arrival points in distant countries.

A reconstruction of a Polynesian waka, of the type used for journeying.

Source: New Zealand National Maritime Museum

World Heritage Serial Sites

These are outstanding sites that can occur in one country or in a number of countries and are united by the same theme.

Examples of serial sites on the World Heritage List:

- The Churches of Chiloe, which is a series of wooden churches along the coast of Chile.
- The Route of Santiago de Compostela in France where, in the Middle Ages, countless thousands of pilgrims followed four routes through France to reach the goal of their pilgrimage, the sacred city of Santiago de Compostela in Spain.

Suggested Student Activity 9

Pacific Serial Sites

Objective:

To assist students to identify who the Pacific navigators were and where they came from

Your students could:

- Find out where the earliest people of their country came from.
- Find out if the earliest people in their country were Pacific navigators and, if so, how they know this.
- Suggest countries that could be included in a Pacific navigators' serial site.
- Suggest the steps needed to make this happen, such as:
  - identifying the countries involved
  - making sure that they have all joined the World Heritage Convention
  - setting up a co-ordinating group composed of one person from each country
  - appointing a small group of experts to collect the information
  - writing the nomination document for the World Heritage Committee.
- Identify the problems that could occur when working with a group of countries rather than with just one country. For example, disputes could arise over which countries are included and about which experts are appointed. They could discuss how to work through these problems.
- Suggest some themes for serial sites in the Pacific. These could include:
  - turtle breeding areas
  - places where stone money was quarried and/or used (Palau and Yap in the Federated States of Micronesia).

There could be turtle breeding areas that form a group of World Heritage Serial Sites in the Pacific. This is a large leatherback sea turtle, which breeds in the Pacific and is rare throughout the rest of the world.

Photo: UNESCO Photo Library

Why Are There So Few World Heritage Sites in the Pacific?

In the past, Pacific cultures constructed buildings using materials that were easily accessible. Stone was often used for foundations, timber for the walls, and thatch for roofs. Over time, walls and roofs would rot away, leaving only rock platforms to indicate where buildings had been. Because these wall and roof materials were so impermanent, the rich sequence of architectural developments that can be seen in European building does not exist in the Pacific.

The Pacific people have a unique culture and heritage, but often it cannot be seen. We have a rich intangible heritage. Our stories, legends, songs, dances, and knowledge have been transferred orally from generation to generation. Our elders are our libraries. Our ancestors' skills fitted their environment, and they used the resources that they had at hand. These resources were limited, but they were used in many ways so that our ancestors could live in harmony with their environment.

Many Pacific people believe that their islands and reefs do not qualify for World Heritage listing as natural sites. But, in reality, the natural environment on many Pacific Islands is unique, with species of birds and plants that are found nowhere else. Local people who have grown up with this richness sometimes don't appreciate that it is so distinctive. As well, many Pacific islands have been inhabited for centuries, and the local people consider that the environment is highly modified by their cultivation and building practices. It is only recently that major impacts have occurred on some of the islands.

There are various reasons why the Pacific is under-represented in terms of the number of sites on the World Heritage List:

- By 2004, only twelve of the eighteen countries in the Pacific had become signatories to the World Heritage Convention.
- Most of the possible sites in the Pacific are on customary land, and so consulting all the stakeholders takes a long time.
- The people from many Pacific countries don't realise the significance of the natural and cultural heritage that is part of their everyday existence.
- The World Heritage listing process has favoured European and North American countries. In many of these countries, there are laws, including Heritage Acts, that protect natural and cultural heritage, such as national parks. It is easier for these governments to nominate the best sites for World Heritage listing as they are already protected sites.
- Much of the cultural heritage in the Pacific is intangible. The people of many Pacific countries are now in the process of recording this information from their elders.

Suggested Student Activity 10

Develop a Strategic Plan for the Pacific

Objective:

To assist students to list and prioritise the actions required to have more sites included on the World Heritage List

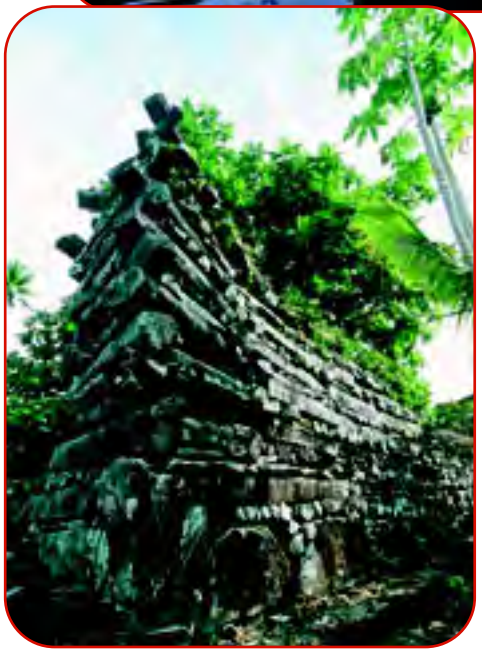
The Pacific is under-represented on the World Heritage List.

Your students could:

- List the actions they would take to have more sites from their region included on the World Heritage List.
- Record and prioritise their responses. This will form their strategic plan for the Pacific.
- Send copies of the plan to the UNESCO Office for the Pacific States in Āpia.

View of Nan Madol from a canal between the man-made islands, Federated States of Micronesia.

Photo: Jeni Bassett



The Nan Madol structures are built from large pentagonal, basaltic rocks. It is thought that the complex was the religious and administrative centre for the island of Pohnpei. The civilisation is thought to have existed for about a thousand years, and it had been abandoned when the first European explorers reached Micronesia in the seventeenth century.

Photo: Jeni Bassett

Aerial view of the Nan Madol site, Pohnpei, Federated States of Micronesia.

Photo: Jeni Bassett

Nature and Culture Linked

The World Heritage Convention is unique because it links the conservation of nature with culture. People's cultural identities are formed in and by the environment in which they live. Some of the world's most spectacular natural sites have also been inhabited for many years. These sites show signs of centuries of human activity and can be important to people for their spiritual, cultural, or artistic values.

Cultural landscapes

This is a World Heritage concept that is particularly suited to the Pacific. Some cultural landscapes are places that have immense spiritual value, just as a cathedral in Europe might have. These places are rich in legends, stories, genealogies, customary management practices, and knowledge of ownership.

One example of a cultural landscape is Tongariro National Park in New Zealand. It was initially included on the World Heritage List for its natural heritage, but later the cultural significance of Tongariro, particularly the spiritual links between the land and its people, was recognised, and it became the first site in the world to be listed as a World Heritage cultural landscape.

North Island volcanoes Tongariro, Ngāuruhoe, and Ruapehu.

Photo: Lloyd Homer copyright © Institute of Geological and Nuclear Sciences

Nature and culture linked – Tongariro National Park

To the Māori tribes in New Zealand, the sacred mountains of Tongariro, Ngāuruhoe, and Ruapehu are spiritually significant. They are so special that, in pre-European times, the Māori people did not look directly at these mountains out of respect.

To protect the mountains, Paramount Chief of the Ngāti Tūwharetoa people Te Heuheu Tukino IV (Horonuku) gifted the mountains to the New Zealand government in 1887. They are to be protected for all time and for all New Zealanders. This was a very clever strategy because Māori lands at that time were gradually being sold to European settlers for farms. Tongariro became New Zealand's first national park and the fourth national park in the world.

Since then, Tongariro National Park has grown three times larger than its original size, but it is still based around the sacred gift of Ngāti Tūwharetoa. Now, the Department of Conservation and the Ngāti Rangi iwi (tribe) are working together on the Kariori Rāhui. This ecological restoration project aims to manage the area in a way that protects the natural environment and recognises Māori cultural values.

Suggested Student Activity II

The Uluru-Kata Tjuta National Park, Australia

Objective:

To assist students to better understand the notion of a cultural landscape and the role of indigenous peoples in World Heritage conservation

This example, presenting the Uluru-Kata Tjuta National Park in Australia, illustrates how inscription on the World Heritage List can enhance the recognition and protection of indigenous peoples' sense of identity and way of life.

At the same time, the park is an example of successful site management in a spirit of partnership between the indigenous peoples and a government conservation agency.

The site was first listed as a natural site in 1987. In 1994, it was renominated as a cultural landscape – a place representing the combined works of people and of nature that manifests the interaction between people and the natural environment. The Uluru-Kata Tjuta National Park was the second cultural landscape to be inscribed on the World Heritage List after the Tongariro National Park in New Zealand.

Your students could:

- Read the following extract and discuss the significance to the Aboriginal people.

Uluru-Kata Tjuta National Park is located on traditional Aboriginal lands where Aboriginals still live and where Aboriginal languages are spoken extensively as the first language. In 1985 the Australian Government handed back the ownership of the land to the Anangu, indigenous peoples of the Western Desert of Australia. Following the "Handback", the Anangu leased the National Park to the Australian Nature Conservation Agency (ANCA). The Anangu and the ANCA now conserve and manage the National Park together. The "Handback" and the joint management of the park are seen as landmarks in the history of the Aboriginal Land Rights movement and in the history of heritage conservation in Australia.

Anangu knowledge and life, identity and social structure, ethical belief system and the landscape in which they live are shaped and explained by the Tjukurpa. Tjukurpa, sometimes inaccurately translated as "Dreamtime", dictates the way in which the Anangu structure their society and look after each other and the land. It guides all behaviour. When Anangu travel across the land in which Uluru and Kata Tjuta stand, they are aware of, and understand, the journeys and activities of their ancestral beings who crossed the land when the surface of the Earth was still featureless. The ancestral beings (in the form of people, plants and animals) moulded the features of the landscape as they journeyed from one area to another, interacting as they went along. Today, as in the past, this knowledge is recounted, maintained and passed on through ceremonies, songs, dance, arts and crafts. Thus a landscape which to non-Anangu people appears to be natural, is in fact full of cultural meanings created by cultural processes.

World Heritage Newsletter, No. 10, March 1996

(Note: The activity is based on an activity designed by the authors of *World Heritage in Young Hands*.)

Uluru-Kata Tjuta National Park, Australia.

Source: World Heritage in Young Hands, *page 97*

Photo: © S. Titchen

We've always been saying the land is important to us for Tjukurpa, now other people from overseas and non-indigenous people recognise that it's of cultural importance – it makes me feel good that it's been recognised at last. In the past, some people have laughed and called it dreaming but the Tjukurpa is real, it's our law, our language, our land and family together.

Yami Lester, Chair, Uluru-Kata Tjuta Board of Management

Suggested Student Activity 12

An Aboriginal Perspective on World Heritage Site Status

Objective:

To assist students to consider and comment on the views expressed by the people's response to obtaining World Heritage site status for their area

In 1992, the World Heritage Committee decided to include cultural landscapes on the World Heritage List. This contributed to the 1994 listing of Australia's Uluru-Kata Tjuta National Park as a cultural landscape to complement its existing natural site listing. The links between the traditional owners of Uluru, the Anangu people, and the site are similar to the situation at other potential World Heritage Sites throughout the Pacific that have customary ownership.

The Anangu people analysed the significance of World Heritage status for them as follows:

- For the first time, the world has recognised the value of our culture, and we can hold our heads high.
- We can require that our sacred sites be respected and have a strong input into the management of the park's natural resources to ensure that management follows the traditional patterns.
- Our culture is being interpreted in our way in a new cultural interpretation centre to educate both our own young people and the public who visit.
- Our people are getting employment opportunities in the tourism field in interpreting our heritage
- At any time, if there should be a government in power that is unsympathetic to us, there is an international group interested in us.

These are very perceptive responses and are an effective answer to those who may consider that World Heritage status may mean a loss of status and control for the traditional owners.
Bing Lucas, 1997

Your students could:

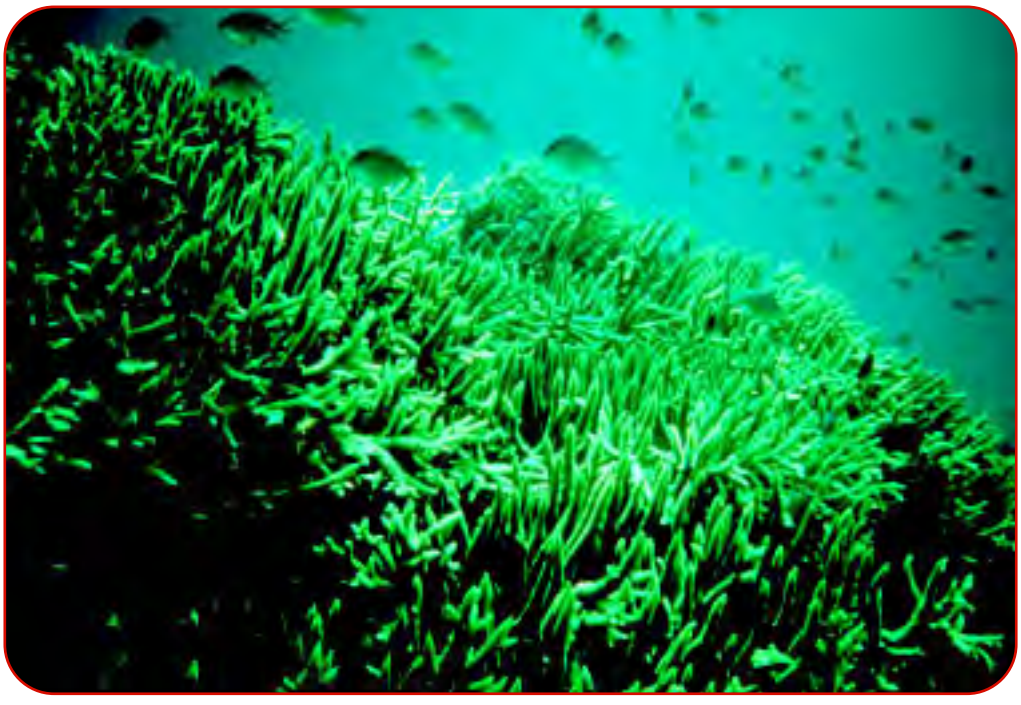
- Carefully study the five responses of the Anangu people, say whether they agree, and give their reasons for supporting or not supporting the views.

How Our Heritage Is Linked to the Rest of the World

We may understand why it is important to preserve our national or cultural heritage, but it may be difficult to see that we are actually interlinked with the rest of the world.

National boundaries are often humanly constructed and have changed over time. For example, for Papua New Guinea and Irian Jaya, trans-boundary sites may be the best way to conserve the natural and cultural heritage. Serial sites that involve a number of countries clearly show the links between the countries.

One way of imagining this is to think of islands connected by coral reefs.



Tubbataha Reef Marine Park, Philippines.

Photo: © IUCN/J. Thorsell

Global networking and the Internet

We live in an era of information explosion. Through the Internet, we can have instant access to libraries, databanks, archives, weather reports, consumer products, and more, all located in different parts of the world. As information and data are important aspects of World Heritage education and research, this new technology provides exciting avenues for teachers and students to discover the values of World Heritage Sites and to learn more about their conservation.

However, the Internet is not available to everyone in all regions of the world, and most people in developing countries do not have access to it yet. Nevertheless, as the cost of purchasing a computer falls and as less expensive telecommunication services become available around the world, the number of users is expected to grow rapidly and extensively.

Global networking

The UNESCO Young People's World Heritage Education Project allows schools to be part of a global network involving all types of schools in all parts of the world. An important dimension of the project is learning together and sharing each other's experiences in developing new and effective ways to introduce World Heritage into the school curriculum.

Most of the schools participating in the Project are members of the UNESCO Associated Schools Project Network (ASPnet), which is designed to reinforce the human, cultural, and international dimensions of education by undertaking pilot projects, such as the Young People's World Heritage Education Project, conducted through ASPnet together with the UNESCO World Heritage Centre. ASPnet schools often establish links and exchanges that involve not only the sharing of experiences but sometimes even the sharing of resources.

As it is very expensive to bring together students and teachers from different countries, the use of technologies for networking purposes, such as the Internet, is proving to be a very effective means for people to get to know each other and to sustain lively, regular communication and sharing of ideas.

Effective networking also requires a frequent flow of information and strong partnerships. UNESCO regularly diffuses information on its Young People's World Heritage Education Project on the Internet and in various publications.

Electronic mail (email)

Any school with a computer of any type, a modem of any speed, and a telephone line can exchange email and be part of the global communication network.

It is easy, for example, to subscribe to the World Heritage Newsletter via email.

World Heritage on the Internet

UNESCO's World Heritage Centre has included information about the World Heritage Convention and World Heritage Sites on the Internet. Over two thousand World Heritage web pages are organised around a few basic headings and groups of images identifying current projects and publications:

The Convention
World Heritage List
Who does what
How we work
Activities
Partner with us
News and Events
Publications
Tools
Frequently asked questions

Website References

The following is a general listing of Internet websites relevant to World Heritage in the Pacific.

The World Heritage Centre:
http://whc.unesco.org/nwhc/pages/home/pages/homepage.htm

The New Zealand Department of Conservation's World Heritage pages:
www.doc.govt.nz/Conservation/World-Heritage/index.asp

The World Heritage Asia-Pacific Focal Point hosted by Environment Australia:
www.heritage.gov.au/apfp

The South Pacific Regional Environment Programme (SPREP):
www.sprep.org.ws

IUCN's World Commission on Protected Areas:
http://iucn.org/themes/wcpa

LEARNZ:
www.learnz.org.nz

ICOMOS:
www.icomos.org.nz

www.icomos.org/australia

Port Campbell National Park: The Shipwreck Coast

Author:

Adrian Orgill

Australia

Intended age group: 12–17 years

Category: National heritage – natural and cultural

Unit Abstract

This unit focuses on Port Campbell National Park, a coastal park in western Victoria, Australia. It provides students with the opportunity to learn about the features of this area that give it value as a national park as well as to investigate management issues relating to the park. Much of the information provided is for teacher reference or background, and individual teachers can decide how it can be presented to and used by students.

This unit assumes that students have already been introduced to the concept of World Heritage and are familiar with the criteria used for assessing areas put forward for listing.

The Twelve Apostles.

Photo: Adrian Orgill

Relevant Curriculum Links

Social studies	Investigate the management of tourism and its impact on the area.
Geography	Do location work as well as looking at natural coastal features and their formation.
History	Research the past use, the shipwrecks, and the cultural aspects of the site.
Graphics	Do poster work for specific activities.

Unit Objectives

Knowledge

To help students develop knowledge and understanding of:

- The role of national parks
- The location of the Port Campbell National Park
- The significance to the area of shipwrecks
- The natural and cultural features that make the site important
- The present uses of the park and how they are managed.

Attitudes

To encourage students to:

- Appreciate the need for national heritage sites
- Recognise the value of local and national heritage sites
- Appreciate the need for management procedures in national parks
- Develop a conservation ethic and responsibility for the environment.

Skills

To help students develop their ability to:

- Read and prepare maps
- Interpret information
- Recognise features in photographs
- Provide links between different kinds of information
- Carry out research
- Work co-operatively with others.

Heritage Site Selection

Port Campbell National Park was formed in 1964 and is located along the Shipwreck Coast and Great Ocean Road in south-west Victoria, about 250 kilometres west of Melbourne. The park covers an area of 1750 hectares. It makes a valuable contribution to Victoria's park system, which aims to protect representative samples of the state's natural environments. Parks such as Port Campbell National Park also provide opportunities for visitors to enjoy and appreciate natural and cultural values and make important contributions to tourism.

Port Campbell National Park is a Category 2 area of the United Nations List of National Parks and Protected Areas. This means that it is managed mainly for ecosystem conservation and appropriate recreation. Sections of the Port Campbell National Park are listed on Australia's Register of the National Estate in recognition of the area's outstanding natural and cultural values and its importance as part of Australia's heritage.

Welcome sign, Port Campbell National Park.

Photo: Adrian Orgill

Natural Values

- A stretch of coastline where the Southern Ocean meets limestone cliffs that are being rapidly and spectacularly eroded
- Extraordinary coastal features, including cliffs, rock stacks, caves, headlands, and bays
- A wide range of original coastal vegetation, which provides a valuable link between other areas of original vegetation in the area
- High biodiversity, including a remarkable variety of plant species (flora)
- Significant animal species (fauna).

Cultural Values

- Evidence of past Aboriginal activities, including shell middens, stone middens, stone artefacts, and staircases cut into the coastal cliffs
- Wrecks of early European ships off the park's coastline.

Tourism and Recreation Values

- Spectacular coastal scenery that has been attracting tourists since the latter decades of the nineteenth century
- Extensive visitor facilities, including interpretation facilities, lookouts, boardwalks, car parks, and walking trails
- A variety of recreational experiences, including walking, swimming, surfing, diving, fishing, and sightseeing.

Economic Values

- As a result of high visitor numbers to the park, substantial economic input into the regional economy from the servicing of tourist needs (for example, accommodation, food, and souvenirs).

Port Campbell National Park: A Future World Heritage Site?

Introduction

Port Campbell National Park is one of the most impressive natural sites in Australia. Many magnificent coastal features can be found along the shoreline and in the offshore waters. The park contains some of the best known landmarks in Australia.

The park is one of the main features along the Great Ocean Road, which is one of the world's most scenic coastal drives. Many visitors from all over the world come by car and coach to visit the park and see the limestone formations and the steep cliffs of this eroded coast.

It is not just natural features that make the park an important heritage site. The park is part of Victoria's Shipwreck Coast. During the nineteenth century, Bass Strait became an important shipping route for supplies and transport from Europe, and some of these ships were wrecked in its notoriously wild seas. The best known wreck along the border of the park is that of the *Loch Ard*, which sank in 1878.

The park is also important for its Aboriginal heritage. The seas that shaped the coastline provided a wealth of resources for Aboriginal people. Shell middens along the coast remind us how rich and varied the Aboriginal culture has always been. The middens are a link to this ancient and ongoing culture.

In 1964, 700 hectares were set aside as a national park in recognition of the value of the coastline. The size of the park was increased to 1750 hectares in 1981.

Loch Ard Gorge.

Photo: Adrian Orgill

Suggested Student Activity 1
Location and Background

Objective:
To have students use an atlas or a wall map to create another map showing the location of the park and the various features of the park that would qualify it as a World Heritage Site

Your students could:

- Draw or work with an outline map of Australia to show:
  - its states
  - their capital cities
  - the location of the park.
- Write a description of the park's location and suggest features that might qualify it as a World Heritage Site.
- Identify and explain the World Heritage Site criteria that might apply to the park.

Features of the Park

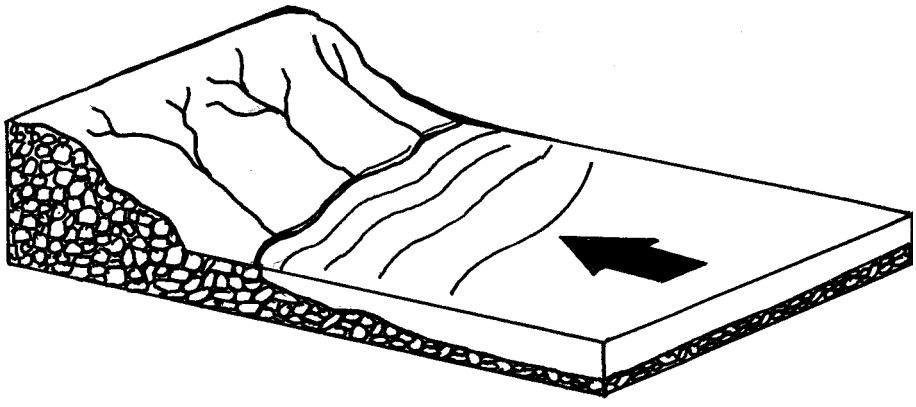
The formation of the Port Campbell coastline

This coast began to form around 10 to 20 million years ago, when countless millions of tiny marine animal skeletons built up beneath the sea to form limestone. By about two hundred thousand years ago, almost at the peak of the last ice age, the sea was more than 100 metres below its present level. As the Earth warmed and the ice began to melt, a process that began about 188 000 years ago, the sea crept towards the cliffs. It reached them about six thousand years ago and has been in about the same place ever since, eating away at the cliff face and forming the spectacular rocks that are among Victoria's greatest natural attractions. The shaping of rock stacks, gorges, islands, arches, and blowholes had begun.

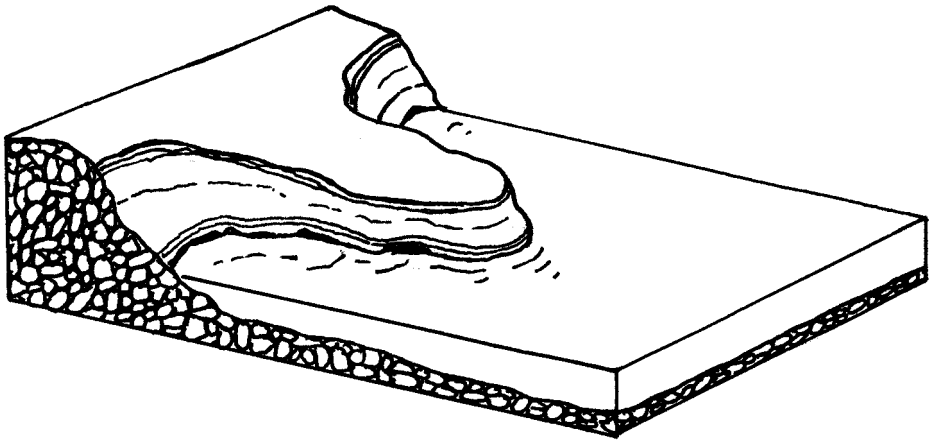
This shaping of the coast by the ocean has resulted in some spectacular scenery. Along some 20 kilometres of coast is an almost continuous line of cliffs. There are only a few sandy beaches at the base of the cliffs. In places, the headlands have been undercut completely at water level to form huge arch and bridge shapes, some completely separated from the mainland. At one place, the sea has battered a tunnel into the base of the cliff where the waves rush through a huge blowhole hundreds of metres inland. Many towers of harder rock rise from the sea, with their tops reaching high above the waves. Figure 1 shows the main processes in the formation of this coastline.

Figure 1. Formation of the coastline

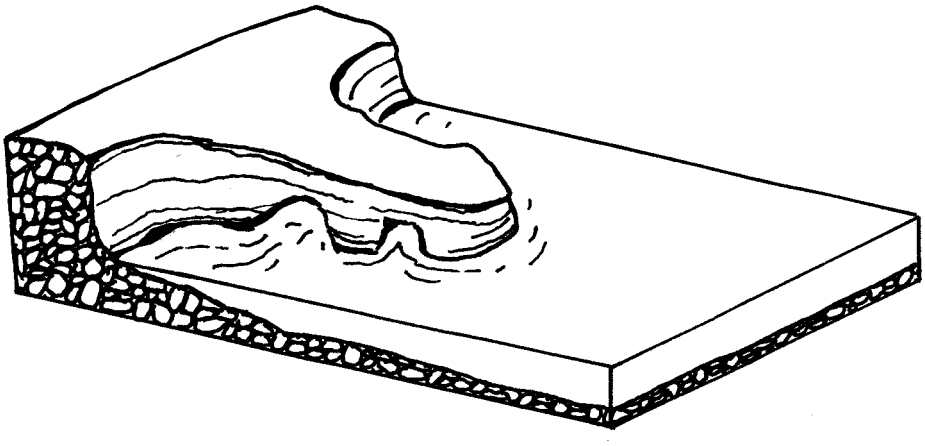
1. Ten thousand years ago: the sea rises and moves inland to form sea cliffs.



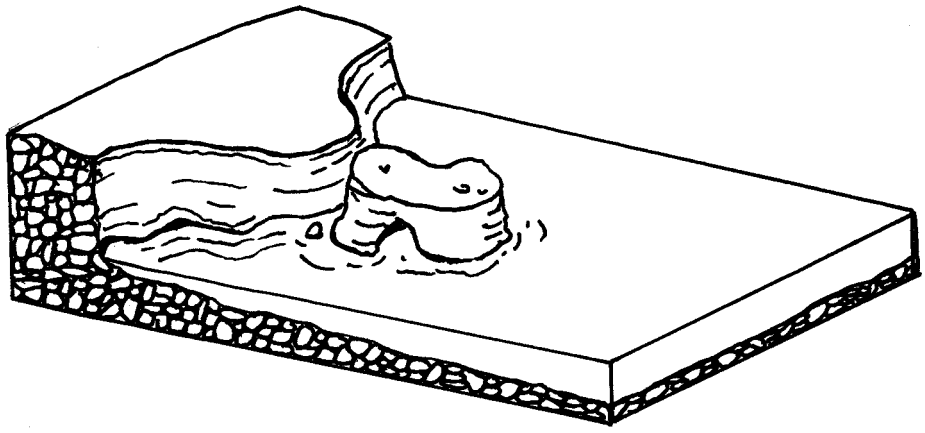
2. Six thousand years ago: wave action wears away the cliff face, exposing harder rock or headlands.



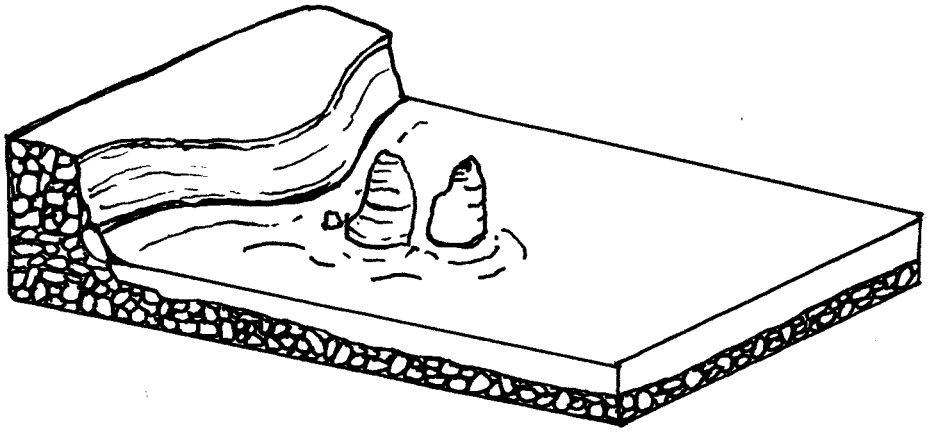
3. At sea level, the waves eat away at the lower rock.



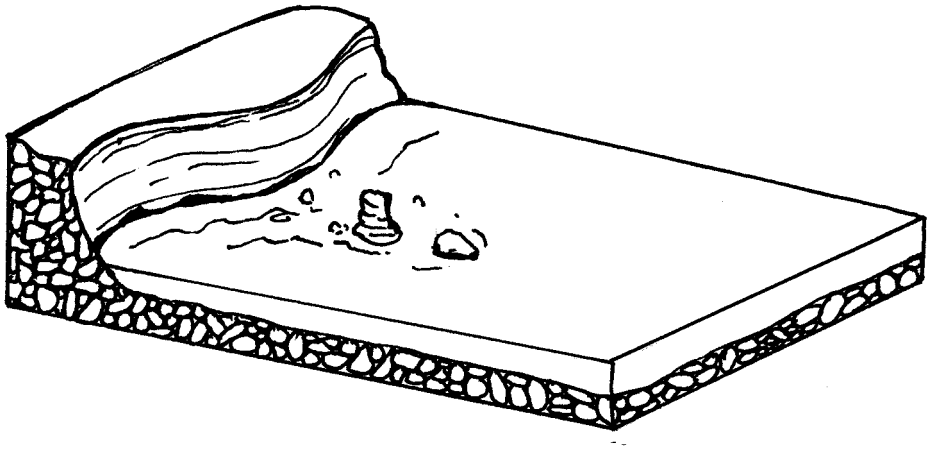
4. Arches collapse when the weight of the crust becomes too much for the soft rock below.



5. About a hundred years later, the second arch collapses, leaving two new islands (sea stacks).



6. Several hundred years later, erosion undercuts the "islands", and they gradually collapse into the sea.



Suggested Student Activity 2

Formation of the Coastline

Objective:

To have students describe how the coastline has changed

Your students could:

- Use the information provided above to write an account of how the coastline has changed over the past ten thousand years.

The park's best known features

The Twelve Apostles is one of the most photographed coastal landforms in the world, but there are many other impressive landforms along this stretch of Victorian coastline. They include Loch Ard Gorge, the Razorback, the Island Archway, the Blowhole, Thunder Cave, Sentinel Rocks, London Bridge, and the Grotto. You can find their locations on the Map of Port Campbell National Park at the end of this unit.

Loch Ard Gorge

Loch Ard Gorge is a sea canyon that extends several hundred metres inland where limestone has been eroded along a fault line. A beach and a cave are found at the end of the gorge.

The Blowhole

The sea has battered a tunnel extending hundreds of metres from the base of the cliff. A huge blowhole has formed, and water sprays skyward when the waves surge through the tunnel.

The Razorback

The Razorback is a narrow, knife-edged island of limestone.

The Twelve Apostles

Wild weather has carved huge rock sculptures from the soft, sheer limestone cliffs, leaving a series of stacks or rock pillars known as the Twelve Apostles. Some of these towers of harder rock stand 65 metres above sea level.

London Bridge

Historically, the London Bridge formation was a natural archway and tunnel in an offshore rock formation caused by waves eroding away a portion of softer rock. However, when it collapsed on 15 January 1990, it became a bridge without a middle.

The Grotto

The Grotto was created when sinkholes in the limestone cliffs met with a receding cliff line.

Photos: Adrian Orgill

Suggested Student Activity 3

Coastal Landform Location Poster

Objective:

To have students complete a poster that locates the main landforms of the park

Provide the students with:

- The location map of the park area.
- A sheet of photographs showing selected landforms.
- A series of paragraphs describing the main features of each landform.

Your students could:

- Place the location map in the centre of a large sheet of paper.
- Arrange photographs around the map. (If photographs are not available, students could make drawings.)
- Match each photograph (or drawing) to one of the paragraphs.
- Draw arrows to the location on the map of each photograph (or drawing).
- Create headings the for the photographs and the map. Create a key for reading the map.

You could use the Parks Victoria pamphlet *Port Campbell National Park, Bay of Islands Coastal Park Visitor Guide*, in this kit, to assist with this activity.

The *Loch Ard* Story

Of the numerous shipwrecks along the Shipwreck Coast, the most famous was that of the *Loch Ard*, which was wrecked on the Mutton Bird Island reefs near Port Campbell in 1878. It was one of the most infamous of Victoria's shipwrecks.

The *Loch Ard*, an iron-hulled sailing ship, was three months into a voyage from England and had fifty-four people on board when disaster struck early on 1 June 1878. Days of fog and rough seas had made it impossible to calculate the exact location of the ship as it passed between the coast and King Island in Bass Strait. The wind and waves drove it towards Mutton Bird Island, but by the time the land was sighted it was too late – the *Loch Ard* was crushed against the reef. With masts, rigging, and rocks smashing the decks, many people were washed overboard or were trapped in the hold.

The *Loch Ard* rolled and sank within fifteen minutes. In the end, only two people survived the wreck, Tom Pierce, eighteen, a member of the crew, and Eva Carmichael, eighteen, who was travelling to Australia with her family. Tom clung to an upturned lifeboat and was washed into a deep gorge that now bears the name Loch Ard. Eva, who couldn't swim, used a chicken coop and then some wreckage to keep afloat. Tom saw her in the water and dragged her to safety. They both took cover in a cave at the end of the gorge.

By now Eva had collapsed with exhaustion. Because she was wearing only a nightdress, Tom covered her with grass before going off in an unsuccessful search for survivors. As morning came, Tom managed to climb out of the gorge and found horse tracks, which he followed to nearby Glenample Homestead. After finding help, he returned for Eva and took her to the homestead.

The morality of the time dictated that because Tom had seen Eva in only her nightdress, he was obliged to propose marriage to her, but she declined. Eva and Tom never saw each other again after recovering at Glenample. Eva returned to Ireland and later married. Tom eventually became a ship's captain.

Memorial Cemetery for the Loch Ard *victims.*

Bodies recovered from the Loch Ard *disaster were buried in a cemetery above the gorge.*

Photo: Adrian Orgill

Suggested Student Activity 4

Loch Ard Picture Story

Objective:

To have students identify and show in a picture story the events that make up one of southern Australia's most famous shipwreck stories

The teacher reads the story of the *Loch Ard* shipwreck.

Your students could:

- Discuss the story and compile a bullet point list of significant events – from beginning to end.
- Develop a picture story of the main events. They could do this in pairs or small groups, and it might be in the form of a cartoon. They should aim to create a wall display and include at least eight frames. If the technology is available, they could use computers to tell the story to the class using computer presentation software.
- Write an imaginative story from the perspective of one of the two main characters, Tom or Eva. They should base their story on the facts available.

Aboriginal Heritage

The Aboriginal people as guardians of the environment

Aboriginal people feel an obligation, as guardians of the land, to protect places and sites.

Spiritual stories told by the Aboriginal people reveal a belief that the coastline was created by one all-powerful creator. The seas that shaped the coastline of the Shipwreck Coast also provided a wealth of resources for the Aboriginal people. The middens along the coast indicate a rich and varied culture.

Daily life in ancient Aboriginal times

The daily life of the ancient Aboriginal people reflects the importance of the coastline to their survival. Every day, the initiated men of the clan would hunt for large game, such as kangaroos and emus. They would fish and collect shellfish off the many rock shelves along the coast. The women would hunt the smaller game, like echidnas and lizards, collect seeds to make damper, and harvest the fresh fruits and vegetables that grew in abundance. The children would stay with their mothers and learn handicrafts. They would play games that imitated hunting or gathering and learn about their culture through stories, songs, and dances from the elders of the clan.

The Aboriginal people moved through different habitats, varying their diet, taking advantage of the harvests of each season, camping close to fresh water, and using plants, animals, rocks, and stones to provide for their daily food and shelter needs. Groups of Aboriginal people probably visited coastal waters during late summer, when calmer weather made the rocky shores and islands more accessible for catching seals and collecting shellfish. During the spring and summer, they collected fish, birds, and berries. At this time of the year, hundreds of thousands of mutton birds migrated from the northern hemisphere. In autumn, eels were abundant in the streams and estuaries, and in winter, the focus was probably further inland, on hunting mammals such as kangaroos and possums.

People of land and sea

All aspects of Aboriginal life were closely linked to the land and sea. Ceremonies were a celebration of the land and its resources, and these links remain important to Aboriginal people today. Aboriginal sites are not just a record of the past – they are also important for teaching Aboriginal children about ancient traditions so that this knowledge is not lost.

Shell middens show us some of the foods that people ate and provide historic records of the occurrence of coastal animals. Stone scatters and scarred trees indicate where tools and weapons were used, while fish traps indicate methods of catching food.

These sites are significant to all Australians because they provide clues about how people lived and managed the available resources throughout the continent's long history. Each site is threatened by natural processes, such as erosion and animals that trample or graze vegetation or that burrow, as well as by such human activities as recreation, ploughing, roadworks, land clearance for coastal developments, and vandalism.

Many sites have significant scientific, historic, scenic, cultural, and social value. All sites and places of significance to the Aboriginal people, whether recorded or not, are protected by law in Victoria. People caught desecrating sites are prosecuted and fined.

Enclosed in this kit is a set of mini-posters to which teachers and students could refer to get more information on middens, scarred trees, and other important aspects relating to the Aboriginal people who lived in the Port Campbell National Park area. These mini-posters have been reproduced with permission of Aboriginal Affairs Victoria.

More information on the mini-poster series, together with information about Aboriginal cultural heritage issues in Victoria, is available on the Land and Culture section of the Aboriginal Affairs Victoria website at www.dvc.vic.gov.au/aav.htm

Example of a mini-poster.

Source: Aboriginal Affairs, Victoria

Suggested Student Activity 5

Dominoes Activity: Aboriginal Past

Objective:

To have students learn about Aboriginal people's past use of the park area and appreciate its cultural importance

Make copies of the following grid and cut them into individual squares to be shuffled.

Your students could:

- Get the text in the correct sequence by putting the sentences together and then trying to work out a logical sentence order. They could then paste the text onto a page.

You should read the previous section of text to your students before giving them this activity.

Aboriginal people feel ...	an obligation, as guardians of the land, to protect places and sites.	The seas that shaped the coastline of the Shipwreck Coast ...	... also provided a wealth of resources for Aboriginal people.
The middens (ancient rubbish dumps) along the coast indicate ...	a rich and varied culture.	The middens are an essential part of ...	... an ancient and ongoing culture.
Every day, the initiated men of the clan would hunt ...	... for large game, such as kangaroos and emus.	They would also fish and collect shellfish off the many rock shelves along the coast.	The women would hunt the smaller game, like echidnas and lizards, ...
... collect seeds to make damper, and harvest the fresh fruits and vegetables that grew in abundance.	The children would stay with their mothers and learn ...	... handicrafts that would build a skill base for their adulthood.	They played games that imitated hunting and gathering ...
... and learnt about their culture through stories, songs, and dances from the elders of the clan.	Groups of Aboriginal people probably visited coastal waters during late summer, ...	... when calmer weather made it easier to hunt seals and collect shellfish.	Aboriginal sites are not just records of the past.
They are also important for teaching Aboriginal children ...	... about ancient traditions so that this knowledge is not lost.	Shell middens show some of the things that people ate and provide ...	... historic records of the occurrence of coastal animals.
Stone scatters and scarred trees indicate where tools and weapons were used ...	... while fish traps indicate methods of catching food.	All sites and places of significance to Aboriginal people, whether recorded or not ...	... are protected by law in Victoria.

Looking after the Park

Port Campbell National Park contains a number of tourist attractions, including The Twelve Apostles. The popularity of these attractions and the significant rise in visitor numbers poses major challenges to park planning and management.

Major management directions for the park include:

- The protection of significant flora, fauna, and other natural and cultural features.
- The progressive implementation of visitor information facilities.
- The control or eradication of pests, plants, and animals.
- The development of a fire management programme.
- The marketing of the park as an important coastal conservation reserve with outstanding scenery, natural and cultural values, and recreational opportunities.
- The management of visitor numbers and movements to reduce impacts on natural values.

Major challenges for park management include:

- Preserving and conserving the rich biodiversity, varied ecosystems, highly significant geological features, and cultural values that are threatened by intense visitor pressures, the forces of the Southern Ocean, and inland development.
- Developing and implementing visitor management facilities and systems that ensure that park visitors gain access to the outstanding scenery and wide range of other recreational opportunities and receive services and facilities that enhance their experience of the park while ensuring a minimal impact on its natural values.
- Involving friends, groups, Aboriginal representatives, neighbours, and the local and wider communities in supporting sound management and promoting the outstanding values of the park.

Suggested Student Activity 6

Visitors to the Park

Objective:

To investigate changes in visitor numbers to the park and identify visitor management measures

Provide your students with the following visitor numbers, which are based on vehicle counts.

Year	1997/8	1998/9	1999/00	2000/01
Number of visitors	1 533 018	1 821 773	1 894 417	1 955 025

Source: Parks Victoria

Your students could:

- Draw a simple bar graph and describe the trends shown by the graph. They then could give possible reasons for any variations and suggest possible consequences and management issues for the future.
- Use photographs of a selection of management measures implemented within the park to design a table that:
  - identifies each measure
  - describes what has been done
  - suggests reasons for the measure.
- Select two or three of the procedures identified and explain some problems that could have arisen if the measures had not been introduced.

Management Measures in the Port Campbell National Park

Information sign.

Boardwalk, viewing platform, and steps.

Steps to the beach.

Photos: Adrian Orgill

Suggested Student Activity 7

Poems from the Shipwreck Coast

Objective:

To have students study poems about the Shipwreck Coast and examine the images portrayed

The five poems that follow are featured in the new Twelve Apostles Visitor Facility. You could read the poems to your class, display copies of the poems in the classroom, and/or ask your students to read the poems.

Your students could:

- Discuss the mood and feelings portrayed by each poem.
- Write poems portraying images of the Shipwreck Coast or shipwrecks that have occurred in their own area.
- Draw or paint images evoked by the poems.

Poems reproduced with permission of the authors.

The Twelve Apostles

Were you halted marching south,
or anchored climbing to the beach?
Did you yearn for freedom through the endless years.

Is the mystic Southern Ocean,
yours to rule or empire lost?
The mists around your rain or wasted tears?

Are you prisoners or guardians,
at the clash of rock and wave?
Do you feel us gaze in wonder at your might?

You have seen the stars before us,
and beyond us you will stand.
Forever at the edge, through day and night.

Suzanne Howard

Wind Song

Wind god,
whipping waves to life.
Howling.
Penguins turn a disrespectful back.

Shrubs bowed,
servile or shrewd?
Surviving.
Coastal flowers tremble into shelter.

Bandicoots,
busy scratching.
Burrowing.
Bush rats scuttle, quick and low.

Silvery tussock grass,
in salty rain.
Determined.
Silver banksia ripples, shines.

Wind god,
no caresses.
Merciless.
Hovering falcons glory in the blast.

Suzanne Howard

Glenample

Glenample yearned as aeons passed,
For man to sing her song,
To make a home of wood and stone,
And a flock ten thousand strong.

At peace she waited safe and high,
As the *Loch Ard* died at sea,
For Eva who lost everything,
And Tom whom fate set free.

And Glenample folk helped bury some,
Who drowned in the sea that night,
The ones who fought their way ashore,
Though their souls had taken flight.

And now we're here to feel again,
The days of pioneer,
Without a sound Glenample speaks,
Of history living here.

Suzanne Howard

The Wave

Silent fluid
Whipped by wind
Gathers strength in tumbling dance
Rolling thunder in the kelp-shred foam.

Blue force
A crystal power
Foaming head and smoking tail
Sending kamikaze hand of liquid loam.

Dolphin rider
Churning tumbler
Meet your goal of rock and sand
Sighing crash at your journey's close.

Christie Gulbis

Shipwreck

Immigrant, you shriek –
I hear you –
I am the land you seek.

In sight of salvation –
Miscalculation –
Welcome to my deep.

Twelve thousand miles to perish
Just a shout
From beach and farm.
Just a breath
From fear and harm.

Can you not swim
Into my arms?

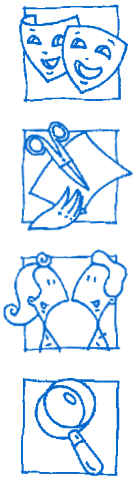
Suzanne Howard

Suggested Student Activity 8

Should the Port Campbell National Park Become a World Heritage Site?

Objective:

To provide students with the opportunity to consider the viewpoints of groups with an interest in the issue



Using role play, the students can present the likely viewpoints of groups with an interest in the issue of nominating a World Heritage Site. Through role play, they can gain a better understanding of the issues and of how to make the appropriate decisions.

You could divide the class into small groups and give each one a different role. Give the students sufficient time to discuss the interests and likely views of their role and prepare a written report.

They will present their report orally to a panel of students acting as government representatives who are responsible for deciding whether the Australian government should nominate the park for World Heritage inscription. This panel should be made up of students who are able to identify the various viewpoints of the parties involved in the issue. They will need to report their findings to the other participants in the role play.

Roles could be prepared for the following interest groups, but others may also be introduced.

- The park ranger – will be responsible for management
- Local business people – because more visitors to the area means more money
- Tourism operators – because a World Heritage listing will broaden the tourist base, advertise the site, and improve business
- Local residents – who are concerned that the relative tranquillity of the area will be disturbed
- Conservationists – who are concerned about the negative impact that increased tourist numbers may have on rare plant species as well as on the nesting sites of migratory birds
- Tourists – who want to see an improvement of the facilities in the area
- A politician – who sees listing as an opportunity to boost the economy of the area but is mindful of the concerns of the residents, who are also voters
- The Government Tourist Corporation – which favours any developments that are likely to improve international tourism to Australia
- Aboriginal representatives – who are concerned about any developments that might threaten sacred sites or other sites of cultural significance.

Suggested Student Activity 9

Promoting the Park

Objective:

To have students develop a variety of resources that would help people find out about the features and use of the park

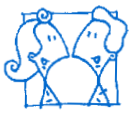
Your students could:

- Write advertising slogans and record a radio commentary about the park.
- Design a poster publicising the park.
- Write and, if possible, record a commentary about the park with a description of what can be seen at each place visited as well as an explanation of how the park's features have been formed.
- Design a tourist information leaflet for people visiting the park.

You may like to add to this range of activities.

Suggested Student Activity 10

World Heritage and Tourism



Objective:

To better understand the impact of tourism on local and World Heritage Sites

One of the worldwide trends of the past forty years has been the increase in tourism. This is having a considerable effect on the number of people visiting World Heritage Sites.

- Divide the class into two groups.
- Ask the first group to make a list of the advantages of tourism for a local or World Heritage Site.
- Ask the second group to make a list of the disadvantages caused by tourism to local or World Heritage Sites.

Your students could:

- Nominate one student from each group to present the group's list and lead a discussion on how to reduce the impacts of tourism.
- Write and perform a play about an ill-behaved tourist, perhaps someone who disrespects heritage sites, spreads litter, sometimes damages the sites with graffiti, makes fun of local traditions and customs, or is mainly interested in personal comfort. A respectful tourist is keen to learn more about local traditions and culture, such as the history of the site, local crafts and works of art, and local music, food, and clothing. Once they have written and performed the play, discuss how such a tourist could be changed into

someone who is interested in visiting local and World Heritage Sites and shows respect for them. They may find the Guidelines for Tourists section on the following page helpful.

- Select a local, national, or World Heritage Site and make a list of suggestions for a campaign that would give tourists more sensitive ways of appreciating the sites. They could discuss these suggestions and share them with the local tourism board or heritage society.

World Heritage and Tourism

Guidelines for tourists

While planning their trips, tourists should:

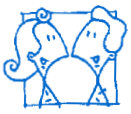
- Learn as much as possible about their destination
- Patronise local suppliers wherever possible
- Plan their vacations and visits during the off-peak seasons if possible
- Visit lesser known destinations.

Once at their destination, tourists should:

- Respect local cultures and traditions
- Consider the privacy, culture, habits, and traditions of the host communities
- Support the local economy by buying local goods, crafts, and services
- Contribute to local conservation efforts
- Conserve and preserve the natural environment, its ecosystems and wildlife
- Use energy and water, and dispose of waste, efficiently
- Be careful with fire
- Use only designated roads and paths
- Keep noise to a reasonable level
- Respect cultural or religious/spiritual sites and monuments.

Suggested Student Activity II

Do You Have a Local Heritage Site Worth Protecting?



Objective:

To visit a local heritage site of significance and investigate its site values and associated management issues

This activity gives students an opportunity to evaluate a local heritage site and gain a greater appreciation of its values and of the issues that might exist concerning its use and management. The site you choose could be a cultural, natural, or mixed site.

Your students could:

- Plan an excursion to a nearby heritage site that is popular with tourists.
- Use the student activity sheet headed Assessing Tourist Facilities at Heritage Sites (one copy for each student).
- Study information about the site that they are going to visit and understand the importance of completing the form and writing the report.
- Present their reports with a summary of their findings.
- Discuss how the facilities could be improved.

You could adapt the student activity sheet that follows so that it suits the assessment of the tourist facilities at the site you are to visit.

Assessing Tourist Facilities at Heritage Sites

Rate the adequacy of the facilities by placing a tick in the appropriate column.

Facilities	Inadequate	Adequate	Good	Very Good
Signs				
Car park				
Toilets				
Information				
Exhibitions				
Souvenirs				
Litter bins				
Cleanliness				
Guides				
Snacks				
Other (name)				

Assessing Tourist Facilities at Heritage Sites

Report to the Heritage Site Manager

Dear (name)

I have recently visited your site and conclude that:

The site facilities are adequate.

The site facilities are inadequate and need to be improved as follows:

I hope this report will be of use for future developments at your site.

Yours sincerely

Name:

Signature:

Date:

The students should give their reports to you when completed.

General Resources

Parks Victoria. *Port Campbell National Park, Bay of Islands Coastal Park Management Plan.*

Parks Victoria. *Port Campbell National Park, Bay of Islands Coastal Park Visitor Guide.*

Parks Victoria. *State of the Parks 2000 Park Profile.*

References for Websites

www.parkweb.vic.gov.au/parks/v28.html

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www.greatoceanrd.org.au

http://walkabout.fairfax.com.au/fairfax/locations/VICPortCampbell.html

www.infotravel.netmag/campbell.html

www.nre.vic.gov.au/coasts/coastkit/ch2/traditn.html#2.26

Glossary

Aboriginal people	The original inhabitants of Australia
Arches	Bridge-like formations
Biodiversity	The variety of living things found in an area
Blowhole	A hole reached by waves that travel through underground tunnels from the sea
Damper	A type of bread made from flour (made from ground seeds or roots) and water
Ecosystem	A system of interrelationships between the living and non-living features of an environment
Eroded coast	A coastline where water and wind have worn away rock and soil, resulting in eroded landforms
Fault line	A break in rock strata
Fauna	The animals of an area
Flora	The plants of an area
Gorge	A narrow valley with steep sides
Guardians	People who assume responsibility for care and protection
Habitat	The natural environment of an organism
Ice age	A period of glaciations during the Pleistocene epoch
Limestone	Soft sedimentary rock formed over millions of years from the skeletons of marine life
Loch Ard	A nineteenth century sailing ship that was wrecked and also had a gorge named after it
Middens	Rubbish dumps, near traditional Aboriginal camps, that have evidence of how Aboriginal people lived
National park	An area that protects natural and cultural values
Sinkhole	A sharp dip or hole below the surface
Stacks	Offshore rock pillars found close to the shoreline

Giant Prehistoric Animals: Australia's Megafauna

Author:

Rebecca McCartney

Australia

Intended age group: 12–17 years

Category: World Heritage with applications to natural and local national heritage

Unit Abstract

This unit of work focuses on the Naracoorte Caves and Wonambi Fossil Centre. This World Heritage Site in the south-east of South Australia is linked with Riversleigh in Queensland to form a serial World Heritage Site called Australian Fossil Mammal Sites (Riversleigh/Naracoorte).

Primarily, this unit provides resources and information for the study of a World Heritage Site where unique and extraordinary creatures roamed mainland Australia thousands of years ago.

Skeleton inside one of the Naracoorte Caves

Photo: Steve Bourne

Relevant Curriculum Links

Social studies	Research the development and management of a natural heritage site.
Geography	Research the formation of caves and the presence of dune systems that existed before the sea receded thousands of years ago.
History	Find out about the geological timescale and the prehistoric fauna that existed before the sea receded thousands of years ago.
Art	Make models, drawings, and paintings of extinct and present-day native species.
Science	Research the evolution of species, their extinction, their fossilisation, and their links to Gondwanaland.
English	Do puzzles relating to existing and extinct fauna.

Unit Objectives

Knowledge

To help students develop knowledge and understanding of:

- The Naracoorte Caves as a World Heritage Site
- The evolution and fossilisation of species
- Scientific research and the significance of the Naracoorte Caves and Australia's prehistoric past
- The tourism development and management undertaken at the Naracoorte Caves
- The relationship between this site and other sites of this serial inscription: what they have in common and what they share.

Attitudes

To encourage students to:

- Identify and recognise the value of a local, national, or World Heritage Site
- Become more aware of, and empathetic to, the threats that may face heritage sites
- Appreciate the need for protecting heritage sites
- Adopt a more protective attitude towards cultural and natural heritage sites.

Skills

To help students to:

- Conduct research at a heritage site
- Interpret information accurately
- Work in collaboration with members of the community
- Work co-operatively with others
- Provide links between different kinds of information.

Heritage Site Selection

The Wonambi Fossil Centre and the Naracoorte Caves National Park, South Australia's only World Heritage Site, lies approximately 300 kilometres south-east of Adelaide.

These cave sites contain scientifically significant species and a diversity of fossilised Australian ice-age megafauna, including many species of extinct birds, mammals, and reptiles.

The skeletal remains of leaf-eating marsupials were discovered in the Naracoorte Caves in 1969 by two scientists, which led to further discoveries and research. These led to inscription on the World Heritage List in 1994. Australia's fossil mammal sites of Naracoorte and Riversleigh (in Queensland) are known to contain the most extensive and diverse fossils in Australia of late Pleistocene fauna (those living 1.6 million to ten thousand years ago).

The discovery of these fossils has meant that historians and scientists alike have physical proof of the existence of giant marsupials and reptiles from Australia's late Pleistocene era.

Natural Values

- Over twenty caves in a small area
- Decorated caves and chambers, with stalagmites/stalactites, columns, and straws
- Well-preserved species of mammals, marsupials, reptiles, and birds fossilised in the cave
- Terrestrial vertebrates that illustrate fauna changes spanning two ice ages.

Cultural Values

- *Wonambi naracoortensis*, which is possibly the rainbow serpent that Aboriginal people portrayed in the dreamtime.

Tourism and Recreational Values

- World Heritage Site
- Guided and self-guided tours in a variety of caves
- Wonambi Interpretive Centre
- Adventure caving
- Bat cave video centre – where bent-wing bats can be viewed in their natural environment
- Visitor facilities – camping grounds, barbecues, and picnic areas, café, defined paths, and information signs
- Educational tours – with topics including geology and palaeontology.

Location and Description of Local Area

The Naracoorte Caves occur in a rural landscape of cleared pastoral and cropping land with scattered native and introduced trees and extensive pine forest plantations. The area has a cool, moist climate with long, relatively dry summers. Much of the rainfall occurs in winter.

The caves were formed in the Naracoorte East dune in the Oligo-Miocene Gambier Limestone (formed 35–36 million years ago), which is the oldest in a series of stranded coastal dunes in the area.

Approximately 20 million years ago (in the early Miocene), the Naracoorte limestone was deposited in shallow ocean waters with an abundance of marine life. Common fossils found in the limestone include molluscs, echinoderms, corals, and sponges. By the late Miocene, the sea had retreated, with underground water flowing more freely from the Naracoorte Plateau to the sea, and the formation of the caves began.

In the late Pleistocene era, the caves were open to the surface, which allowed bones and sediment to accumulate in their entrances and the depressions of the dune. This accumulation is most significant in the Victoria Fossil Cave.

Megafauna and Climate

The fossil vertebrate deposits of Naracoorte are contained in the Victoria Fossil Cave. In 1969, two cave explorers squeezed through a 25-centimetre passage into what is now a World Heritage Site. This small entrance was then enlarged so that visitors could view the gradual unearthing of fossils by scientists.

The fossil remains have been preserved in the caves for millions of years, and since their discovery, there has been a lot of speculation about how such a wide variety of mammals and reptiles came to be in the caves.

Some possible causes include:

- Climatic changes.
- Predators bringing captured animals into the caves.
- Animals washed into the caves' entrances by sediment deposition.
- Animals living in the caves.
- Animals falling into the caves through a pitfall (an opening in the caves).

The fossils provide a great opportunity for research into Australia's and Earth's natural history.

Reconstruction of a Tasmanian devil in a Naracoorte Cave.

Photos: Steve Bourne

Tasmanian devils lived in the caves and feasted on the animals that either fell into the cave or were brought there.

The Pleistocene period of Earth's history, some 1.8 million to ten thousand years ago, was a period of dramatic climate change related to fluctuating glacial (ice-age) conditions. The fossil deposits at the Naracoorte Caves cover the last third of this period and give scientists insight into how the local fauna reacted to these climatic changes.

Approximately fifty thousand years ago, many of the large animals ormegafauna found in the fossil deposits of the Naracoorte Caves became extinct. The reason for their extinction remains a topic for scientific debate.

One theory to explain the extinction of megafauna is that of climatic change, and Australia has indeed become more arid in the last million years. Another theory is habitat change through fire-stick farming and hunting pressure from the Aboriginal people, whose existence in Australia dates back over sixty thousand years.

The Geological Timescale: The Key Stages in the Evolution of Plants and Animals

Era	Period	Epoch	Millions of years ago (in millions)	Plants	Animals
	Quaternary	Recent Pleistocene	0.01 2.5		Rise of civilisation
CENOZOIC	**Tertiary**	Pliocene Miocene Oligocene Eocene Palaeocene	7 26 38 54 65	Australia drifts north Dominance of land by flowering plants	First hominids Dominance of land by mammals, birds, and insects
Many extinctions: 70% of animal species lost, including almost all larger reptiles					
MESOZOIC	**Cretaceous**		136	Angiosperms arise, gymnosperms decline	Last of the dinosaurs Second biggest increase of insect species
	Jurassic		190	Last of the seed ferns Gymnosperms still dominant	Abundance of dinosaurs The first birds
	Triassic		225	Seed ferns decline while gymnosperms dominate land	First mammals First dinosaurs

Era	Period	Epoch	Millions of years ago (in millions)	Plants	Animals
PALAEOZOIC	**Permian**		280	Rapid decline of seed ferns	Great increase of reptiles and decline of amphibians
	Carboniferous		345	Great coral forests, the beginning of evolution of ferns and gymnosperms	Age of amphibians, first reptiles, first increase of insect species
	Devonian		395	Increase of vascular plants, origin of first seed plants	First amphibians and insects Age of fishes
	Silurian		430	Invasion of land by primitive vascular plants	Invasion of land by arthropods
	Ordovician		500	Abundance of marine algae	First vertebrates
	Cambrian		570	Primitive marine algae	Marine invertebrates abundant
PRECAMBRIAN			680 3400 4600	Protists and prokaryotes Beginning of life and the formation of the Earth	First invertebrates

Management Issues

Since European settlement, the area that is now the park has always been popular with visitors. The first cave found by Europeans was Blanche Cave in 1845. In 1885, the park was established to protect and maintain the caves. In 1972, the management of the park was transferred to the National Parks and Wildlife Service of South Australia.

Developments at the Naracoorte Caves Conservation Park

Entrance to the Wonambi Fossil Centre.

The Mega Menagerie on display in the Wonambi Fossil Centre.

The Caves Café.

Camping grounds, barbeques, and picnic areas that are also part of the park's facilities.

Photos: Steve Bourne

Visitor conditions

- Dogs and cats are not permitted in the park.
- Firearms are prohibited.
- Camping is permitted only in the designated areas.
- Access to the wild caves is permitted only by permit.
- Wood fires are allowed only in designated fire pits and when no fire ban applies.

Models of Zygomaturus trilobus. *These were created by scientists using the unearthed fossils as the only guide to the creature's physical appearance.*

Photos: Steve Bourne

What are fossils, and how are they formed?

Fossils are the preserved traces or remains of organisms embedded in rocks. They provide direct evidence of past life on Earth and allow us to put a timescale on the evolution of life. A fossil can form in a number of ways. It can be:

- The preserved remains of an organism (usually the hard parts like teeth and bones).
- The mineralised cast of an organism (similar to the plaster cast that is made from a mould).
- An impression left by the soft tissue of an organism, which is preserved in rock and is derived from very fine sediments.
- A trace fossil that provides evidence of the existence of an organism. Examples of such fossils include footprints and tracks.

Suggested Student Activity 1

Footprints in the Sand

Objective:

For students to make a simple fossil in order to understand how evidence of earlier existence can be preserved that may otherwise be lost

Your students could:

- Make an impression of a shell, leaf, footprint, or handprint by pushing the object into mud, clay, dough, or plaster of Paris. If using plaster of Paris, allow it to dry before removing the object.

Dough recipe

2 cups plain flour
1 cup salt
1 cup cold water

Method

Mix all the ingredients and knead them until smooth. Roll the dough out on a flat surface until it is about 1 centimetre thick. Make an impression in the dough and bake it in an oven (130°C or 250°F) for about 40 minutes or leave it outside in the sun until it's hard and dry.

- Display the impressions when they're dry.
- To help their understanding of the fossilisation process, explain to your students how the impressions are similar to fossils.

Suggested Student Activity 2

Investigation into Adaptation and Extinction

Objective:

For students, through observation and investigation, to gain insight into the survival of species

Your students could:

- Observe animals in a range of natural habitats, such as intertidal mudflats, reefs, forests, and inland waters.
- Discuss how each of these animals has adapted to their habitat and how they are able to live and function in it. Questions could include:
  - What environmental pressure does the animal face in this habitat?
  - Does it have any predators?
  - How does the animal's structural or behavioural features enable it to survive in this habitat and not become extinct as a species?

Example:

On an intertidal rock reef at low tide, the students find a limpet (shellfish) in the crack of a rock. They can see that, with the rise and fall of the tide, the animal must survive in both salt water and air. The limpet may face predation from birds at low tide and crabs and fish at high tide. This animal feeds on the algae found on the surrounding rocks.

To survive in this environment, the limpet has a large muscular foot so that it can hold on to the rock surface and not get washed away by the waves. It is found in the crack of a rock, where it can stay moist and not dry out.

It lives close to its food source, which helps its survival. It has a hard shell to reduce the chances of predation by birds and crabs. All of these adaptations increase the probability of survival for this animal, enabling it to reach maturity and to reproduce and so further the survival of the species.

Template for Field Activity

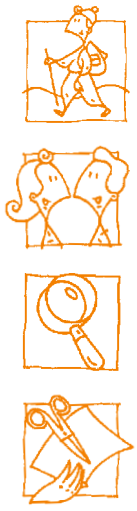
Animal found	Picture	Structural features	Behavioural features	Advantages of features for survival
Limpet		• Hard shell • Foot muscle • Triangle shape	• Hides from sun • Lives near food	• Hard shell to protect from predators • Large muscular foot to hold on to rocks

Suggested Student Activity 3

Significance of a Local Habitat or Heritage Site

Objective:

For students to gain an understanding of the changes that have taken place at a significant local habitat or heritage site



Your students could:

- Identify a local heritage site they are familiar with and, if possible, visit the site to become more familiar with its unique features.
- Compile a detailed assessment of its current condition, noting the existence of flora and fauna (in natural sites), amenities, paths, tourist facilities, seating, and any other features considered to be important.
- Formulate a series of questions to ask older members of the community or other people with an in-depth understanding of the history of the heritage site. These questions need to focus on whether there has been any damage to the site or a decline in native species of fauna and flora at the site. The students or the school need to contact prospective interviewees. The interviews could be recorded.
- Use the responses and draw conclusions as to how or why the site has been degraded (for example, by vandalism, the introduction of pests, trampling, or non-native species).
- Publish the results of their findings.
- Discuss each other's findings and produce a plan of action that highlights the threats to the site and recommends various ways to address these threats.
- Send copies of the plan of action to the stakeholders, including members of local government and the community.

Questions that the students could ask in their interviews include:

- How long have you or your family lived in this area?
- How was the site managed or preserved in years gone by, for example, twenty, ten, or five years ago?
- What is your fondest recollection of the site?
- How does that compare with today?
- If your recollection has not altered, what changes have you seen take place in the heritage site?
- Do you think the changes have had a negative or positive effect on the site?
- If the changes have been significant, what or who, in your opinion, has been responsible for the changes?
- What threats, if any, face this heritage site?
- In your opinion, how should the site be managed or protected in the future?
- Who, in your opinion, is responsible for this protection, and how will it be achieved?

Skull and jaw of the extinct short-faced kangaroo, *Sthenurus occidentalis*. After surviving the fall into the cave, it crawled off and perished.

The short-faced kangaroo stood no taller than a modern grey kangaroo but was much more robust. It was heavier in build and had a strong, short tail. The word "Sthenurus" means "strong-tailed". The fossil evidence of bones and teeth suggests that this kangaroo was a leaf-eating animal different from the fast-moving, grazing kangaroos of today.

This creature was about the size of a pygmy hippopotamus and possibly had many similar traits. Probably best described as a swamp cow, this marsupial with a backwards-facing pouch is called *Zygomaturus trilobus*.

Wonambi is an Aboriginal word that means "rainbow serpent", and as the snake was first discovered in Naracoorte, it was given the name *Wonambi naracoortensis*.

It is seen as a true Gondwanan relic as it was more closely related to the snakes of South America and Africa than to the constrictors of Papua New Guinea and northern Australia.

From the skeleton of *W. naracoortensis*, it appears that this snake would have killed by wrapping its large body around its prey, gradually tightening its coils until the animal died. It is likely that *W. naracoortensis* relied on its weight to suffocate, rather than crush, its prey. A model of *W. naracoortensis* is displayed in the foyer of the interpretive centre. It is here that the journey back in time begins. Computer-animated recreations of some of the 113 species of animals found in the caves are on display in a darkened setting that depicts the environment as it may have appeared over two hundred thousand years ago.

Procoptodon goliah, the largest known leaf-eating kangaroo, was able to reach leaves as high as 3 metres from the ground by standing on its huge, single toe.

This "marsupial lion", *Thylacoleo carnifex*, was the largest mammalian predator in Australia. On its powerful front legs, it possessed possum-like fingers and a thumb with a retractable claw. The skull has large teeth at the front and a small, bony recess behind the eye that stops the eyes from popping out when the animal exerts its powerful biting force. Both of these animals can be seen on display in the Wonambi Fossil Centre.

Photos: Steve Bourne

Suggested Student Activity 4

Megafauna Mystery

Objective:

For students to become more aware of the physical appearance of the megafauna found fossilised in the Naracoorte Caves and link their unique characteristics to existing species

The Connections between Fossils and Their Living Relatives

Structural features can be used to suggest the relationships between fossil species and living species. However, other information is needed to help determine whether the relationships suggested are actually possible.

For the many fossil species that have no direct modern counterpart, no linkages can be devised between the fossil and a living relative. However, useful deductions can still be made about this kind of fossil organism, such as where it lived, what it ate, and how it moved. For example, a streamlined shape might suggest that the organism moved through water.

Your students could:

- Read and discuss "What am I?"

  What am I?
  I lived in the Pleistocene era.
  I am the largest discovered marsupial that ever lived.
  I have a large, rounded body.
  I have four legs.
  I am covered with fur.
  I have a strange, rounded nose.
  I look like an enlarged wombat.
  What am I?

  I am a *Diprotodon australis*.

- Write and share with the class their own "What am I?" megafauna. (For this, they could use the images contained in this unit.)
- Play a "What am I?" game as a class.
  1. The name of an animal is assigned to each of three contestants, who are unaware of what animal they are.
  2. The contestants take turns in asking the rest of the class closed questions (requiring a "yes" or "no" answer) that are designed to reveal information about their animal. If a contestant asks a question and gets a "no" answer from the audience, it is then the next contestant's turn to ask a question about their animal.
  3. If the contestant gets a "yes" answer from the audience, they continue to ask questions until they get a "no" answer.
  4. The first person to correctly guess their assigned animal wins the game.

Suggested Student Activity 5

Endangered, Extinct, or Fossilised?

Objective:

For students to identify indigenous flora or fauna from their own country that may be endangered, extinct, or fossilised

Your students could:

- Find out and discuss the meaning of the words “endangered”, “extinct”, and “fossilised”.
- Complete the student activity sheet entitled Endangered, Extinct, or Fossilised?

Endangered, Extinct, or Fossilised?

Country	Endangered	Extinct	Fossilised
Australia	Northern hairy-nosed wombat Green turtle Tree frog	Tasmanian tiger	*Diprotodon australis*
New Zealand	Kiwi Black robin	Moa Huia	Haast's eagle

Suggested Student Activity 6

Extension Options

Objective:

For students to improve their knowledge of Australia's megafauna by undertaking one or more extension activities





Your students could:

- Construct scale models of various animals found in the Naracoorte Caves.
- Make a jigsaw puzzle featuring an animal found in the Naracoorte Caves.
- Study the Pleistocene era of their local area or their country.
- Visit a fossil site.
- Investigate how a fossil site could be protected in the future.
- Discuss ways in which animals have become fossilised, including how they may have been deposited in the rock.
- Design a poster promoting responsible tourism to a known fossil site and providing behavioural guidelines for tourists visiting this site.
- Prepare a role play of a meeting held to determine the preservation, tourism needs, and agricultural needs of the Naracoorte Caves area prior to its World Heritage listing. Present all sides and arguments, including, for example, farmers who have lived and worked on the land for many generations, researchers and scientists, tourism developers, and conservationists. Define the differences between the decision-making processes prior to World Heritage nomination and those being used today.
- Investigate how a heritage site has changed since European settlement by, for example, researching family histories in the area and previous uses for the area.
- Investigate and describe the unique characteristics of the various fossilisation processes.
- Discuss whether tourism, population growth, agriculture, and habitat destruction will affect the future prospects of such sites as those found in Naracoorte and Riversleigh or the likelihood of similar sites being established in the future.
- Provide examples of safeguards that could be implemented to ensure the preservation of fossil sites.
- Investigate and describe how human settlement could adversely affect fossil sites, for example, through habitat destruction, agriculture, population growth, and tourism.
- Present an argument in favour of listing a local natural heritage site, such as the Naracoorte Caves, as a World Heritage Site.

Glossary

Counterpart	An object, animal, or person that closely resembles another
Dreamtime	An Aboriginal concept marking the beginning of time and explaining where the Aboriginal people and their world come from
Echinoderms	Marine animals with hard outer bodies, such as starfish and sea urchins
Evolution	Changes in living things over time
Fire-stick farming	Using a smouldering stick carried from camp to camp to start fires and so manage grasslands and assist with the capture of animals
Fossil	The preserved remains of an organism or of direct evidence of its presence
Geology	The science that looks at the physical structure of the Earth, for example, rocks, and the changes that have taken place or are taking place
Glacial	Produced by the pressure of ice
Gondwanaland	The land mass that once linked the five main continental regions
Ice age	The period of glaciation during the Pleistocene epoch
Marsupial	A mammal characterised by having a pouch in which it carries its young
Megafauna	Huge animals
Miocene	An epoch of the Tertiary period preceding the Pliocene epoch
Molluscs	Simple animals without vertebrae that mostly live in the sea, such as squid, clams, snails, and oysters
Oligocene	Between the Miocene and the Ecocene
Organism	Any form of animal or plant life
Palaeontology	The study of fossils and the evolutionary relationships that led to their formation
Pleistocene	The division of time immediately following the Pliocene epoch, which is the most recent division of the Tertiary period
Preserved	Kept in existence or retained
Sponges	Simple marine animals that feed by filtering water
Stalactites	Formations that hang from the roof of a cave; formed by dripping water
Stalagmites	Formations that grow up from the floor of a cave; formed by dripping water
Straws	Very thin stalactites
Traces	Marks or evidence of the former presence of an object
Terrestrial	Living on land
Vertebrates	Animals with a backbone
Wild caves	Caves without visitor facilities

Heritage and Identity

Authors:

Pulotu Rika and Jiutatia Kubuabola

Fiji

Intended age group: 10–13 years

Category: Personal and local heritage – natural and cultural

A Fijian Custom

The first born ...

There are many customs accorded to the first-born child in a Fijian family. One such custom is when the umbilical cord falls off. Fijians take much pride in customs such as this one because it is often accompanied with a sense of goodwill and mana to the child and the family. The custom may vary a little from province to province.

When the umbilical cord falls off, the child's grandfather or uncles make vakalolo, a Fijian dessert made from dalo and covered in sweet caramel sauce. This is then distributed to the women, children, and relatives in the village.

The umbilical cord is kept and buried together with a sprouting coconut. Fijians believe that burying the cord means that the child will always have a link with his or her vanua and kinsmen, regardless of where he or she goes.

In fact, the restless spirit and behaviour of children is often attributed to the umbilical cord not being buried as Fijian custom demands.

Unit Abstract

This unit focuses on heritage in relation to identity. Understanding heritage can help us to become aware of our own roots and of our cultural and social identities. A closer look at all these concepts will help us to learn about people's beliefs, values, and knowledge and the civilisations that created them (people's cultural heritage). It also tells us about their natural heritage and cultural landscapes.

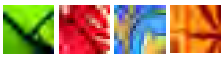
Cultural and natural sites form the environments on which we all depend, psychologically, religiously, educationally, and economically. The destruction of these environments or even their deterioration could be harmful to the survival of our identity, our nations, and our planet.

This unit has four student activities, which can be used either as stand-alone activities or in the order in which they are presented.

Teachers are encouraged to use, adapt, and extend these activities.

Photo on section cover source: © WWF Fiji

Photo: Meg Gawler



Relevant Curriculum Links

Science	Research selected issues affecting the country's environment. Investigate the factors that affect a living process.
Social studies	Investigate the implications of changes to places, for both people and the environment.
Language	Interpret, analyse, and produce written and observed data as well as using appropriate technologies; retrieve, select, and interpret information from a variety of sources. Present information accurately and coherently.
The arts	Investigate how the visual arts or the oral arts intersect with cultural and/or natural heritage

Unit Objectives

Knowledge

To help students develop knowledge and understanding of:

- Heritage as the embodiment of stability in a rapidly changing world
- The specificity of each culture and the notion that all cultures are part of human civilisation
- The interactions and interdependence between nature and culture and between cultures
- Cultural diversity as a treasure of humanity.

Attitudes

To encourage students to:

- Appreciate their culture, their history, and their country
- Identify their society's prevailing values and the roots of these values
- Cultivate respect for cultures
- Develop a sense of shared responsibility for the world's cultural and natural heritage.

Skills

To help students develop their ability to:

- Research their origins
- Discuss issues in an open and democratic manner
- Assume leadership in support of heritage conservation.

Suggested Student Activity 1

Awareness Raising

Objective:

To encourage each student's active involvement in support of heritage conservation

Your students could:

- Explain and expand on their understanding of the following key words as well as their everyday equivalents if possible:
  - awareness
  - local and World Heritage
  - conservation.
- Choose an area near the school that they can study, photograph, research, and explore and that is a clearly defined area that they have an interest in. Ask them to:
  - list all the important things in the area
  - draw a map of the area with all its important features marked clearly
  - identify the boundaries of the area
  - take a walk around the area and check each map for accuracy.
  - Either individually or in groups, write down their conservation proposal, based on their discussion of the key words above.
  - Discuss how they could contribute to making the members of their family and the local community more aware of family, local, national, regional, and World Heritage issues.

The student activity sheet that follows could help with this exercise.

Student Activity Sheet

Awareness Raising

- Find and display photographs of some local, national, and World Heritage sites and either name the sites or name the countries where the sites are located.
- List items that you view as heritage and then sort them under the headings given in the table below.

Item	Personal	Local	National	World
e.g., a person's name				

They could prepare a proposal to designate a site as a local or national heritage site, using the information in the above table as a basis. They could also use the headings given below.

Sample Proposal:

Aims and Objectives

Methodology

Contents

- Title page
- Acknowledgments
- Table of Contents
- Introduction
- Methodology
- Findings
- Conclusion
- Recommendations
- Bibliography
- Appendices

They could discuss their proposal with others in their class and then present it to other classes.

Suggested Student Activity 2

Heritage Trail

Objective:

To provide students with an opportunity to be adventurous and creative and to become more aware of their local environment

Your students could follow the steps below to make a heritage trail:

1. With your help, they could discuss the type of trail they could use, for example, a cultural heritage trail, a natural heritage trail, an urban heritage trail, a flower trail, or a tree trail. They could consider using a still and/or video camera to record some features of the trail.
2. Once they've decided on the theme of their heritage trail, you could give the class some site maps. They could study these together to familiarise themselves with the area.
3. They could map out their trail and make some "on the spot" inspections.
4. Once the trail has been planned and tested, they could prepare a booklet about it to help focus attention on its special features.
5. You could plan a special day for a trail hike to help further develop their sensory capacities and familiarise them with the trail.
6. Depending on the impact of the trail on the students, you could propose other trail hikes to which they might invite other students or members of their community.

Suggested Student Activity 3

A Village's Future – to Move or Not to Move

Objective:

To assist students to better understand the impacts of development on heritage conservation

Navala Village

Navala is a Fijian village located in the interior of Ba, about 20 kilometres from Ba town. The present village site is protected by ridges and mountains.

The village has a unique setting, and it reminds us of how village sites were chosen in the past to provide fortresses during tribal wars.

Navala is perhaps the only Fijian village that still has Fijian bures.

Your students could:

- Organise a role play based on the following hypothetical situation.

A Development Plan for Your Village

The local authority has drafted a development plan concerning your village, where your people have lived for many generations. The government, through its rural development programme, wants to develop the roads and communication systems on the island in the hope of improving the people's quality of life. The village is situated on a stretch of land that is needed for a road. The current village site is very old, and it includes some traditional homes as well as some burial grounds and other special features, including places that are of significance to the local people.

For this reason, the houses, the features, the burial grounds, the trees, the plants, and the whole environment are an important part of your identity. However, the island, as seen by some people, has been lagging behind in the modernisation process. The students are still walking long distances to school, and the villagers are still living a traditional or subsistence life.

If the development plan is implemented, all the traditional homes, burial grounds, special places and features, fauna, and flora will be destroyed, mainly to provide for the construction of roads and new homes. These changes would mean a change of lifestyle for the people.

Some members of the village, particularly the young, are in favour of the proposed development plan, but other members are against it.

Today the different parties concerned are to meet and hold a debate to decide whether or not the plan is to be implemented.

- Divide into five groups representing the following:
  - government officials from the Rural Development Office, who are proposing the development
  - the villagers who are in favour of the proposed development plan
  - the villagers who are against the proposed development plan
  - the villagers who now live in the traditional urban areas
  - experts, who include historians, environmentalists, Land-use Office representatives, and Provincial Office representatives.
- Elect a chairperson and two assistants to lead the debate and two recorders to write a report of the meeting.
- Reflect on and discuss similar threats to World Heritage Sites.

Suggested Student Activity 4

Who Am I?

Objective:

To assist students to reflect on their personal and family identities

Bula vinaka. I am a Fijian boy. My name is Maciu Talemailepanoni Lesikivuda Rika. Very briefly, I'll try to explain how I got my name.

In the Fijian culture, it was appropriate for me to be named after my grandfather because I am the first boy born of my dad, who is the eldest of the four brothers in his family of eight.

Maciu, my grandfather, was a Methodist Church Minister. I was born in 1982, soon after his return from Lebanon, where he served for one year as the chaplain of the Fiji Army contingent, thus the name "Talemailepanoni". Upon his return, his next posting was to the Vuda Circuit near Lautoka, and "Lesikivuda" is indicative of this posting. Of course, Rika is my surname.

So, in a way, my name tells the story of my grandfather's return journey from his tour of duty in Lebanon and being posted to the Vuda Circuit.

Explanatory Note

Fijian Word	English Equivalent or Meaning
Maciu	Matthew
Lesikivuda	Getting a transfer to Vuda (a Fijian village on the island of Viti Levu)
Talemailepanoni	Returned from Lebanon
Rika	Jump

Names as Identity Carriers

Your students could:

- With the help of their parents and friends and the teacher, trace the meaning of their personal names as well as their family names.
- Explain how their personal names were chosen and by whom and respond to the following questions:
  - How do you feel about your name?
  - Does the name affect your identity?
  - Is it a common name in your country? (If they say yes, they could explain why.)
  - Is your name connected in any way to an important cultural site or event?
  - Is it unusual?
  - Was it given in memory of a certain person, place, or event?
  - Would you like to continue with your family name? Why?
  - Are there traditions or rituals related to naming a person, particularly a newborn baby, where you live? What are these?

Glossary

Bure	A traditional Fijian house with a thatched roof
Dalo	The taro plant
Vakalolo	A Fijian dessert made from dalo
Vanua	A land or place

National Heritage and Cultural Identity

Authors:

Pulotu Rika and Jiutatia Kubuabola

Fiji

Intended age group: 11–15 years

Category: National heritage – natural and cultural

Unit Abstract

Although cultures are diverse, in many countries today there are certain natural features that can be viewed as our common heritage.

Their destruction or deterioration could be harmful to the survival of our collective national or global heritage.

The student activities can be used as stand-alone activities or as a complete unit.

Photo on section cover
source: © WWF Fiji

Photo: Catherine Holloway

Relevant Curriculum Links

Science	Research selected issues affecting the country's environment. Investigate factors that affect a living process.
Social studies	Research the implications of changes to places, for both people and the environment.
Language	Interpret, analyse, and produce written and observed data as well as using appropriate technologies; retrieve, select, and interpret information from a variety of sources. Present information accurately and coherently.
The arts	Investigate how the visual arts, crafts, and oral traditions represent heritage and build local or Pacific identity.

Unit Objectives

Knowledge

To help students develop knowledge and understanding of:

- Heritage as the embodiment of stability in a rapidly changing world
- The specificity of each culture and the notion that all cultures evolve differently in response to their environment
- The interaction and interdependence between nature and culture and between cultures
- Cultures as part of human civilisation
- Cultural diversity as a treasure of humanity.

Attitudes

To encourage students to:

- Appreciate their culture, their history, and their country
- Identify their society's prevailing values and the roots of these values
- Cultivate respect for all cultures
- Develop a sense of shared responsibility for the world's cultural and natural heritage.

Skills

To help students develop their ability to:

- Research their origins
- Discuss issues in an open and democratic manner
- Assume leadership in support of heritage conservation.

Suggested Student Activity 1

An Example of Fiji's National Heritage: The Sigatoka Sand Dunes National Park

Objective:

To assist students to understand the significance of national heritage

The Sigatoka Sand Dunes National Park

A Sigatoka sand dune.

Source: National Trust for Fiji

The Sigatoka Sand Dunes were designated as Fiji's first national park in 1989. They are located directly west of the mouth of the Sigatoka River and cover an area of 650 acres. This interesting landform includes historical, ecological, and recreational features.

The heavy surf along the shoreline of the dunes has contributed to the dunes' formation and is also an important feature of the park.

Sand dunes are rare in tropical islands, where reefs are prevalent. Dunes the size of those in the park are unique in Fiji.

The average height of the dunes is 20 metres, but the dunes at the western end of the park have a maximum height of 50 metres.

The park has yielded remains of Lapita pottery dating back possibly three thousand years. Archaeological excavations on the eastern end of the dunes have revealed a unique sample of ancient Fijian civilisation. The evidence indicates that people have lived in the dunes for about 1800 years.

It is believed that the first settlers carried with them a wide range of food, plants, pigs, and a distinctive style of pottery known as Lapita ware. This pottery is generally associated with people who had well-developed skills in navigation and building and were farmers. From Fiji, the Lapita culture was carried to Tonga and Sāmoa, where the first distinctively Polynesian cultures evolved.

In addition to the rich geomorphologic and ecological attributes the park offers, the dunes are also the location of one of Fiji's earliest recorded prehistoric sites and contain a wealth of Fijian material culture. At the eastern end of the dunes is a substantial burial ground.

These important features of the park are under threat from squatters, grazing livestock, and the removal of sand. As a result, an extensive management plan has been developed by the National Trust for Fiji to ensure that this important national heritage site will be preserved to be enjoyed by everyone.

The western part of the dunes provides a typical example of a natural Fijian beach forest, with many casuarina and pandanus species. About 165 recorded plant species grow there, and they support a small population of reptiles and migrating birds.

The park can also be a popular surfing site, owing to the absence of a reef and an abundance of huge waves, which are ideal for this sport.

Your students could prepare responses to the following questions:

- What is a natural heritage site?
- Why are natural heritage sites necessary?
- What threats are there to the Sigatoka Sand Dunes National Park?
- What can be done to protect and enhance the Sigatoka site?
- Could the Sigatoka sand dunes be considered as a mixed site with both natural and cultural heritage value?
- What are three special features of the park and why are they important?

They could then:

- Find out more about Lapita pottery.
- Plan a trip to a national park or beach.
- Map how the Lapita culture travelled through the Pacific.

Suggested Student Activity 2

The Yadua Taba Crested Iguana Sanctuary

Objective:

To understand the significance of the efforts made to protect endangered species

Yadua Taba wildlife sanctuary.

Source: National Trust for Fiji

Yadua Taba was established as a wildlife sanctuary in 1980. This tiny island of 70 hectares is located north-west of Nabouwalu on Vanua Levu.

The island is home to one of the world's rarest and, to some, the world's most attractive lizard, the crested iguana, *Brachylopus vitiensis*, known as vokai in Fiji.

The National Trust for Fiji had to secure a management agreement for the uninhabited island, where it established Fiji's first wildlife sanctuary because of the rarity of the vokai and the public interest in it. Fiji's iguana population is a remnant of one that was once widespread throughout the Pacific.

The crested iguana has also been found on the other islands of Yasawa and those in the Mamanuca Group. The security of the iguanas on these islands is threatened by extensive human activity.

Yadua Taba is separated from neighbouring inhabited Yadua Island by only 200 metres of shallow water, and so the iguana habitat is very vulnerable to predators. A goat population on yadua Taba is another major problem.

To help the National Trust protect this species in their natural habitat, the Honolulu Zoological Society agreed in 1990 to donate funds for the management of the sanctuary for a period of five years. Sydney's Taronga Park Zoo has also helped by researching the survival of the iguana. A volunteer on the island helps with this research. The crested iguana's survival under National Trust management now seems assured.

Your students could:

- Listen to or read the story *Vuki and the Vokai*,* which is enclosed with this kit.
- List the significant features of the crested iguana and suggest why this species should be protected.
- Draw and colour a crested iguana.
- Find out how an iguana is different from a gecko or a lizard.
- Discuss what they could do to help protect the iguanas.
- Plan, organise, and put into action their contribution.

Extension Work

Your students could:

- Find out what species are endangered in their country and whether these species are found in other countries as well.
- Investigate to find out whether the smuggling of endangered species is a problem in their country.

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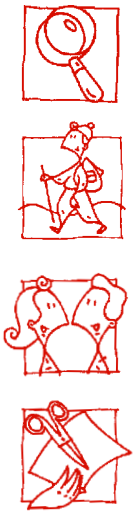
Suggested Student Activity 3

Garrick Memorial Forest Reserve

Objective:

To understand the reasons why reserves of native fauna and flora are established



The Garrick Memorial Forest Reserve was donated to the National Trust for Fiji in 1984 by the Garrick family as a contribution towards the preservation of Fiji's native forests. The area is a forest reserve of significant ecological value and is a first for Fiji in its effort to protect tropical rainforests. The reserve also meets the requirements set by international bodies.

The reserve is located 7 kilometres inland from Navua Town in south-east Viti Levu. It covers an area of 429 hectares of native forest.

According to reports made on the reserve, birds and animals are found in abundance in the area, and the villagers close to the reserve catch fish and prawns in the streams that flow through it.

In 1989, when funds were available to survey the area and to enable forest reserve management plans to be developed, it was reported that nearly a third of the reserve had been brutally logged by neighbouring landowners.

This led to a public outcry, confrontation, and legal action before the problem was resolved.

To ensure that this valuable piece of Fiji's natural heritage is protected, the National Trust for Fiji has started work on a rehabilitation plan with the assistance of the landowners. Comprehensive regrowth and reforestation programmes are now in place. The success of the rehabilitation programmes can be an example to all of what can be achieved to compensate for the losses caused by logging.

A forest ranger now looks after the site, and the National Trust is trying its best to make sure that this reserve is conserved and protected.

The National Trust plans to develop the site into a forest park.

Your students could:

- List some of the benefits that the villagers close to the reserve would receive.
- Organise a class debate about logging and deforestation.
- Invite a guest speaker from the departments of Environment or Forestry to speak to the class on the importance of establishing forest parks.
- Find out more about their own national natural heritage.
- Organise a field trip to a national natural heritage site.
- Find out why it is so important to plan and manage forest resources.
- Find out how the integrity of a site can and should be protected.

Glossary

Casuarina	A common coastal tree
Lapita	An early Pacific culture noted for its distinctive style of pottery
Native forest	A forest area made up of trees native to a particular country or region
Pandanus	The "screw pine", a coastal tree found throughout the Pacific and noted for its fruit and distinctive leaves
Vokai	The Fijian name for the crested iguana

Heritage and Environment

Authors:

Jiutatia Kubuabola and Pulotu Rika

Fiji

Intended age group: 12–16 years

Category: National heritage – natural and cultural

Unit Abstract

This unit looks at how the conservation of heritage can make a significant contribution to the protection of the environment, both in its cultural and natural diversity and in the interactions between people and the environment.

Heritage conservation is helping to address some of today's key environmental concerns, particularly the increase in the number of threatened and extinct plant and animal species and the resultant decline in biodiversity.

The student activities can be used as stand-alone activities or be followed through as a whole unit.

Photo on section cover source: Photo Disc, Signature Series 28, Panoramic Views

Relevant Curriculum Links

Science	Research selected issues affecting the country's environment. Investigate the factors that affect a living process.
Social studies	Investigate the implications of changes to places, for both people and the environment.
Language	Interpret, analyse, and produce written and observed data as well as using appropriate technologies; retrieve, select, and interpret information from a variety of sources. Present information accurately and coherently.
The arts	Investigate how the visual arts or the oral arts interact with cultural and/or natural heritage.

Unit Objectives

Knowledge

To help students develop knowledge and understanding of:

- The natural and cultural environments and the interactions between people and the environment
- World Heritage Sites as protected areas that are essential for the conservation of biodiversity and the protection of threatened plant and animal species
- The World Heritage Convention as an important contributor to collective international action to protect the environment.

Attitudes

To encourage students to:

- Develop a strong conservation ethic and take responsibility for the environment
- Approach their life in a sustainable way to protect species and ecosystem diversity (biodiversity) and to assist future generations to meet their own needs.

Skills

To help students develop their ability to:

- Participate in environmental protection, particularly local and World Heritage conservation
- Participate in the process of ecologically sustainable development for the future of the planet and its people
- Provide leadership in local and World Heritage conservation.

Suggested Student Activity 1

Ecosystems and Landforms

Objective:

To assist students to become more aware of the different types of ecosystems and natural heritage sites

Your students could:

- Show and discuss photographs of some ecosystems or landforms, pointing out, for example:
  - their main characteristics or features
  - the types of plant and animal species found there.
- Find out whether such ecosystems or landforms exist in their local area.
- Identify, select, and classify twenty World Heritage natural sites into the following categories:
  - forests
  - coastal or marine environments
  - mountains.
- Discuss their findings and identify heritage sites in their own country that are of equal importance to them.
- Identify and discuss examples from the World Heritage List of:
  - coral reefs
  - forests
  - islands
  - deserts
  - wetlands
  - mountains.

Suggested Student Activity 2

Wetlands: Kuta Growing in Fiji

Objective:

To assist students to understand the importance of the conservation methods used for kuta and its cultural values

Background on Wetlands

The 1971 Ramsar Convention on Wetlands is an intergovernmental treaty that provides the framework for international co-operation for the conservation and wise use of wetlands and their resources.

There are currently (in December 2003) 138 contracting parties to the Convention, with 1364 wetland sites, totalling 120.4 million hectares, included in the Ramsar List of Wetlands of International Importance.

For further information, visit the Ramsar website at www.ramsar.org

In Fiji the areas covered by wetlands have not been well documented. They represent ecosystems that are unique in their plant and animal composition and in the interaction between plants and animals.

Wetlands in Fiji.

Source: WWF, Fiji

The wetlands include lakes, reservoirs, rivers, and mangrove areas. Some are freshwater areas and are habitats for kuta, *Eleocharis dulcis*. The freshwater wetlands are valued by the weaving communities in Bua, Macuata, and Cakaudrove.

Kuta Growing in Fiji

In Fiji, a freshwater plant known locally as kuta has been used for hundreds of years for making beautiful woven mats and other handicrafts.

Over the past few decades, the wetlands that sustain kuta have been disappearing for a number of reasons. These include deforestation, land reclamation for agriculture, and, to some extent, the local people's lack of interest and knowledge.

Although kuta can be found in other parts of Fiji, the significant areas are around the provinces of Bua, Cakaudrove, and Macuata. Mats woven from kuta are of cultural significance to the local people as well as to the Fijian people as a whole. Interestingly, kuta is also valued by the Tongan people.

Supplies of kuta have been declining, and concerned groups have started to take action. The Worldwide Fund for Nature (WWF), together with other organisations, has been working with the communities in the different growing areas. Their work has included community awareness and resource assessment; pond restoration; researching the kuta profile; the harvesting, preparation, storage, and weaving of kuta; and the marketability of products made from kuta.

Your students could research and prepare responses to the following:

- Do you have a wetland in your area?
- If you do, compare it with one of the wetlands in Fiji.
- Are the wetlands in your country disappearing? Why is this so?
- Do you think that involving the local community will help to protect and conserve a wetland area? Explain your answer.

Suggested Student Activity 3

Biodiversity in Crisis

Objective:

To help students understand the importance of, and the threats to, biodiversity

You and your students could:

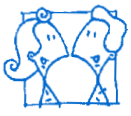
- Plan and conduct a field trip to a wetland where kuta (or some other locally significant plant) is growing to undertake a local biodiversity survey, that is, a census of the number of plants and animals living there.
- Document your findings using photographs, maps, and sketches.
- Collate and display your findings as a class activity and present these to the rest of the school and, if possible, to the students' parents as well.
- Make a list of the changes that could put pressure on the biodiversity of the local area. These could include:
  - habitat modifications such as clearing and/or draining of forests or wetlands for agriculture and clearing mangroves
  - the introduction of new species of plants and animals
  - pollution.
- Support the above list with relevant maps, photographs, or newspaper cuttings.
- Survey the community's views using questionnaires to find out whether any native birds, animals, or plants have become less common.
- Find out whether any conservation efforts have been undertaken already.
- Invite someone from the Department of Environment, or any other relevant organisation, to speak about the importance of conservation.

Suggested Student Activity 4

Celebrating Biodiversity – Making a Mural

Objective:

To assist students to consolidate some of their understandings about biodiversity



Your students could:

- Individually, or in small groups, make and display murals by following these steps:
  - choose a theme to reflect or capture the unique beauty and the rich value of Earth's diversity
  - use natural materials, such as leaves, shells, and dyes
  - incorporate man-made objects to show the impact of people's activities on the natural environment
  - display the murals in a prominent place.
- Consolidate the message(s) contained in the murals through role play.

Glossary

Kuta	A freshwater plant used for making woven mats and other items
Biodiversity	The variety of species in a community, ecosystem, or larger unit of habitat
Wetland	A low-lying area where the land is saturated with water

Heritage and a Culture of Peace

Authors:

Pulotu Rika and Lorima Voravora

Fiji

Intended age group: 10–15 years

Category: National heritage – cultural

Unit Abstract

This unit looks at heritage and the fostering of a culture of peace in the different contexts of our lives.

Peace calls for non-violent relationships, not only between countries but also between individuals, between social groups, between a country and its citizens, and between people and their environment.

Learning about the cultural and natural sites included in either the World Heritage List or a national heritage list should help us to understand the various facets of peace by reminding us of the magnificent creations of both nature and humanity. Many of these reflect our eternal aspirations to freedom, justice, mutual understanding and respect, and love and friendship; or, on the contrary, they provide important examples of human activity that we should strive to avoid in the future. They reflect our fundamental human rights and responsibilities, which are important ingredients for peace and development in terms of each individual, each society, and the world as a whole.

This unit has a number of student activities that can be used either as stand-alone activities or in the order in which they are presented.

Relevant Curriculum Links

Social studies	Understand and explain the different types of relationships that can exist between cultural groups and the ways in which cultural interaction can enrich communities and societies.
Language	Interpret, analyse, and produce written and observed data as well as using appropriate technologies; retrieve, select, and integrate information from a variety of sources. Present information accurately and coherently.
The arts	Apply knowledge of elements and principles for a range of art-making purposes, using conventions and a variety of mainly traditional techniques, tools, materials, processes, and procedures.

Unit Objectives

Knowledge

To help students develop their knowledge and understanding of:

- Heritage sites as a testimony of peace, human rights, and democracy
- The importance of racial non-discrimination, tolerance, and respect for all people and their cultures.

Attitudes

To encourage students to:

- Respect other people and their cultures and motivate them to search for peaceful conflict resolutions
- Co-operate in the spirit of solidarity in support of World Heritage conservation.

Skills

To help students to develop their ability to:

- Work together as a group
- Resolve conflicts peacefully among themselves and help others to learn about personal conflict resolution
- Participate democratically in political and civil life
- Contribute to UNESCO's World Heritage conservation effort.

Suggested Student Activity 1

Defining Peace and Heritage

Objective:

To help students to understand the relationships between peace and heritage better

You could write the word "peace" on the board, and the students could:

- Identify the equivalent of the word "peace" in their own language, explain its meanings, list as many English and/or vernacular terms as possible that can be associated with peace, and identify which terms are associated most frequently with it.
- Repeat the above exercise for the word "heritage" and make connections between the two words.

Sites That Symbolise Peace

Many World Heritage Sites reflect the fundamental values of peace and human rights, and intercultural co-operation has often ensured their conservation.

Likewise, at the local and national level, there are sites that symbolise peace by their scenery and/or their richness in plant and animal life.

Your students could:

- Identify such sites and discuss their location and importance.

Bigeye Trevally.

Source: © WWF Fiji

Photo: Catherine Holloway

Suggested Student Activity 2

Heritage and Peace in Your Community

Objective:

To have students reflect on natural and cultural heritage sites that symbolise peace

Your students could:

- Identify national or local heritage sites where peace treaties have been signed or that have symbolic value in terms of historic events.
- Bring to class whatever information they can collect about the sites.
- Express in a creative way (by writing, drawing, or painting) what they believe to be the messages from any of these sites.

Suggested Student Activity 3

Momi Bay Historic Park

Objective:

To help students to understand the significance of a historic place such as Momi Bay Historic Park

An American donated the 13-hectare Momi Bay site south-east of Nadi to the National Trust for Fiji in 1980.

The site has a commanding view of the surrounding coastline and reef. It contains the historic Momi Bay Battery, set up during World War II.

This site was established by the New Zealand 30th Battalion in 1941 because of its strategic importance overlooking the Wavula Passage.

The main features of the site are two large six-inch guns that are rumoured to have been used in the Boer War and in World War I before being sent from Britain to New Zealand and from there to Momi via Suva. Machine guns for anti-aircraft defence were also mounted at Momi Bay.

By August 1942, the New Zealand battalion was relieved at Momi by the US 148th Battalion. The site was manned until early 1944, when all Fiji's coastal batteries were closed. During the war, the Momi guns fired only once in anger. This was at a Royal New Zealand Navy ship that gave the wrong signal.

After hostilities ceased, the guns were dismantled by scrap collectors, except for the parts that were too heavy to carry.

Over the years, the site deteriorated. Only after the site had been donated did restoration and development work begin. It became the first trust site open to the public.

The site serves not only as a reminder of international co-operation during the war but also as an example of what a country should do to keep memories alive for both local and international visitors.

Your students could:

- Identify and discuss the significance of the Momi Bay Historic Park.
- Suggest why it is important to restore and protect such places of significance.
- Find out more about World Wars I and II.
- Suggest how we could help to bring about peace in our local community, our region, and the world.

Suggested Student Activity 4

Prejudice – a Threat to Peace

Objective:

To help students to work towards the elimination of intolerance and the promotion of intercultural learning and respect

Your students could:

- Express their feelings on some major international, regional, national, and local historical events that generate prejudice, intolerance, and discrimination.
- Discuss the effects of these historical events on the people and the country or countries as a whole.
- Determine a range of peaceful ways to resolve conflicts.
- Discuss the need to contribute towards ensuring a peaceful future by writing stories or poems, making drawings or posters, or composing songs or dances.
- Create a “peace corner” in the classroom.
- Identify a culture that interests them and find out more about it.
- Describe the identified culture and compare it with their own.
- Write up their findings as a report and present it to the class.

Suggested Student Activity 5

Fiji – a Rainbow of Cultures

Objective:

To help students towards a better understanding of the different cultures that can coexist in one nation

Your students could:

- Identify some of the ethnic groups that now make Fiji their home.
- Find out what term is usually given to a country like Fiji.
- List some other countries that have a similar population mix.
- Find out what each culture's contribution to the nation has been over the years.
- Discuss what "a rainbow of cultures" means.
- Choose a cultural group in their country that is different from their own and find out more about it.
- Present their findings to the class.
- Explain what causes conflict in their home, school, community, and country and in the world.
- Find out about practical ways in which people of different cultures can live together peacefully.
- Compose songs or dances that reflect peaceful, harmonious living.

A rich marine environment.

Source: © WWF Fiji

Photo: Catherine Holloway

Harakeke: A Symbol of a Pacific Nation

Author:

Robin Slow

New Zealand

Intended age group: 11–13 years

Category: Personal and local heritage – natural and cultural

The Beginning ...

Nothingness, Te Kore.
From the nothing came the beginning.
From Te Kore came Te Pō, the Night, the Great Night, the Dark Night, the Long Night, the Night to be Felt, and the Night Unseen.
Light came, at first no more than a glow-worm light.
Sudden Light, Te Rā, came and warmed the heavens.
Time and space was Ranginui.
Warmth and dust from the heavens created Papatūānuku, the Earth Mother.

Ranginui, Sky Father, held close to him Papatūānuku, Earth Mother.
Tāne Mahuta lay with his brothers between his parents. They were not the forms of humankind, except for Tū Matauenga. In complete darkness they lay, Tāne tucked under Ranginui's arm. When his father made the slightest of movements, Tāne glimpsed, ever so quickly, a wonderful light.

Lying on his mother, Papatūānuku, Tāne drew his knees up to his chest and placed his feet on his father. Slowly he pushed. The more he pushed, the more light shone through between his parents. The more light there was, the stronger Tāne became. With one final push, Tāne separated his parents.

The world was full of light.

With the light came the shadows of separation. The parents were separated forever from each other.

In the shadows was another brother, Tāwhiri Matea. He had a great love for his parents and was angry about what Tāne had done. He fought with his brothers, using the winds as his weapons. The brother Tangaroa of the oceans was beaten by large waves of white foam pushing against the land surface. Tū Matauenga struck out at all, reducing everything in front of him to an empty shell. Haumaietiketike protected what he could from the surface by placing them below the ground. Rongo Marareoa spent his time trying to heal the wounds created by the brothers' battle.

Deep in the womb of Papatūānuku lay Rūaumoko the unborn, the protector of fire and the Earth Shaker.

Everything is related and woven together. The human and the natural worlds are combined as one because Ranginui and Papatūānuku are the parents of all. People and other life forms are woven together by the strands of kinship. All creatures, plants, stones, rivers, and life forms are brothers and sisters and are part of each of us. We are one family within the Universe.

Source: School Journal
Part 3 Numer 1 2004, page 17

Photo: Elton Gregory

A Traditional Story

There was a beautiful patupaiarehe (fairy woman) who, while gathering seaweed to eat, met a young human man. In true manner, they fell in love, married, and had children.

Now this beautiful woman was an expert weaver. She could weave beautiful objects, from garments to mats. She wove at night and on misty cloud-filled days. In the morning, when the first light of dawn appeared, she would carefully fold up and cover her work. She was of the fairy people, and if the sunlight touched her work, her weaving would unwind itself and she would lose her skills.

The other women of the village wanted to learn how the fairy woman wove, and so they asked the tohunga (a wise, learned one) to create a karakia (prayer) that would keep her working after the sun had come up. This happened, and the fairy woman worked on into the day while the village women watched nearby, learning all that they could. Soon the fairy woman realised that she had been tricked. She sang a farewell lament to her husband and children. As she sang the lament, a cloud of mist came down and took her back to her mountain home, never to be with her husband and children again.

Today, many Māori women do not weave at night. Instead, they lay their work down and cover it when evening comes because they do not want their work to go to the darkness, just as the fairy woman's work should not have gone with the light.

Unit Abstract

This unit of work should assist students to look at their own environment and culture and identify a special feature (such as harakeke, *Phormium tenax*) that has a heritage value. It looks at viewing heritage through a natural feature with strong cultural aspects and a long history. By studying the plant harakeke and its special features, students will be able to look at aspects from heritage conservation, biodiversity, and traditional uses through to contemporary and cultural values.

Life would have been difficult for Māori in Aotearoa New Zealand if they had not had harakeke. It provided them with a material from which they could make clothing, homes (warmth and protection), fishing nets, containers, binders of all types, and medicines.

The flax trade was also very important to the Europeans who colonised Aotearoa New Zealand. A shipment of flax fibre was first sent to London in 1818. By 1830, a major flax trade had been established. It became the country's largest export until wool and frozen mutton became more dominant in the late 1800s.

The American Civil War created a demand for flax fibre, but it was not until 1868 that a flax stripper was invented. This machine eliminated the intense manual labour associated with the flax trade. By 1906, there were 240 flax mills in the country. However, after 1940, less than 1000 tons of flax was exported. Some flax was used in New Zealand, mainly for wool packs, but the last mill closed down in 1985.

Harakeke can be seen as a symbol of the bicultural aspects of New Zealand life.

Relevant Curriculum Links

The visual arts	Apply their knowledge of elements and principles as well as the use of traditional techniques, tools, and processes to compose images and make objects. Students could make and use a variety of materials. For example, they could weave tīpare, create muka, and make paper as well as using other forms of art, graphics, or photographs to create artworks. Investigate the functions of objects and images in past and present cultures and identify the contexts in which they are made, viewed, and valued.
Technology	Examine how people within specific technological areas carry out activities in particular ways, identify the nature of the issue, and explore feasible strategies to reach appropriate solutions.
Social studies	Become aware of their immediate heritage, both natural and cultural, within their local and national community and why the preservation and promotion of heritage is important.

You can find additional information about harakeke enclosed in this kit in the Christchurch City Council's Flax – harakeke *pamphlet and the* New Zealand Geographic *poster "Harakeke".*

Unit Objectives

Knowledge

To help students develop their knowledge and understanding of:

- The natural and cultural values of harakeke
- Interactions between people and the environment
- The protection of an icon that is essential for the conservation of biodiversity and of special plant and animal species.

Attitudes

To encourage students to:

- Develop a conservation ethic and take responsibility for their environment
- Ensure that local features are valued and maintained
- Understand the cultural values of a group of people within their own community who may have values that are different to their own
- Share their own values with others.

Skills

To help students to develop their ability to:

- Participate in the protection and care of a species of plant
- Use materials in a sustainable manner
- Create visual artworks that reflect the knowledge and attitudes that they have developed.

Rules for Handling Harakeke

- Do not cut harakeke in the rain.
- Leave three shoots when cutting the flax.
- Treat the material with respect at all times.
- Never step over harakeke or tread on it when it's being used by a weaver.
- Return all your waste material to the compost.
- Do not eat or drink when working with harakeke.
- Do not place your hands in your mouth or near your eyes when working with harakeke.
- Wash your hands when you've finished working.
- When you have completed your first woven article, you must give it to someone else. The second one you may keep, but the third one you must use to teach another person with. (You need not give away your first article until you've finished the second one.)

Suggested Student Activity 1

Location and Background

Objectives:

To have the students:

- Record the plant by photographing, drawing, or sketching samples that they have observed
- Locate, observe, and record the different life forms that use the plant for survival
- Become aware of the community's commitment to the upkeep and maintenance of the area
- Understand the special features of the plant, its historical context, and the continuing importance of the plant as a spiritual connector for some people.

Site Visit

Take the students to a site where harakeke grows. This could be in the school grounds or in a special area (a pā harakeke). Observe the physical features of the site. Make drawings and take photographs for future reference.

Your students could:

- Meet members of a local community weaving group, who could speak about how they tend the plants and cut the harakeke for weaving. The students may have the opportunity to participate in this process.
- Meet a Department of Conservation officer, who could speak about his or her role in looking after the area.

- Record the overall form of the plant in a photograph or drawing, including details of its leaf fans, flowers, and stalks and any life forms they find on it.
- Listen to a weaver of harakeke, who could explain how to prepare muka and its different qualities, explain how to prepare the material for weaving, and suggest a simple activity that the students could try for themselves.

After the Site Visit

Your students could:

- Use their observations, drawings, and photographs to extend their own art or design work by making a picture, drawing a diagram, or creating a pamphlet.
- Create a computer-generated or cut-and-paste, hand-produced pamphlet to:
  - inform others about the special site
  - instruct others how to care for an individual plant
  - inform others about the life forms found on the harakeke plant.
- Draw the plant and label it in English and Māori.

Suggested Student Activity 2

Māori Proverb/Whakatauākī

Objective:

To assist students to recognise symbolic messages

Hutia te rito o te harakeke
Kei whea te kōmako e kō?

If you cut the baby flax,
Then where will the bellbird sing?

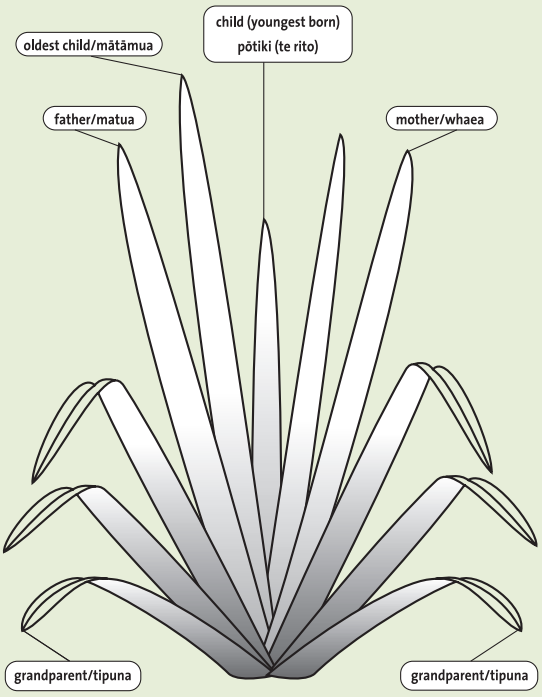
Whakatauākī
Proverb

Explanation: *If the centre shoot (baby) of the plant is cut, the new flower will not form and grow. The bellbird and the tūī will not be able to feed from the nectar.*

Further whakatauākī could include:

Aitia te wahine i roto te pā harakeke.
Bond with the woman who works with flax (for she will prosper).

Tungia te ururoa, kia tupu whakarito te tupu a te harakeke.
Burn the undergrowth so the flax will shoot up. (Clear what is bad, and the good will flourish.)



Source: Relationships Whakawhanaungatanga
© Crown 2003

Illustration: Phillip Paea

Harakeke plant

Note: The labelled picture and the above whakatauākī will assist your students to see the symbolic message contained within. The harakeke bush stands for the people in their environment in Aotearoa. We must look after the centre, the rito, and protect it, with the family standing on either side. The rito must stand tall and flower so that the bird will sing.

Suggested Student Activity 3

The Uses of Harakeke

Objective:

To assist students to list the past and present uses of harakeke

The list could include the following:

Present

- Landscaping
- Providing food for birds
- Making rope and string
- Making kete
- Making cloaks
- Making paper
- Creating artworks (from woven costumes through to sculpture and textural surfaces)
- Making medicines

Past

- Making clothing, from fine cloaks through to raincloaks
- Making footwear
- Making face powder (with the pollen)
- Constructing buildings
- Building waka and rafts (with the kōrari used as floaters)
- Creating tools and implements from chisels to string games (from moari) and weapons
- Making fishing nets
- Weaving kete and most other woven articles
- Making medicines
- Trading
- Making rope, string, and twine
- Making wool bags
- Making stuffing for furniture

Suggested Student Activity 4

Marae Visits

Objective:

To plan a visit to the local marae

This would allow your students to see, work in, and learn from a marae base while staying on the marae.




Marae Visit

The following background information and protocol is for visits to Onetahua Marae, Tākaka. Onetahua Marae is situated in the Pōhara Valley about 5 kilometres from Tākaka.

Before attending, your students could:

- Learn the correct tikanga and kawa for visiting the marae.
- Prepare for a pōwhiri (a welcome ceremony) and practise a waiata (a song) in support of a student who will be speaking for them in reply to the greeting by the tangata whenua (the local people of the marae).
- Remember that the speeches and songs are performed in Māori and that after the speeches, kai (food) is always served.
- Create a menu and complete some preparation.
- Listen to a presentation by a local weaver, who could visit the classroom with samples of their work.

The staff could:

- Write letters home to the parents asking permission for their children to stay on the marae and inviting them to join in on the understanding that they will follow marae protocols.
- Estimate the cost of the visit, including a koha (a gift) for the tangata whenua.
- Arrange the transport.
- Discuss the visit with the tangata whenua.
- Discuss the procedures for dealing with the harakeke with the kuia (the female elder).
- Discuss the general programme with the marae committee and the kaumātua (the elders).
- Draw up a list of equipment and materials needed
- Arrange duty rosters for the students.
- Write a safety matrix for the principal.

At the Marae

The students are welcomed on to the marae by way of a pōwhiri. Once on the marae, the students are in the hands of the tangata whenua. The procedures are all in te reo Māori. By experiencing living on the marae, the students will gain an insight into the ways things are done there. They will see aspects of the culture they are familiar with and aspects that are different from their own experience. They will have plenty of time to discuss these things in the evenings.

The students are placed into groups. They rotate around the various activities provided.

- With a kuia, they will visit the pā harakeke, where the rules about harakeke will be discussed.
- They will learn to weave a tīpare (a headband).
- Working with the staff and members of the marae, they will prepare food following the correct marae procedures.

In the evenings, there will be time for other activities, such as:

- Traditional storytelling, using the carvings and artworks as the basis.
- Demonstrating and playing traditional musical instruments made from local resources.
- Entertaining through waiata, jokes, or role plays.

The students will sleep marae fashion, that is, all in the wharenui (the meeting house). There are expectations placed on the students, especially if there are elders staying.

Māori weaving artists speak to the groups about their work. Samples of work will be on display in the wharenui. The visitors can study different weaving techniques, from whāriki to tukutuku. The marae cloak samples provide a wonderful set of examples using different materials, including harakeke, for wearable artworks.

At the completion of the stay comes the poroporoaki (the farewell speech). This is a time for the students to express their thoughts and their thanks and maybe their concerns about the time they have spent on the marae. Everyone is allowed to speak. These speeches are, of course, followed by waiata and a karakia (prayer). This is an evaluation session for the people of the marae and a time to send the students safely on their way home.

The students should have a basic idea at this stage of the following:

- How to cut, collect, and protect the natural material.
- Simple, traditional Māori weaving techniques.
- The connection between the care of the material and the artwork.
- How to investigate a weaving programme further.

Suggested Student Activity 5

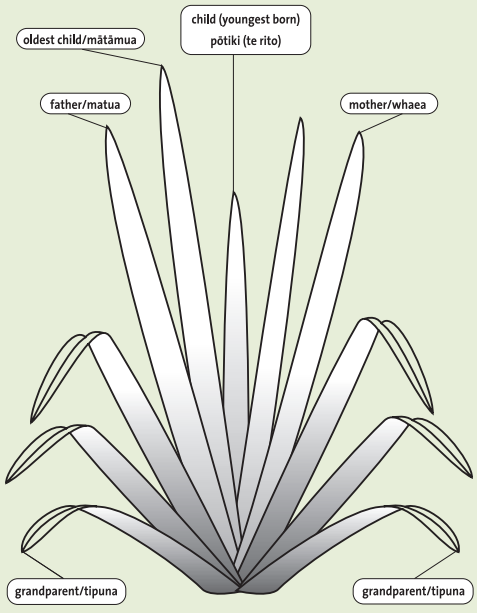
Harvesting Harakeke

Objective:

To learn from a weaver or elder how to cut flax

Your students should learn that:

- You do not cut the rito (the child), the whea (the mother), or the matua (the father); you only cut the tipuna (the ancestor).
- When cutting the tipuna, you move as far down as possible towards the bottom of the blade, separating it from the other blades, and then you cut downwards with a sharp knife or an instrument that is used only for that purpose.
- You must wash your hands when you have finished cutting and handling the harakeke.



Warning: Never put your fingers in your mouth after cutting or handling harakeke as it may cause a stomach upset.

Suggested Student Activity 6

Using Harakeke

Objective:

To have students appreciate traditional uses of harakeke

Using the collected material is probably best demonstrated by a weaver. You could try following the diagrams and directions to create a tīpare. If you have no flax fibre available, you could use paper, thin card, or packing ribbon.

Your students should:

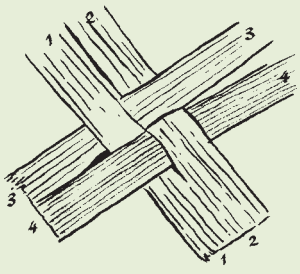
Weave the two pairs together as on the following page.

- Bend strip 4 over to the left. It goes on top of strips 3 and 2.
- Place strip 4 under strip 1.
- Bend and turn strip 4 to the right. Place it under strip 2.
- Bend strip 1 to the right. Place it on top of strips 2 and 4. Place it under strip 3.
- Bend and turn strip 1 to the left. Place it under strip 4.
- Turn strip 3 to the left. Place it under strip 2.

Continue working from side to side. Repeat these instructions until you have the desired length of weaving. If one strip of flax becomes too short, overlap another one on top. Don't trim the strips until you have finished. When the weaving is long enough, tie the two ends securely together or weave them into each other.

Weaving a Tīpare

A



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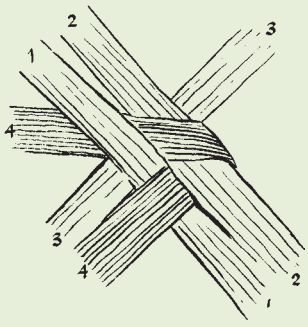

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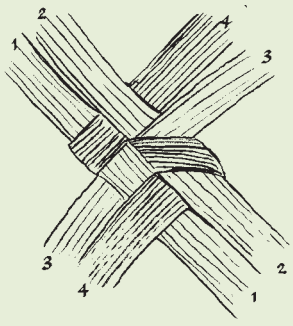

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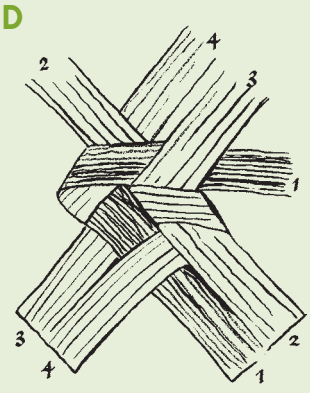

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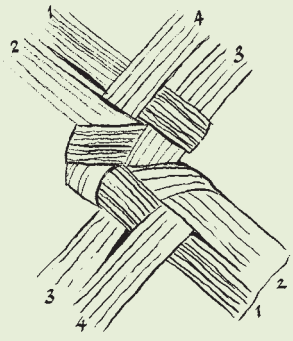

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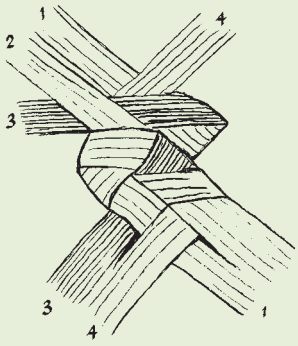


Illustrations: Robin Slow

Photo: Robin Slow

If you cannot put the discards from your weaving back under the bush or into some compost, cut them into 1-centimetre strips. When you have collected enough of these, boil them in water for several hours and then beat them (or put small amounts in a blender) to pulp them for papermaking. Flax produces a very strong paper that needs no additives and has wonderful colour and texture. Many weavers today do not place their discards under the flax bush but have a separate compost pile for the material. This is because there are no longer weka (a bird species) around city areas to eat the pests that may breed in the material.

Suggested Student Activity 7

Mural or Construction

Objective:

To have students complete a co-operative mural or picture of one of the traditional stories that has harakeke as an element

Your students could:

- Try to incorporate aspects of weaving (including different weaving patterns) and plaiting. The base of the work could be particle board, cardboard, or even fabric. They could present this work as a koha to the marae or display it in a prominent position in the school.
- Devise a construction from the flax flower stalks. These stalks should be bound by the fibre of the harakeke leaf, and then the construction should be used to hang or display any weaving pieces that the students have created.

Suggested Student Activity 8

Research Possibilities

Objective:

To have students research one of the following topics and/or become involved in a community environmental activity

Suggested research topics:

- In St Helena (in Washington State in the north-west of the United States), where harakeke was introduced from New Zealand, the plant is now considered to be a problem. Harakeke was grown there for its fibre content, but now that natural fibre has been largely superseded by synthetic products and is no longer used. Your students could find out why harakeke has become such a problem as well as what is being done to remedy this.
- At Lincoln University, in Canterbury, New Zealand, research is being undertaken on the qualities of harakeke. Your students could find out what the objectives of this research are.

Suggested community activities:

- Trim overgrown plants in the community.
- Join or support groups that are caring for plants.

Suggested Student Activity 9

Making Paper

Objective:

To teach students how to make paper from harakeke cuttings

Instructions

Collect a small bundle of flax leaves. Split the leaves into strips and then use strong scissors to cut them into pieces 3–4 centimetres long. Separate the waste material.

Place these pieces in a large plastic bucket or container and cover them with water. Allow them to break down over several weeks. Alternatively, you could put them into large preserving pots, cover them with water, boil the material for five hours, and then allow it to cool.

Drain off the liquid and save the pulp. Beat this pulp with a wooden club to separate the fibre.

Alternatively, you could use a food blender (but if so, it should be used for this process only, not for food). Put a small handful of the harakeke pieces in the blender, fill it with water, and blend them until they are chopped up. Put this material in a plastic bucket and then work your way through the rest of the harakeke. At this stage, you could drain off the surplus water and keep the plant material in plastic bags in the freezer. When it's required, boil the material again and then blend it. How long you blend it will depend on how fine or coarse you want the final product to be.

Cutting harakeke into small pieces, ready for making paper.

Boiling harakeke to soften the fibres.

Photos: Robin Slow

To make the harakeke fibre into paper, you will need the following:

- A number of screens, which could be made by stretching plastic fly screen. material (or similar) over simple wooden frames, making it as taut as possible.
- A plastic container (such as a fish crate) that is large enough to hold the screens flat with room for your hands as well.
- An iron.
- Some newsprint and some newspaper.
- A clothesline or a place to hang the paper from.

Method

1. Fold newspaper to the size of the screens.
2. Fill the large container about one-third full with water. Into this, tip about four large handfuls of the blended and prepared harakeke. Swirl it around in the water with a stick.
3. Take one of the screens, with the screen material facing upwards, and slide it into the liquid. Your hands should be on either side of the screen, and the screen should be parallel with the bottom of the container. Jiggle it backwards and forwards a little and then lift it out slowly and evenly. Do not tip it. Allow this to drain.
4. Cover the folded newspaper with a piece of newsprint. Tip the drained fibre on the screen onto the newspaper so that it is flat on the surface. Sponge the top of the screen to remove any surplus moisture. Start lifting one edge of the screen carefully until the screen peels away from the surface of the paper. The fibre should then be on the newsprint.
5. Lift the newsprint by two corners and peg the sheet of paper on a line to dry. Drying should only take overnight. Repeat this procedure until you have used up all the prepared fibre. The thickness of the mixture in the container will dictate the thickness of the finished paper.
6. Once the harakeke paper is dry, you can be separate it from the newsprint. Start this by using a palette knife and complete it with the flat of your hand. You could keep the newsprint for repeating the process.
7. You could iron the paper at this stage to make a flatter surface.

The paper is now ready to use.

Sample Lesson as Developed by a Kuia

(a Māori woman elder with special knowledge in a particular field)

Objectives:

To provide students with opportunities to:

- Strengthen and/or stimulate their curiosity, imagination, and sense of connectedness
- Develop their knowledge base about the world as an entity, especially about plant–creature relationships
- Examine human options through practical work with harakeke.

This activity should take place in a harakeke plantation (a pā harakeke).

Harakeke/Whāriki

A kuia explains the process.

Your students will better understand the following about harakeke:

- Plant/ecology/biosphere relationships
- Human use – historical, cultural, current
- Shelter for animals
- Art/craft/taonga links
- Future possibilities.

Making the harakeke into strips.

The Harakeke Plant

Your students will learn:

- What plants do (in general)
- What people need
- What this plant needs
- What people do with harakeke.

Each student should know how to name the plant, prepare the plant leaf, and create a simple weaving.

Practical Rules

A student workbook and weaving project.

Photos: Robin Slow

Your students will understand:

- Karakia
- That they must wash their hands after handling the harakeke
- The correct way to cut and collect the plant material
- That they must give their first piece of weaving away, they may keep the second, and they must use the third to teach or instruct
- That what is left over is not rubbish.

References for Websites

www.tmc.waikato.ac.nz/robyn/jeanettem/flaxwork.html
Demonstration of a simple contemporary weaving task

www.maori.com/misc/raranga.html
A perspective on traditional weaving

www.creativenz.govt.nz/artsnz/maori.html
An overview of some Māori arts and development

Glossary

Harakeke	Flax
Kai	Food
Karakia	A Prayer
Kaumātua	An elder
Kawa	Procedures
Kete	A basket
Koha	A gift
Kōrari	A flax flower stalk
Kuia	A female elder with special knowledge in a particular area
Marae	A centre of Māori activity
Matua	Father
Moari	A maypole
Muka	Flax fibre
Pā harakeke	The site of a plantation
Poroporoaki	A farewell speech
Pōwhiri	A welcome
Rito	A child
Tangata whenua	The local people
Taonga	Possessions, valuables
Te reo Māori	The Māori language
Tikanga	Customs
Tīpare	A headband
Tipuna	An ancestor; a grandparent (plural: tīpuna)
Tohunga	A wise, learned one
Tūī	A native bird that feeds on nectar
Tukutuku	Decorative reed panels of the whare (house)
Waiata	A song
Waka	A canoe
Weka	A native, hen-like bird
Whaea	Mother
Whakatauākī	A proverb
Wharenui	A room; a meeting house
Whāriki	A mat

Restoring the Bexley Wetland: A Local Heritage Site

Author:

Bede Cooper

New Zealand

Intended age group: 10–15 years

Category: National heritage – natural and cultural

Unit Abstract

This unit of work focuses on how students can become involved in working closely with local authorities and environmental groups to learn more about wetlands and, in particular, an important local heritage wetland site. Students will be able to learn about aspects of local history, heritage conservation, biodiversity, and the co-operative efforts that can lead to the successful restoration of a wetland.

Raupo (Typha orientalis) and rushes (Juncus sp.) around a freshwater pond within the Bexley Wetland.

Source: reproduced with the permission of the Christchurch City Council, New Zealand

Photo: Kate McKeowen

Photo on section cover reproduced with the permission of the Christchurch City Council, New Zealand.

Photo: Kelvin McMillan

Relevant Curriculum Links

Social studies	Investigate why and how people pass on and sustain their culture and heritage
Science	Investigate a local environmental issue and explain the reasons for the community's involvement
	Explain and use information from personal observation and research on wetland plants and animals, including the importance of special features these have to help survival into the next generation
The arts	Generate and develop visual ideas in response to a variety of motivations
Language	Gather, select, record, interpret, and present coherent, structured information from a variety of sources using different technologies

Unit Objectives

Knowledge

To help students develop knowledge and understanding of:

- The history, deterioration, and restoration of a wetland area
- The interactions between people and the environment
- The interdependence of living organisms, including people, and their relationship with their physical environment
- The planning and organisation essential for conserving biodiversity and protecting important flora and fauna.

Attitudes

To encourage students to:

- Develop a conservation ethic and to take responsibility for their environment and their day-to-day actions in the environment, noting what impact their actions have on the environment
- Become more aware of, and empathetic to, the threats that may face heritage sites
- Appreciate the efforts people make to restore and maintain heritage sites.

Skills

To help students develop their ability to:

- Interpret information
- Work co-operatively
- Work in collaboration with members of the community
- Collate and present their findings
- Identify and justify the need for preserving local heritage
- Provide links between different kinds of information
- Participate in environmental protection projects.

An Introduction to the Heritage Site Selection

The Bexley Wetland is a small wetland in eastern Christchurch. Its eastern border is the Avon River, its southern border is the Avon Heathcote Estuary, and there are housing subdivisions to the north and west.

In 1984, local residents petitioned the Christchurch City Council to save the unique habitats of the Bexley Wetland. In 1992, 12.5 hectares of the site were designated by the Christchurch City Council as an ecological heritage site and protected from future development. Now this salt marsh and salt meadow wetland with some freshwater springs has a development plan that highlights the natural and cultural heritage features of the site and identifies management priorities and time frames.

The goal of the restoration of the Bexley Wetland is to protect its existing plant communities and to restore lost or damaged plant communities and wetland bird feeding, nesting, and roosting habitats while providing public access for recreation and education.

The Bexley Wetland provides expansive and open views.

Paradise shelducks (Putangitangi), rushes, sedges, and grasses around a freshwater spring in the Bexley Wetland.

Source: reproduced with the permission of the Christchurch City Council, New Zealand

Photo: Kelvin McMillan

Natural Values

- Extensive wetlands once existed on the area that is now covered by the city of Christchurch.
- The Bexley Wetland includes a wide range of flora and fauna as well as important feeding, nesting, and roosting habitats.
- The Bexley Wetland provides good flood management options, especially for nearby residential areas.

Cultural Values

- This wetland area represents an important source of food and resources for Māori.
- The area exhibits the respect for an environment that helps to sustain life. Particularly important here is the idea of kaitiakitanga.

Recreational and Educational Values

- The wetland area has public access, and its facilities include walkways and lookouts.
- Habitat restoration days are held.
- The wetland is an area that is studied for its historical, cultural, environmental, and scientific significance.

Location and Description

Extensive wetlands once covered much of the area that is now Christchurch.

The Bexley Wetland is part of a green corridor that runs along the eastern suburbs of Christchurch. It is also an important link in a chain of coastal Canterbury wetlands that lie under an international bird flyway.

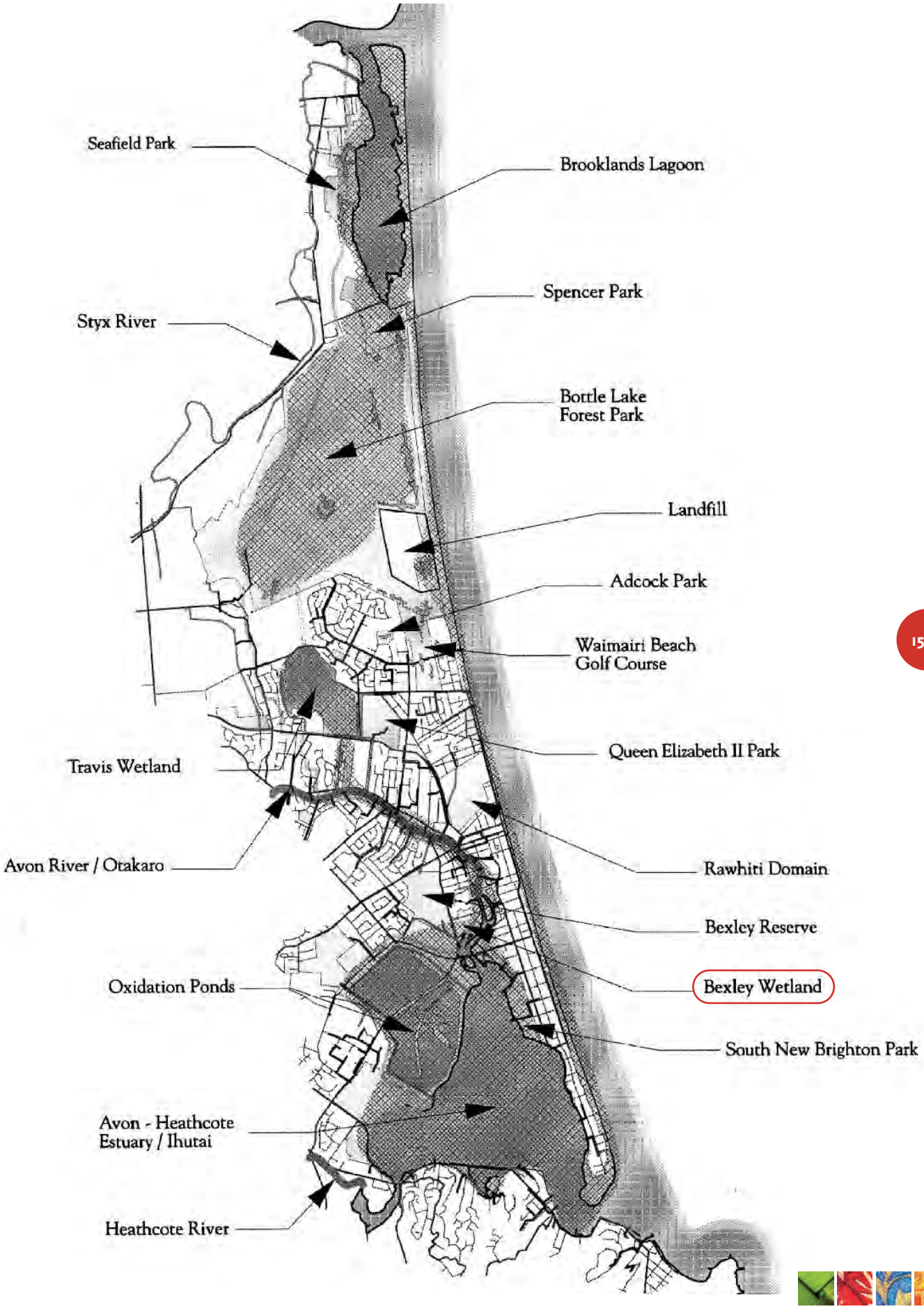
The establishment and maintenance of connections through the coastal green corridor aims to foster ecological, recreational, cultural, and heritage links through the wetlands and open spaces of eastern Christchurch. (See Figure 1.)

The mouth of the Avon River, near the Bexley Wetland, was once known for its abundant supply of tuna (eel), inanga (whitebait), and kōkopu (native trout). The plentiful fish and bird populations provided an excellent source of food and other resources for local Māori.

Following European settlement, small dairy farms were established in the area to supply the growing population of Christchurch with milk. When the government required milk to be sent to a factory for pasteurisation, many farmers could not make a profit if they had to buy milk back from the factory to sell on. They left the land, which then became overgrown. Eventually, it was treated as a wasteland.

The site adjacent to the Bexley Wetland was used as a scrap metal yard, and this has left a section of the soils contaminated.

Figure 1: Green Corridor of Eastern Christchurch



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Suggested Student Activity 1

Features of Wetlands

Objective:

To have students identify and describe the main features of a wetland and, in particular, the features of a wetland the students have access to.

Many researchers believe that wetlands covered 6 percent of the world's land surface before the Industrial Revolution. Furthermore, they suggest that half of the world's wetlands may have been lost since 1900. Drainage for agricultural production is the principal cause of wetland loss.

In New Zealand, the loss or modification of wetlands is as high as 90 percent. This means that only one-tenth of New Zealand's natural wetlands is left.

Your students could:

- Identify, list, and write about the things that have contributed to the deterioration and loss of wetlands.
- Find out why efforts are being made to preserve and restore wetlands. They should report their findings to the rest of the class.
- Investigate and report on the variety and interdependence of living things in a wetland and explain why this wetland is important to their community or to their country.
- Visit a wetland to observe which plants, insects, and animals contribute to the various food chains that exist there. Draw two or more food chains. Construct a food web to show some of the interrelationships that exist in the wetland.
- Based on the information collected, make images to show the existence of food chains and food webs. The students could predict what could happen if key plants, insects, or animals were removed. They could also predict the impact this might have on the wetland as a whole and on the future uses people could make of it.

Suggested Student Activity 2

Overview – Past and Present Uses of the Wetland

Objective:

To have students learn about the past and present uses of the wetland

The combined efforts of the Bexley Wetland Trust, the staff of the Christchurch City Council, and the local community, including St James School, have resulted in significant and successful efforts to restore the Bexley Wetland.

This salt marsh and salt meadow wetland, which also has some freshwater springs, is located near where the Avon River meets the Avon–Heathcote Estuary.

The goal of the Bexley Wetland restoration project is to protect existing plant communities, to restore lost or damaged plant communities, to revitalise wetland bird feeding, nesting, and roosting habitats, and provide public access for recreation and education.

Location Map of the Bexley Wetland

Source: reproduced with the permission of the Christchurch City Council, New Zealand

Designer: Sandra Parkkali

Your students could:

- Invite members of the local iwi, members of the Trust Board, and council staff to outline the history of the wetland to them, paying particular attention to:
  - the use of the wetland by the indigenous people
  - the historical importance of the wetland and its significance to the local people
  - the reasons why the wetland has deteriorated
  - the reasons for restoring the wetland and the efforts made to do so
  - the future plans for the wetland.

- In pairs or small groups, research one of the above topics and write an account of their findings, which they can present to the rest of the class when completed. They could collate and publish their written work, sending copies to the local iwi, the Trust Board, local government, and other interested groups.
- As a group, consider and discuss the cultural and heritage values identified by the local community as being important for the Bexley Wetland and other wetlands along the coastal green corridor in eastern Christchurch and decide whether they agree with them. Their interpretation and on-site activities can highlight the cultural and heritage values. The cultural and heritage values listed on the following page include some tangata whenua values.
- Visit a wetland to observe and record:
  - A general description of the area.
  - The general state or condition of the wetland.
  - The variety of fauna and flora, including the condition of the more common species.
  - The impacts caused by people.
  - The possible threats, including that of pests, to the wetland's survival.
  - The attempts made to protect, restore, or improve the wetland.
  - The recreational and other uses made of the wetland.

Avon River saltmarshes adjacent to Bexley Wetland. Jointed wire rush (Leptocarpus similis)

Source: reproduced with the permission of the Christchurch City Council, New Zealand

Photo: Kelvin McMillan

Cultural and Heritage Values

The Bexley Wetland reflects the following cultural and historical values:

- Māori cultural values, including the restoration of the life force to signify the spirit as one in the collective and as one in partnership
- The importance of the site as an eastern gateway to New Zealand – the links to Easter Island and Tahiti
- The trade links along the coast and through inland routes
- Guardianship and resource utilisation
- Sustainable mahinga kai harvest practices, reseeding, and management, such as using eel traps made of manuka stakes, estuary gathering, and the flax harvest
- The interconnectedness of ecosystems
- The importance of water quality and the appropriate use of water
- The recognition of nearby pa sites and the naming of landmarks
- The use of dry-earth ovens for cooking
- Oral communication, highlighting the importance of sites
- The transmission of knowledge/whakapapa (genealogy)
- The importance of indigenous species and replanting
- Flax planting, reseeding of fisheries, nurseries, and water quality improvement.

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Suggested Student Activity 3

People and Wetlands

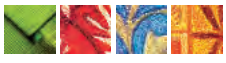
Objective:

To have students identify and describe the importance of kaitiakitanga and the impacts of human interaction with the wetland

As with all fragile ecosystems, wetlands have been changed by human activity. These changes may impact negatively on the wetland. Such impacts can include:

- The encroachment of buildings, including housing subdivisions.
- The restriction of drainage.
- Pollution.
- The dumping of unwanted items.
- Contact with the nutrients and animal waste that flow through waterways.
- Deforestation, which can allow eroded soil to clog rivers and wetlands.
- Overfishing and/or overhunting.
- The removal of plants.
- The introduction of non-native plants and animals.

But people can also have a positive effect on an ecosystem, protecting and enhancing the system and its future development. Plants and animals may be saved, especially when people find ways of conserving their food and shelter.

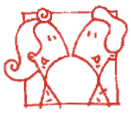


Your students could:

- Visit a wetland and identify the changes caused to the wetland over time, noting both the natural changes and changes caused by people.
- Brainstorm as a class the negative and positive impacts people have had on the wetland, recording these in separate lists and displaying the responses.
- Invite a member of the local iwi to speak about the importance of kaitiakitanga.
- Write a detailed description of one human impact on the wetland, including its consequences. They should use images to back up their claims.
- Publish the above accounts as a class booklet.
- Identify and list the relationships between the living and non-living elements of the wetland. They could report their findings to the class.
- Invite a local council or government official to speak about the laws, by-laws, and/or regulations that help to protect the wetland environment.
- In small groups, design and make a snakes-and-ladders-type activity that utilises some of the positive and negative impacts on the wetland.
- Draw up a list of ways to minimise people's impact on the wetland and publicise this list in a school newsletter and by sending copies to the local media.

Suggested Student Activity 4

Community Involvement



Objective:

To introduce students to the idea of wetland restoration and community involvement in this process

The restoration of the Bexley Wetland is a good example of successful collaboration between a local council, government departments, and community groups to plan and implement a programme of restoration.

In 2000, the Christchurch City Council released its development plan for restoring the Bexley Wetland. Included in the plan was a set of human values:

- Retain the site as an area for birdwatching and walking
- Create ecological and recreational linkages
- Provide a loop walk
- Develop a proactive community education programme
- Provide viewing areas and hides with interpretative panels
- Include more public education, including signs and maps
- Involve local schools
- Involve children with planting
- Create a contemplation area
- Foster new themes for the area, for example, "a peaceful place" and "being surrounded by nature"
- Develop a picnic area
- Create ecotourism opportunities.

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Students benefit enormously by participating in a range of restoration activities, but it's essential to plan carefully and prepare for these visits.

Experts, including members of the local iwi, local conservation experts, and local authority rangers, can all offer valuable assistance, which can include an explanation of the uniqueness of the ecosystem and the important features of the plants and animals found there.

You can find additional information about restoring and protecting the Bexley Wetland in the pamphlet entitled *Bexley Wetland – A Unique Wetland Environment* enclosed with this kit. This publication has been made available through the courtesy of the Christchurch City Council.

Your students could:

- Identify and discuss the reasons why a group of people may wish to restore a wetland habitat and how they might do this.
- Consider, comment on, and add to the values identified in 2000 by the Christchurch City Council.
- Identify and discuss which groups in the community could make a valuable contribution to wetland restoration and say how each group could go about achieving its goal.

Suggested Student Activity 5

Habitat Restoration Days

Objective:

To assist students to learn about and understand the value of habitat restoration days

Many schools participate in habitat restoration projects. Participation may involve one-off activities or medium-term or long-term involvement. The following description outlines the involvement and commitment of St James School, Christchurch.

St James School has adopted the Bexley Wetland ecological heritage site and has been actively involved with the restoration of this habitat over the last three years. These are some of the school's major tasks:

- Growing shrubs and trees from seedlings sourced from genetic stock. The students undertook to water these seedlings and look after them, even during the school holidays. They also learned about these plants, their value to the wildlife, and their value to Māori custom and culture.
- Planting these young trees and shrubs in the Bexley Wetland during a school visit on Arbor Day. They mulched the planted site to suppress weeds.
- Picking up litter and generally cleaning up the Bexley Wetland on "Clean-up-the-World Day". They disposed of the rubbish collected from the reserve in recycled shopping bags.
- Incorporating the Bexley Wetland in as many study projects as possible. The students made frequent field trips to the wetland together with their parents and with the guidance of a representative of the Bexley Wetland Trust.
- Participating in the official opening of the contemplation platform. The school seeks to be involved in both formal and informal activities to enhance the wetland.
- Undertaking a future project to assist with creating a protective buffer zone. This zone is designed to safely integrate the adjacent residential development and the important wetland wildlife habitat.

The students have successfully applied for a grant from the World Wildlife Fund to fund this project and have signed a contract with them. This commitment will take three years, during which time the students will look after the plants, weed and mulch the area, and observe and study the difference this new vegetation makes for the birds in the reserve.

Your students could undertake one or more of the above exercises in a site of your choice.

Suggested Student Activity 6

Plant Communities

Objective:

To assist students to understand that people can cause significant change to wetland ecosystems

Human impact can be both negative and positive. In the case of the Bexley Wetland, human intervention is now leading to the restoration of this ecosystem.

Your students could:

- Make use of visiting expert speakers, coupled with visits to a wetland near your school. These interactions will provide your students with opportunities to hear about, observe, and record the conditions necessary for plant communities to grow and develop.
- Find out what protection is in place for the existing vegetation and prepare a class poster or mural that advocates the protection of endangered wetland plant communities. This should include listening to the views of a local kaumātua and/or a local conservation expert.
- Invite a local expert on wetland plants to speak about the main species of plants found in the wetland, the threats the plants face, any problems relating to their needs, and any problems caused by pollution.
- Working as individuals or in small groups, research and prepare a report on a plant found in the wetland. The class as a whole could list the elements to be considered during these investigations.

Suggested Student Activity 7

Bird Life

Objective:

To assist students to identify the wetland features that attract birds and to name the relationships birds have with the wetland

In many wetland areas in and around the Pacific, European settlement has brought about a rapid decline in bird populations. The main causes of this decline have often been the drainage of the wetlands, pollution, the use of fertilisers, shooting, and the introduction of predators.

The restoration of wetlands, though, has often led to a recovery in the number of birds inhabiting the area.

The future of wetland bird life depends a great deal on the quality of the ecosystem. The Bexley Wetland is a good example of a wetland that now has the potential for its bird population to increase sgnificantly. Bexley's close proximity to the Avon–Heathcote Estuary, where there is an abundance of bird life, is an important contributing factor to future bird populations in the wetland.

You can find additional information, including a range of useful images, in the pamphlet *Wetland Birds* enclosed with this kit. This publication has been made available through the courtesy of the Christchurch City Council.

You could use the pamphlet for a wall display to support the wetland study.

Students wishing to find out more about migratory godwits could visit the following websites:

www.ea.gov.au/water/wetlands/publications/pubs/flyway.pdf
www.wbkenglish.com/flag4.asp
www.abc.net.au/wing/community/news.htm

The following is a useful summary of the important reasons for restoring a wetland and the consequential or expected increase in bird habitation.

Restoring Bird Habitats

One of the main objectives of restoring the Bexley Wetland is to increase bird numbers. The birds likely to increase in number include waterfowl, waders, and, in particular, white-faced and white herons, grey teal, New Zealand shovellers, native grey ducks, and kingfishers. Bellbirds may also use the area when the flax bushes and kōwhai trees have become established around the margins and provide nectar.

The following features could contribute to a range of habitats:

- A series of islands divided by waterways throughout the site to increase the feeding margin for birds, an area that could be surrounded by a moat to protect against predation and that would provide nesting sites largely protected from cats and ferrets
- Shallow muddy margins for wader feeding (īnanga and invertebrates) along the waterways between the islands
- Sites with ample bird feeding and breeding opportunities
- Plenty of high-tide roosting sites
- Areas of tall freshwater wetland plants to promote nesting habitats for pūkeko, marsh crakes, and bitterns
- Plants that screen the road while still allowing visual access from the road into the wetland
- A tidal influx to maintain the dominance of salt-tolerant plants and to restrict invasive weeds
- A range of water salinity levels
- Tree stump roosting sites for birds
- A policy that prohibits dogs in feeding, roosting, and nesting areas and requires them to be on a leash in all other areas.

Adapted with the permission of the Christchurch City Council, New Zealand

Your students could:

- Prepare a list of the things they think birds are dependent on from a wetland habitat. They could record this on a chart, whiteboard, or chalkboard and keep it for future reference. Possible sub-headings could include: food, shelter, predators, and nesting (a place to reproduce).
- Suggest how changes to the wetland ecosystem could affect the way in which the needs of different birds might or might not be met. Figure 2 on page 170, Cross-section of saltwater to freshwater gradients, could be useful for this exercise. You could display it in the classroom or make a copy for each student.
- Following a visit to the wetland, list the reasons why the wetland ecosystem attracts birds. You could summarise these on a chart.
- Identify and name the birds visiting the wetland and list the adaptive features of each bird, noting how these features assist the bird's survival.

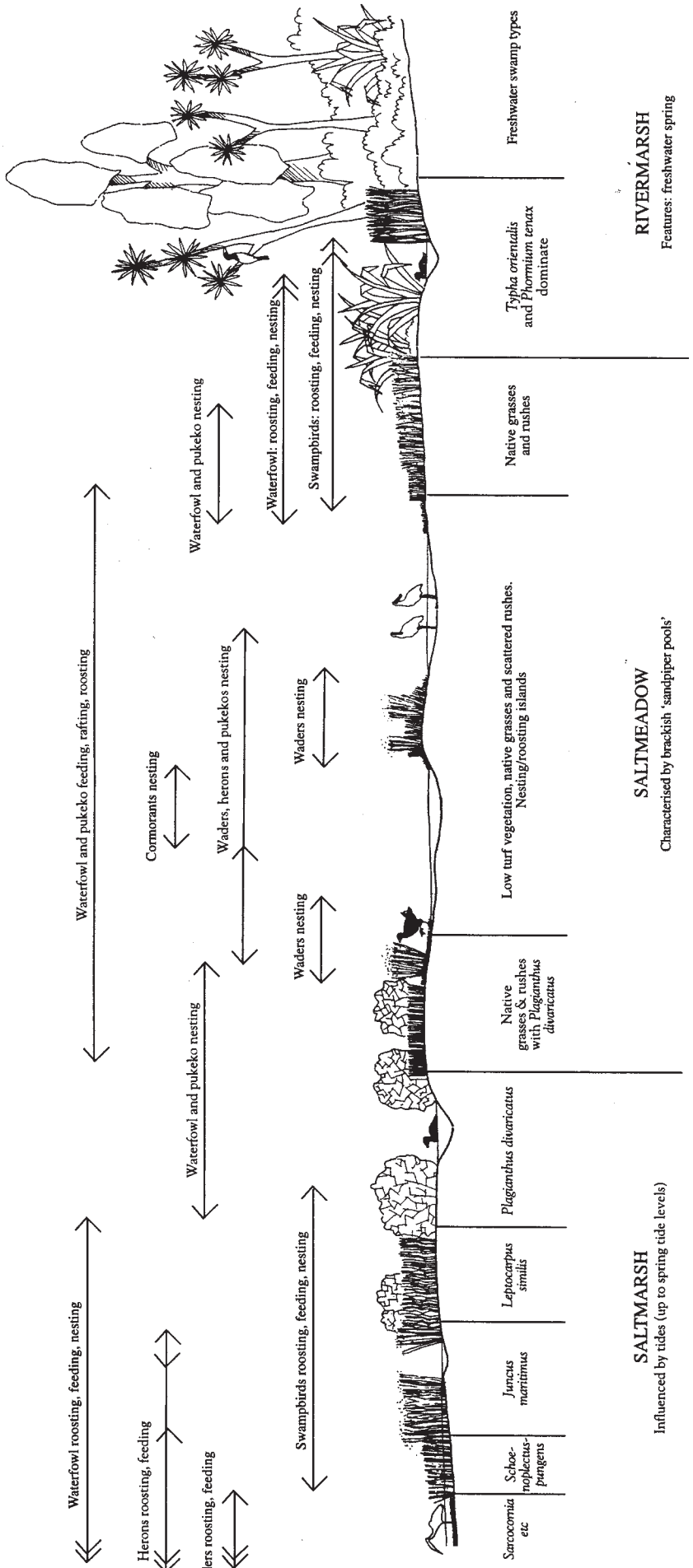
Bird	Adaptive Features	Helps Survival by

- Identify, discuss, and write a paragraph about the values or qualities that birds bring to the wetland.

Glossary

Biodiversity	The number or variety of species in a community, ecosystem, or larger unit of habitat
Fauna	The animals of a particular habitat
Flora	The plants of a particular habitat
Iwi	A tribe
Kaitiakitanga	Guardianship
Kaumātua	An elder
Mahinga kai	A food source or food for preparation
Tangata whenua	The original inhabitants, the people of the land

Figure 2: Cross-section of saltwater to freshwater gradients



Protecting Jacob's Ladder: A Local Heritage Site

Author:

Janet Williams, Tania Gallen, and Bede Cooper
New Zealand

Intended age group: 10–15 years

Category: National heritage – natural and cultural

Unit Abstract

Jacob's Ladder is located adjacent to St Mary's College, Auckland. It is a steep set of ninety-two steps that allow people to walk between the residential suburb of Ponsonby and the Auckland waterfront. When Ponsonby was first settled, the water of the harbour lapped at the base of the ladder.

Owing to land reclamation, the water has receded, and the ladder now ends near a bend in a motorway. The ladder has provided a link between Ponsonby and Victoria Park for more than a hundred years and is used by hundreds of city workers, local residents, students, and tourists every day.

St Mary's College has taken up the challenge to work with local residents, heritage groups, and the City Council to preserve and maintain this local site.

Relevant Curriculum Links

Social studies	Research how people organise themselves in response to challenge.
	Research why and how groups pass on and sustain their culture and heritage.
	Research why particular places and environments are significant for people.
	Research the implications of change to places for people and for the environment.
Language	Gather, select, record, interpret, and present coherent structured information from a variety of sources, using different technologies.
The arts	Apply their knowledge of elements and principles to make logos, murals, and posters, using a variety of techniques, tools, materials, processes, and procedures.

Unit Objectives

Knowledge

To help students develop knowledge and understanding of:

- The history, use, and preservation of Jacob's Ladder
- Why people might fight to save a heritage site
- The planning and organisation essential for the conservation and protection of a heritage site
- The concept of a heritage management plan.

Attitudes

To encourage students to:

- Develop a conservation ethic and to take responsibility for their environment and their actions in the environment
- Become more aware of, and empathetic to, the threats that may face heritage sites
- Appreciate the efforts that people make to restore and maintain heritage sites.

Skills

To help students develop their ability to:

- Interpret information
- Identify and justify the need for preserving local heritage
- Work co-operatively with others
- Identify and discuss the key issues of the relevant stakeholders
- Provide links between different kinds of information
- Collate and present their findings.

Heritage Site Selection

Jacob's Ladder is a set of ninety-two steep steps on a high embankment. It's a small but important site. It serves as a good example of how a community can gain widespread support for a local heritage site when it becomes threatened.

Jacob's Ladder is particularly significant to the community in the St Mary's Bay and Ponsonby areas. It has provided residents and churchgoers with relatively quick access to schools and churches while allowing easier and more direct access to and from the city.

Natural Values

- The site comprises a natural embankment with exposed rocks. This provides an unspoilt site in a built-up area.

Cultural Values

- This site is an early European migrant area of particular significance to past and present communities.
- It is spiritually important to the Christian community and, in particular, to the community that supports St Mary's College.

Educational Values

- The area can be studied for its historical, spiritual, and environmental significance and is an integral part of a school's environment.

Saint Mary's College students and other users of Jacob's Ladder.

Suggested Student Activity 1

Awareness Raising

Objective:

To have the students investigate a heritage site's significance

Your students could carry out the following investigations:

- Why "adopt" or "support" a local heritage site?
- What links does the site have to the school?
- What other groups have an interest in the site?
- How can we, as students, learn more about the site?

The students can be asked to collate their findings and present these to the class.

Suggested Student Activity 2

Site Visit

Objective:

To have the students become more familiar with a site and the issues surrounding it

Your students could:

- Visit a heritage site and, after looking over it carefully, respond to the questions below:
  - What is the site currently used for?
  - How might it have been used in the past?
  - Who might have used it and why?
  - How might the physical environment have changed over time?
  - What evidence is there to support your ideas?
- Identify, draw, and name any native vegetation seen at the site.
- Find out what issues are linked to the site.
- Suggest how the natural environment could be improved or protected.
- Sketch the main features of the site.

Suggested Student Activity 3

Matching the Values of a Local Heritage Site against UNESCO's Criteria

Objective:

To have the students become aware of UNESCO's criteria and support for listing a World Heritage cultural site

Your students could:

- Find out and report to the class what role UNESCO has in promoting the listing of World Heritage Sites.
- Identify and name the criteria UNESCO uses to approve a World Heritage cultural site.
- Compare their findings with the important attributes that this local heritage site has.
- Study and complete the student activity sheets for the nomination of a heritage site to a heritage inventory or register.

Note: The material contained in this folder, especially in the introductory section, Understanding World Heritage, together with a wide range of material found on various UNESCO and other heritage websites, will assist with this activity. The following websites could be useful starting points:

UNESCO World Heritage Centre
http://whc.unesco.org

World Heritage List
http://whc.unesco.org/pg.cfm?cid=31

Organisation of World Heritage Cities
www.ovpm.org

Student Activity Sheet

Guidelines for Students

Nominating a local heritage site to your country's national heritage list, inventory, or register

Your country has decided to draw up a list of national cultural and natural heritage sites. Your class has been asked to prepare one or more nominations of local cultural and/or natural sites for this list. This activity may involve both class time and extra-curricular work (for example, visits to sites).

Guidelines for preparing a nomination

Use the form that follows to prepare a nomination, considering the following.

The description section should contain:

- A description of the site and a list of its main features and characteristics (for example, the types of birds, trees, and animals for natural sites and the types of buildings and archaeological features for cultural sites).
- The history of the site.
- Maps.
- Photographs (to be attached).
- A brief reference list giving the main sources of information about the site.

The justification section should contain:

- The reason(s) why this site is considered to be of national importance. If your country has criteria for determining whether a site is of national importance, use these to assess the site.

The conservation section should contain:

- An indication of who is responsible for looking after the site. Do the local people conserve the site themselves, or is a local, regional, or national organisation involved? Do the people looking after the site have the ability to preserve the site? Do they have enough money and expertise? Is there a law to protect the site?

The comparison section should contain:

- Details of other sites of a similar type in your country and/or in your region of the world.
- An evaluation of the site's present state of preservation when compared with similar sites in your country. Is the site in danger of deteriorating so much that it cannot be saved? How many similar sites are there? How would you rank this site alongside similar sites? What are this site's unique features? For example, for a natural site, ask whether some of the plant or animal species are in danger of dying out.

Student Activity Sheet

Name of country where the site is located:

Name of the person who prepared the nomination:

Date:

Name of the site:

Geographical location of the site:

Description of the site:

Justification for including this site on the list of national cultural and natural heritage sites:

Criteria met:

Conservation of the site:

Comparison with other similar sites:

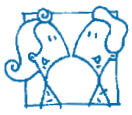
Suggested Student Activity 4

Meeting the Stakeholders

Objective:

To have students meet and hear the differing views of individuals along with representatives of community groups and local government





Your students could:

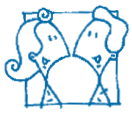
- Work in small groups or pairs to prepare questions for the representatives they are to meet. They may wish to give the interviewees advance copies of the questions.
- Meet and interview individuals from the community and representatives of local businesses and community groups as well as local government officials who have an interest in the heritage site. The notes the students take should accurately reflect what each person or group has to say and why they hold a particular position on any issue.
- Prepare detailed reports on each interview. They could include images with their reports, such as photographs, maps, drawings, cartoons, and graphs.
- Gain permission from the individuals or groups concerned to use their names and photographs in any publication the school may produce.

Suggested Student Activity 5

Informing the Community

Objective:

To have students prepare a school newspaper to inform the local community and interested groups about the issues associated with the heritage site



You and your students together could:

- Select an editor who will lead the activity and write an editorial.
- Decide on the selection of reports from the previous activity and agree on any other issues and items that they need to include in the newspaper. Select students who will write or edit the reports and articles.
- If this has not already been done, select suitable images to support the written reports.
- Following a cost analysis exercise to determine how much funding would be required for the newspaper, seek sponsorship from local businesses, clubs, and other organisations to cover costs. This support should be acknowledged in the newspaper, and consideration should be given to using advertisements as well.

- Include in the newspaper an invitation to its readers to write to the editor expressing their views on the need, or otherwise, to protect the heritage site.
- Arrange for the newspaper to be printed and distributed.
- Have the editor, with help from other students, reply to all the letters received from the readers.

The New Zealand Herald

Jacob's Ladder Launch Off To Excellent Start

A Team & Their Dream Embark on Jacob's Ladder Renovation

A newspaper prepared by the students of Saint Mary's College.

Role play

You may find the ideas that follow helpful. Many teachers seeking to capture the interest of students in favour of heritage conservation have found role play to be very useful. Role play has these main learning objectives:

- To build awareness
- To make difficult or abstract topics more easily understood
- To help students acquire new research skills
- To forge attitudes and a long-term commitment
- To develop students' creative potential.

Role play in the classroom

Heritage conservation involves many challenging and sometimes complex questions, such as the decision to add new sites to the World Heritage List or a national heritage register; the choice of different preservation materials and methods; development (such as the demolition of old houses, the development of tourism, and building new roads); conservation and management planning; site inspection; promotional campaigns; and prioritising funds for support to one site rather than another .

Through role play, students come to a better understanding of these issues and of how to take the appropriate decisions. You could divide the class into small groups and ask each group to reflect on and research the position of the group or character that they are to enact. You could help them further by suggesting where to find the necessary information or data. Alternatively, you could prepare

profile cards describing each interested party in advance and give one card to each group of students. Each group could then discuss its position and select one student to take part in the role play, where each player can defend the position of his or her group. The rest of the students could play the jury or committee that votes on the decision to be taken in the light of the presentations.

To allow your students to understand the totality of the role-play process, you could take the following steps:

- Establish the nature of the conservation challenge facing the heritage site.
- Divide the students into groups representing different interest groups.
- Have the groups present possible ways of dealing with the challenge.

Then, each group should:

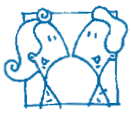
- Evaluate the solutions presented.
- Democratically choose the best solution.
- Decide how to implement the solution.
- Evaluate the consequences of the choices made.

Suggested Student Activity 6

Role play: Should Our Local Heritage Site Be Preserved and Maintained?

Objective:

To have students examine different points of view through role play



Your students could:

- List the main stakeholders.
- Elect an impartial chairperson and two assistants.
- Divide into groups representing each of the chosen stakeholders.
- In their groups, prepare a script for presentation that either supports or rejects the case for the heritage site to be preserved and maintained.
- In their groups, present their case to the chairperson, the assistants, and the rest of the class.
- Listen to the chairperson sum up the main points of the presentation, which the assistants will record for future reference.

Note: Ensure that there is a balance of “for” and “against” groups.

Suggested Student Activity 7

Consolidation and Application of Learning to Date

Objective:

To have students apply their knowledge of elements and principles to make logos, murals, and posters

Your students could:

- Design and make a logo that could be used on information and promotional material for the heritage site.
- Prepare and complete murals and/or posters that illustrate the values and issues associated with the heritage site.
- Prepare brief written explanations for each logo, poster, and mural.
- Display art works with explanations in suitable locations.
- Invite public responses to the display items.

Logos prepared by the students of Saint Mary's College.

Tongariro World Heritage Site: Volcanoes and Culture

Authors:

Elspeth Wingham and Bede Cooper

New Zealand

The authors wish to acknowledge the valuable contribution made to this unit by Neville Raynes, Avondale College, Auckland, New Zealand.

Intended age group: 11–15 years

Category: World and national heritage – mixed site – natural and cultural heritage

Unit Abstract

Mt Ngāuruhoe close up with Mt Tongariro in the distance.

Source: Department of Conservation, New Zealand

This unit focuses on Tongariro National Park, which is a mixed (natural and cultural) World Heritage Site in the central North Island of New Zealand. In 1993, it was the first site ever to be nominated on the World Heritage List as a cultural landscape. Cultural landscapes are a major illustration of the World Heritage Convention's spirit, linking culture and nature.

The site is of special significance to Māori. It contains volcanoes as well as forests, tussock lands, and lakes, has a variety of landscapes, and is spectacularly beautiful.

Tongariro National Park has a rich cultural heritage and is considered a special area by a number of Māori tribes. It is the home of the Ngāti Tūwharetoa people. Tongariro National Park is also referred to as "the sacred gift".

A portrait of Horonuku Te Heuheu Tukino IV, Paramount Chief of the Ngāti Tūwharetoa people, who gifted the sacred peaks to the Crown in 1887.

Photo: Burton Bros. Collection, copyright © Alexander Turnbull Library, Wellington, New Zealand

The Māori people consider Tongariro National Park to be a sacred area because of the mountains. It was gifted to the Government of New Zealand by Paramount Chief of Ngāti Tūwharetoa Horonuku Te Heuheu Tukino IV in 1887 because he could see the area diminishing as parcels of land were sold to the European settlers. This was a very strategic move because it meant that the area became the property of all New Zealanders, it was protected by law, and it was New Zealand's first national park. Today, many New Zealanders and tourists from overseas visit Tongariro National Park because of the beauty of the area and the many outdoor activities it offers, including tramping and skiing.

Tongariro National Park has a diverse range of environments, which has led to the development of many unique plants and animals. Tongariro National Park has active volcanoes, and the Earth-shaping events of volcanism are obvious in the landscape. Volcanoes have been a major Earth-forming feature throughout the Pacific, and so elements of this unit are likely to relate to many Pacific countries.

The unit can be useful in looking at different cultures and values at different times, for example, Māori and sacred mountains, European settlers and potential farmland, and, more recently, New Zealanders and the Tongariro National Park's tourism value.

Photo on section cover source: Department of Conservation, New Zealand

This unit also looks at a range of ideas associated with volcanoes: the Earth's structure, the distribution of volcanoes, the structure of volcanoes, eruptions, and volcanic activity as well as some of the cultural dimensions associated with volcanic activity.

Relevant Curriculum Links

Social studies	Investigate why and how people pass on and sustain their culture and heritage.
	Investigate why particular places and environments are significant for people.
	Investigate why people regulate the use of places and environments.
Science	Gather information about the origins and history of major natural features of the landscape.
	Investigate and describe the processes that change the Earth over time at local and global levels.
Language	Gather, select, record, interpret, and present coherent structural information from a variety of sources using different technologies.

Unit Objectives

Knowledge

To help students to:

- Understand a natural heritage site that has different cultural significance for different cultures
- Recognise that unusual ecosystems often contain unique animals and plants that have evolved to cope with a specific environment
- Gain knowledge of the Earth's structure and volcanoes
- Understand the landforms around them and possible formation processes.

Attitudes

To encourage students to:

- Respect other viewpoints and value systems to create harmony between different ethnicities and cultures
- Recognise the cultural diversity and equal value of all cultures
- Value the broad range of environments that exist as each will have its own unique flora and fauna
- Respect biodiversity as a common heritage of humanity.

Skills

To help students develop their ability to:

- View a place from different cultural perspectives
- Recognise distinct ecosystems and the need to protect a variety of them
- Read instructions and follow them precisely
- Appreciate their sense of place and belonging through understanding how the landscape around them was formed and learning the ancestral stories and/or legends associated with the place.

Ngātoroirangi and the Mountains of Tongariro National Park

They say that the Ngāti Tūwharetoa people came to Aotearoa (New Zealand) in the canoe *Te Arawa*. The navigator of *Te Arawa* was a powerful tohunga (or high priest) called Ngātoroirangi. After the canoe had landed in the Bay of Plenty on the east coast of the North Island, Ngātoroirangi led a group inland to search for a place to settle. This is the story of how he claimed the mountains of Tongariro for his people.

Ngātoroirangi had already laid claim to Taupō by driving his spear into the lake's waters. To claim the mountains of Tongariro and the surrounding land, he would have to be the first person to stand on the volcano's summit. Ngātoroirangi asked most of the people travelling with him to stay by the lake and not to eat anything until he returned. If they ate food, this would break the tapu (sacred protection) over his journey. They could lose their lives or their claim to a large and important area of land. As Ngātoroirangi crossed the barren desert to the east of Tongariro, he met another tohunga travelling with his people to claim Tongariro. His name was Hapekituarangi, and Ngātoroirangi wanted him to give up because he had seen the mountains first.

Ngātoroirangi continued to climb up the mountain's slopes, but he looked back and saw Hapekituarangi following. Ngātoroirangi was very angry, and he shouted out, "Go no further. I have warned you. You will perish, and your people will pay the price for your stupidity." However, Hapekituarangi continued to climb towards the summit. He did not notice that Ngātoroirangi was using his powers to call for assistance from the gods.

Soon a dark grey rain cloud appeared and came down around Hapekituarangi and his people. They were overcome by a savage storm that was bitterly cold and wet. Snow began to fall, and Hapekituarangi sank to his knees in defeat as the storm covered his group. The area where this happened is known as Rangipō.

Meanwhile, on the shores of Lake Taupō, Ngātoroirangi's people grew hungry and broke their fast. This nearly caused disaster for the temporarily successful tohunga. Again the wind rose, and icy gales surrounded Ngātoroirangi's party. As he and his companions were dying from the cold on the summit of Tongariro, he called to his priestess sisters who had remained in Hawaiiki, "Oh, Kuiwai! Oh, Haungaroa! I am carried away in the cold south wind! Send fire to warm me!" To add strength to his prayer, Ngātoroirangi killed a slave called Auruhoe. His sisters, Kuiwai and Haungaroa, heard his prayer and sent fire southwards. The flames first erupted where the volcano is at White Island and then at Rotorua and Taupō. Finally, they burst at Ngātoroirangi's feet, welling up from the large vent in the volcano's summit, warming the tohunga and his companions.

In appreciation of his sisters' help, and to please Rūaumoko, the god of volcanoes and earthquakes, Ngātoroirangi threw the body of Auruhoe onto the new flames, permanently lighting the fires of occupation in the lands of Tongariro and Taupō.

The Sacred Gift

During the 1850s throughout New Zealand, Māori land was being placed under the same laws as Pākehā-owned land. The Native Land Court was established in 1865 to find out who owned Māori land, to define its boundaries, and to give it a certificate of title. After a title had been processed by the court, the land could be sold to the ever-persistent settlers.

Te Heuheu Tukino IV (Horonuku), the chief of the Ngāti Tūwharetoa, was a man who, like his forefathers, had led his people through times of conflict and change, all the time maintaining the mana (status) possessed by the land of Tongariro and the people of his tribe. He was responsible for gifting the sacred volcanoes of Tongariro, Ngāuruhoe, and Ruapehu to the Crown and to the people of New Zealand. He did this to prevent the lands of Tongariro from falling into private ownership, which would have meant that the sacred volcanoes, and his people, would have lost their mana.

Horonuku faced his first Land Court battle in 1881. Kepa Te Rangihiwinui Taitoko of Ngāti Whanganui had raised a claim of raupata rights (rights to claim the fruits of conquest) on the land south of Mt Ruapehu. Before the Land Court, Kepa stated that his fires of occupation, his ahi-kā, were burning in South Taupō. He suggested that because he had fought on the side of the Pākehā in the Waikato land wars, his fires of occupation now burned on Tūwharetoa land.

Horonuku listened to Kepa's argument with growing anger. He rose and delivered a speech displaying the mana of his ancestry:

"Who are you that speak of your fires of occupation burning in my country? Where is your fire, your ahi-kā? Where is it? You cannot show me for it does not exist. Now I shall show you mine. Look yonder."

Horonuku, grey-haired, in his sixtieth year, turned and pointed across Taupō Moana (lake), southwards to where a coil of smoke rose from Ngāuruhoe's volcano.

"Behold my ahi-kā, my mountain, Tongariro. There burns my fire, kindled by my ancestor Ngātoroirangi. It was he who lit that fire, and it has burned there ever since. That is my fire of occupation. Now show me yours."

Kepa Te Rangihiwinui Taitoko was silenced, but the decision rested with the Land Court. A year later, the block was divided between the tribes of Tūwharetoa, Whanganui, and Ngāti Tama of Turoa. A long-term lease for over three-quarters of the block was awarded by the Court to sheep farmers Moorhouse and Studholme.

Five years later, the Land Court convened in the district once more, at the request of Ngāti Tūwharetoa and Ngāti Māniapoto, to clarify the location of their boundary. The Court required that all the lands in a vast area be included in the hearing. One border of this land could not be considered in isolation. The peaks of Tongariro, Ruapehu, and Ngāuruhoe were heading for a certificate of title.

During the Land Court hearing, Horonuku expressed his fears to Lawrence Grace, his European son-in-law, who was also his adviser and a member of parliament.

"If our mountains of Tongariro are included in the blocks passed through the Court in the ordinary way, what will become of them? They will be cut up and perhaps sold, a piece going to one Pākehā and a piece to another. Tongariro is my ancestor, my tupuna. It is my head; my mana centres round Tongariro; my father's bones lie there today. I cannot consent to the Court passing these mountains through in the ordinary way. After I am dead, what will be their fate? What am I to do about them?"

Tongariro National Park

Grace, his son-in-law, replied to Horonuku's question, "Why not make them a tapu place of the Crown, a sacred place under the mana of the Queen? The only possible way to preserve them forever is to give them to the Government as a reserve and park, to be the property of all the people of New Zealand, in memory of Te Heuheu and his tribe."

Gifting the peaks of the volcanoes required the approval of the Tūwharetoa subtribes and the transfer of several land titles to Horonuku. These agreements and transfers were gained, and the title for 2630 hectares of land was deeded by Horonuku and Ngāti Tūwharetoa to the Crown in 1887. Te Heuheu Tukino IV (Horonuku) died the year after.

By 1907, the Crown had purchased neighbouring land and had gazetted 25 000 hectares as the Tongariro National Park, the fourth national park in the world and the first national park in New Zealand. The park has continued to be extended and is now three times larger than its original size, but it is still based around the sacred gift of Ngāti Tūwharetoa.

A historic saying (kōrero) that acknowledges and gives respect to the sacred values of Ngāti Tūwharetoa – the mountain, the lake, the people, and their chief:

Ko Tongariro te maunga,
Ko Taupō te moana,
Ko Tūwharetoa te iwi,
Ko Te Heuheu te tangata.

Tongariro is the mountain,
Taupō is the lake,
Tūwharetoa are the people,
Te Heuheu is the man.

Tongariro National Park – World Heritage Site

The gift of Tongariro to the people of New Zealand was, in effect, a gift to the people of the world. The volcanoes, glaciers, plants, and animals of the park represent a combination of land forms and natural communities that is unique on this planet.

In 1990, Tongariro National Park gained World Heritage status for its natural landscape values. This was in recognition of the unique landforms created by the volcanoes in the park. Later, the World Heritage Committee re-examined Tongariro National Park to consider its cultural landscape values. The new criteria included sites where spiritual and cultural values are recognised as part of the landscape. In 1993, Tongariro National Park became the first World Heritage Site in the world to be given World Heritage status within the Cultural Landscapes category.

Tumu Te Heuheu, currently Paramount Chief of Ngāti Tūwharetoa, is the great-great-grandson of Te Heuheu Tukino IV (Horonuku). He is continuing to protect "the sacred gift" through his interest in conservation and his leadership. He is the leader of the team of New Zealanders that represents New Zealand on the World Heritage Committee (since 2003).

Source: Department of Conservation, New Zealand

The moon rising behind the cone of Mt Ngāuruhoe, highlighting the plume of steam escaping from the volcano.

Source: Department of Conservation, New Zealand

Suggested Student Activity 1

The Sacred Gift

Objective:

To have students understand how and why Tongariro National Park came to be known as "the sacred gift"

For the activities given below, the students will need to read, or have read to them, the legend Ngātoroirangi and the Mountains of Tongariro as well as the text The Sacred Gift (on pages 187–188).

Your students could:

- Discuss in small groups the positions taken by Kepa Te Rangihiwinui Taitoko and Te Heuheu Tukino IV and then report their findings to the rest of the class.
- Create and present a role play, a radio play, and/or an enactment of the 1881 Land Court hearing. The role of the narrator should be considered important.
- Write a recount of the events of the Land Court hearing of 1881 from the perspective of a Pākehā settler who has a farm in the Tongariro area.
- Write a poem expressing the feelings they think Te Heuheu Tukino IV held towards the mountains of Tongariro, Ngāuruhoe, and Ruapehu and the land surrounding them.

Mt Ngāuruhoe in winter.

Source: Department of Conservation, New Zealand

The Earth's Structure

Earthquakes and volcanoes are connected. Some countries, such as New Zealand, have frequent earthquakes and volcanic activity. Earthquakes and volcanoes tend to occur in the same areas, and they are usually distributed over the surface of the Earth in the form of large, irregular bands. One of the best known bands is the Ring of Fire, an arc of volcanoes that encircles most of the Pacific Ocean. The Ring of Fire marks the edge of a vast plate of rock – the bed of the Pacific Ocean.

Temperature

The Earth's temperature is hottest at its centre, reaching 5000 degrees Celsius at its inner core. Between 100 and 350 kilometres below the Earth's surface is a layer of rock called the asthenosphere, which has a temperature of over 1000 degrees Celsius. Even though this rock is very hot, it is kept from melting by the great pressure at this depth.

The top layer of the asthenosphere blends into the lithosphere, a 100-kilometre-thick layer of solid rock. The upper lithosphere makes up the Earth's crust. The Earth has, in fact, two kinds of crust: oceanic crust and continental crust. Continental crust rides higher in the lithosphere than oceanic crust and generally projects above sea level (see Figure 1).

A cracked shell

The continental masses of the Earth form a kind of cracked shell around it (see Figure 2). These masses were formed by the rigid lithosphere being dragged by currents in the asthenosphere deep below the Earth's surface. This cracked shell is made up of roughly twelve large plates and several smaller ones. They float on a mantle of semi-fluid rock, constantly drifting, colliding, folding, and sinking in a process known as plate tectonics or continental drift. It is along the edges of these enormous plates that most of the Earth's earthquakes, volcanoes, and mountain ranges occur.

Spreading ridges

Where the currents rise, the plates are forced apart and molten asthenosphere (magma) flows to the surface through the oceanic crust (see Figure 3). Along these sites, mid-ocean ridges are formed, and these are the source of many shallow earthquakes and of much of the volcanic activity of the world. New sea floor is continuously created on either side of the ridges, filling the gap created as the currents push the plates apart at a rate of 10 centimetres a year.

Figure 1

The Earth's crust and the main layers of rock beneath. The temperature of the layers becomes hotter deeper into the Earth.

Diagram: Elspeth Wingham and Robin Slow

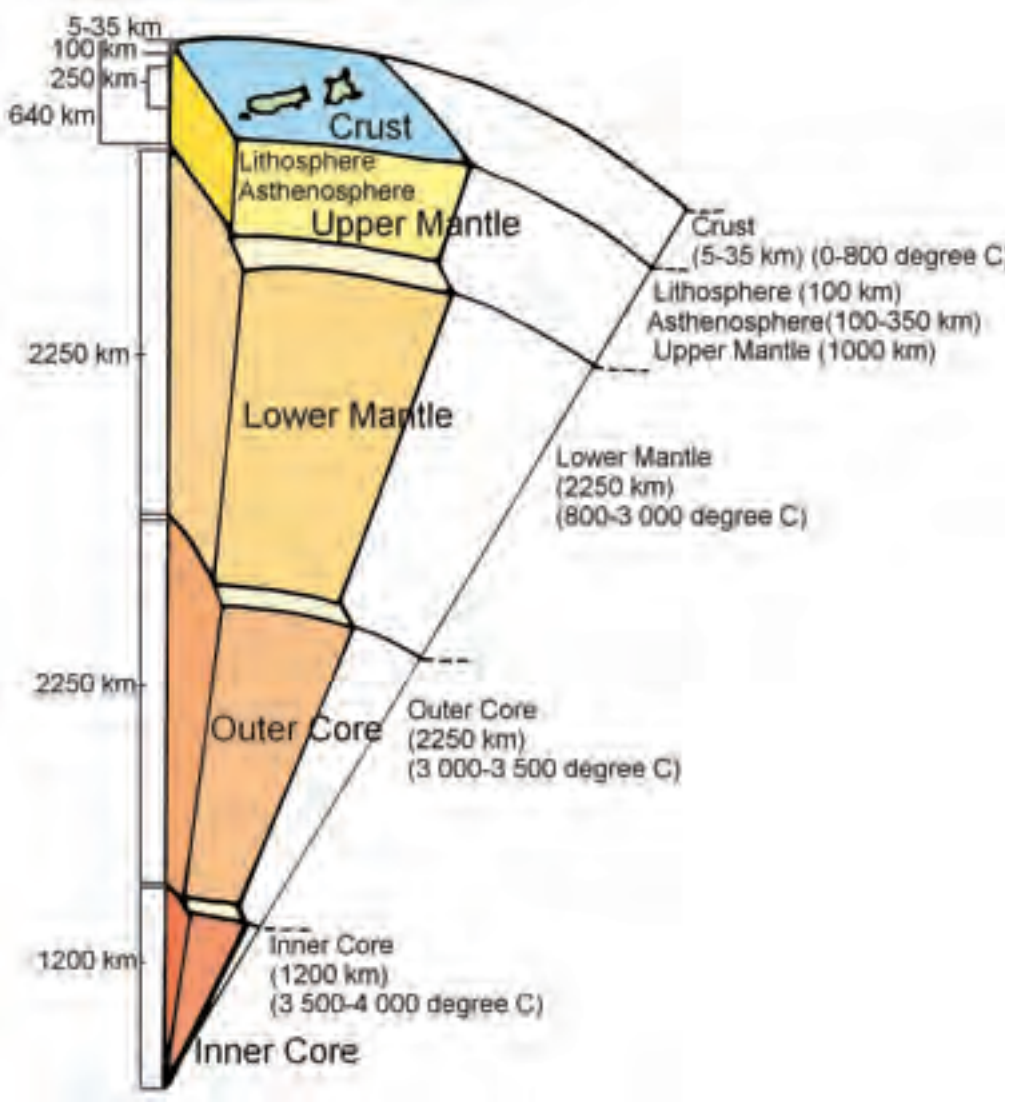
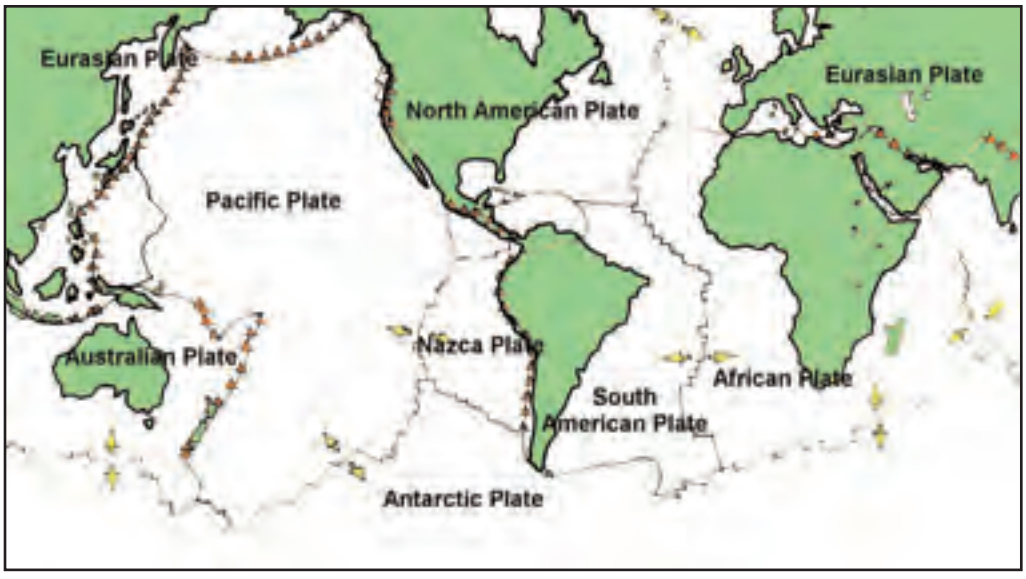


Figure 2

The continental plates and the locations of volcanoes and active zones along their margins.

Map: Elspeth Wingham and Robin Slow



Where plates collide

Over millions of years, the new ocean floor is carried further away from the spreading edge, sinking as it gradually cools. Eventually, it arrives at the edge of a plate. Nothing can stop a plate from moving, so along the collision zone, one plate is usually forced, or subducted, beneath the other into the asthenosphere below (see Figure 3).

When one plate is oceanic crust and the other is continental crust, it is always the denser oceanic crust that sinks. Along the subduction zone, a deep ocean trench forms. The continental plate may break and crumple along its edge, leading to the formation of mountain ranges. As the two plates scrape past each other, earthquakes are generated at increasing depths.

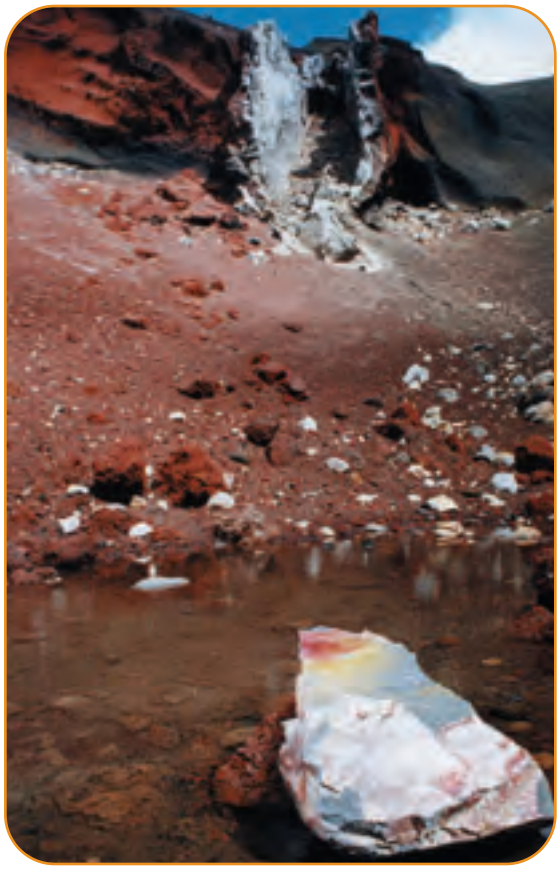
Water squeezed out of the sinking oceanic crust reacts with the asthenosphere, lowering its melting point and forming a molten rock called andesitic magma. The magma rises through the cracks in the continental plate, erupting through the surface as volcanoes.

The characteristics of the volcanoes of Tongariro National Park

A tectonic plate boundary lies just east of the North Island of New Zealand, where the Pacific Plate slides under the Indian-Australian Plate. This area of subduction has created a line of volcanoes that stretches from Tonga to Ruapehu. It is also the southern end of the sequence of volcanoes known as the Pacific Ring of Fire.

The region of volcanic activity that occurs from Mt Ruapehu to White Island in the Bay of Plenty is known as the Taupō Volcanic Zone.

Tongariro National Park has three andesitic volcanoes: Ruapehu, Tongariro, and Ngāuruhoe. Traditionally, Ngāuruhoe has erupted at least once every nine years. Mt Tongariro's active Red Crater last emitted ash in 1926. Mt Ruapehu, which last erupted in 1996, is the highest mountain in the North Island and has eight named glaciers on it. They are the only glaciers in the North Island.



The dike in Mt Tongariro's Red Crater. Dikes are formed when lava solidifies into vertical sheets beneath the surface, only to be exposed later by an eruption or explosion. The outside of the Red Crater's dike solidified after the central magma drained away, leaving the dike partially empty.

Source: Department of Conservation, New Zealand

Photo: P. Blaxter

The New Zealand continent

Geologists consider New Zealand to be a continent, despite its relatively small size. The New Zealand we know is merely the highest 10 percent of a largely underwater continent that stretches from the Chatham Islands in the east to Campbell Island in the south, and northwards to Lord Howe Island and New Caledonia. Over time, the land area has been reduced by erosion. Today, the greater part of the New Zealand continent is underwater, forming the country's vast continental shelf (see Figure 4).

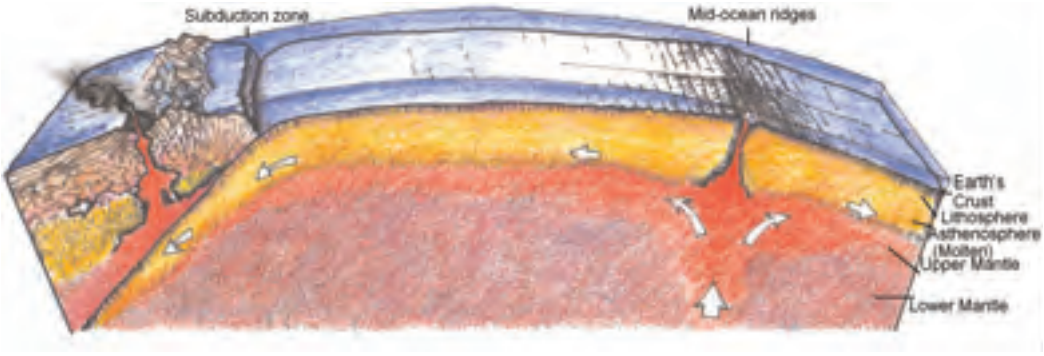


Figure 3

Currents rise and force the continental plates apart, and molten asthenosphere (magma) flows to the surface through the oceanic crust. At these sites, mid-ocean ridges are formed.

Diagram: Elspeth Wingham and Robin Slow

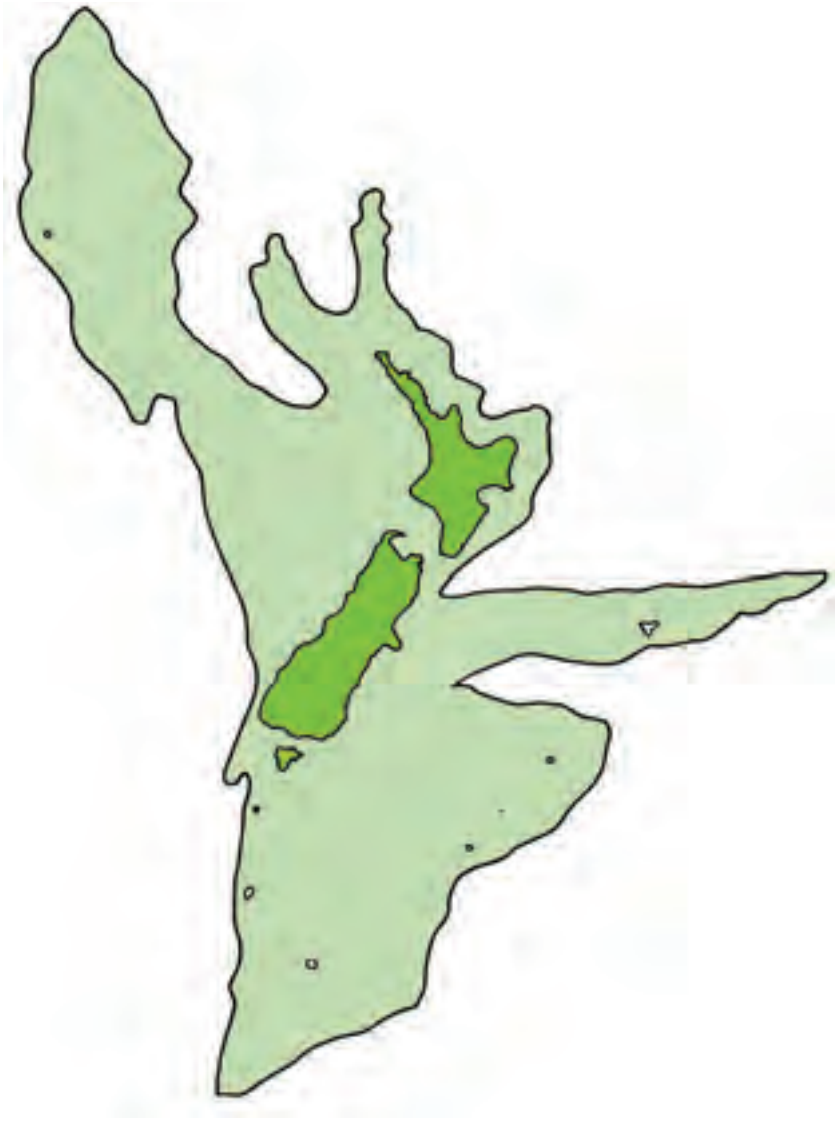


Figure 4

Most of the continent of New Zealand is underwater and forms the country's vast continental shelf.

Diagram: Elspeth Wingham and Robin Slow

Suggested Student Activity 2

The Earth's Structure

Objective:

To have students investigate the composition of our planet and gain an understanding of some processes that shape it

Volcanoes is a topic of study that is popular with students. The volcanoes of the Tongariro National Park, together with the other volcanoes in New Zealand and the Pacific, provide opportunities and resources for students to observe and investigate volcanic activity along with the landscape features it creates.

Your students could:

- Determine whether there is any evidence of volcanic activity in their area or a nearby area. If they find evidence, describe what it is and mark the volcanoes on an outline map.
- Name any patterns that they can identify in the occurrence of volcanoes in their country and throughout the Pacific and suggest what this pattern might relate to.
- Identify where the nearest volcanic activity is, or has been, either in their country or elsewhere in the Pacific. Find out whether there is a pattern to the sites and, if so, what this pattern is. They can use the Pacific map included in this kit for this activity. View and discuss videos that deal with volcanoes, plate tectonics, and continental drift and decide what the impacts of any volcanic activity in the students' own area could be on the local landscape and others nearby.
- Describe the fractured and changing nature of the Earth's crust and explain the reasons for the changes that volcanic activity brings to the Earth's surface.
- Draw a cross-section of the Earth showing what it looks like inside. Label and briefly explain what each part is and how hot it is.

Note: Teachers may consider using the New Zealand Ministry of Education's resource *Volcanoes: Hot Rock in a Cool World* (2001), Book 12 in the Building Science Concepts series, to support their work on the above student activities.

Aerial view of Mt Tongariro and Mt Ruapehu.

Source: Department of Conservation, New Zealand

Structure of Volcanoes – Eruptions and Activity

Different types of volcanoes are formed from different types of magma, which produces the range of volcano shapes and styles of eruption. These are the major types of volcanoes:

Spreading ridge volcanoes

The most fluid lava (molten rock after it has reached the surface and after the gas inside has started to escape) is basaltic and is derived from molten asthenosphere that has risen from deep below the Earth's surface. This can be found where plates are pulling apart; magma wells up to fill the gap, erupting onto the sea floor as lava flows. These lava flows build up to form a spreading ridge of undersea volcanoes. Examples of this volcanism can only be seen where a rift rises above sea level (for example, in Iceland) or crosses a continent (for example, the Rift Valley of Africa).

Hot spot volcanoes

These volcanoes can occur anywhere and are unrelated to plate tectonics. They erupt above a localised source of heat deep beneath the lithosphere created by a rising plume of asthenosphere or a concentration of heat-producing radioactive elements.

Shield volcanoes

Most hot spot volcanoes erupt fluid basalt lava as fountains of molten rock, called fire fountains, from fissures or single vents. The lava flows readily, and these volcanoes have gentle slopes and are called shield volcanoes. The best examples of shield volcanoes are found in Hawai'i (see Figure 5). The island of Hawai'i is the largest volcano in the world. There have been a number of hot spot volcanoes in New Zealand, notably around Dunedin, on Banks Peninsula near Christchurch, and in the Auckland area.

Scoria cones

A scoria cone is usually a small, steep-sided hill with a deep central crater. It is produced by fire-fountaining of frothy, gas-rich lava that cools in flight to form scoria and builds up as a cone around the vent (see Figure 6). Many such cones are found in the Auckland area.

Stratovolcanoes

When magma comes from a subduction zone, it is formed from a mixture of molten asthenosphere and sedimentary rock and is called andesite. An andesite eruption produces a steep-sided volcanic cone surrounded by a gently sloping ring plain (see Figure 7). This plain is composed of rocks and mud carried down the volcano in flows called lahars together with rubble carried down the mountainside as a mixture of hot rocks, ash, and gas. The cone is built up of alternate layers of lava and broken rock. Typical New Zealand examples are Mt Taranaki and Mt Ruapehu.

Figure 5

In shield volcanoes, the lava flows readily and cools to a dark grey colour. These volcanoes have gentle slopes.

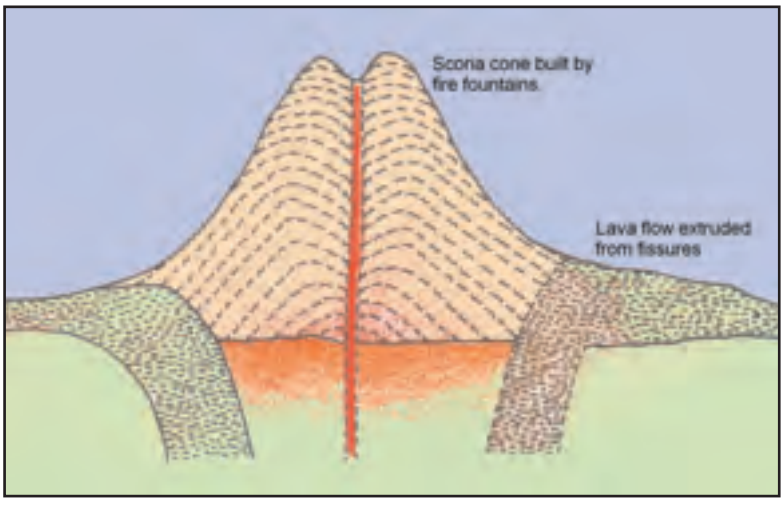


Figure 6

An idealised section through a scoria cone lava flow volcano, of which Mt Eden in Auckland, New Zealand, is a well-known example.

Figure 7

Stratovolcanoes typically have steep-sided volcanic cones and a gently sloping ring plain. The cone has alternate layers of lava and broken rock, resulting in a "stratovolcano".

Diagrams: Elspeth Wingham and Robin Slow

Dome volcanoes

Sometimes rising magma above a subduction zone melts continental crust, forming a kind of magma called rhyolite. It oozes from the vent as a great bubble of rock, doming to heights of several hundred metres. Subsequent eruptions may produce further bubbles, and the volcano becomes a jumble of overlapping domes (see Figure 8). Mt Ngongotahā (next to Lake Rotorua) and Mt Maunganui (in Tauranga) are classic New Zealand examples of dome volcanoes.

Caldera volcanoes

Sometimes a large amount of continental crust is melted above a subduction zone, and the rhyolite magma accumulates in a huge chamber below the Earth's surface. If the internal pressure of this chamber is released rapidly (like a balloon popping), the most violent of all eruptions occurs (see Figure 9).

The chamber empties in a few hours, with pumice and ash being ejected up to 50 kilometres into the air, powered by the release and expansion of volcanic gases. The plume of ash is blown sideways by the wind so that ashfalls cover a wide area. The heavier parts of the eruption column collapse back towards the ground as super-heated clouds of gas and pumice. These form huge pyroclastic flows that explode away from the vent across the land at speeds initially close to that of sound. They eventually form thick deposits called ignimbrite that are sometimes deep enough to hold sufficient heat to weld the cooling flow into solid rock.

During the eruption, the roof of the emptying magma chamber collapses, forming a giant crater in the surface called a caldera (see Figure 10). This may later fill with water to form a lake, as in the case of Lake Rotorua and Lake Taupō in New Zealand.

The 1995 eruption of Mt Ruapehu, looking north towards Mt Ngāuruhoe and Lake Taupo.

Photo: Lloyd Homer, copyright © Institute of Geological and Nuclear Sciences

Lake Taupō and the big bang

As unlikely as it seems now, Lake Taupō was probably the greatest volcano to have erupted on this planet in the past five thousand years, and it would have affected the global climate. Ash that had been blasted high into the atmosphere caused blood-red sunsets recorded by historians in ancient China and Rome; their midday skies were also darkened by the vast quantity of airborne volcanic dust. Layers of pumice, ash, and charcoal can be seen in road cuttings near Taupō. Evidence from the dating of burnt trees, along with the records from ancient China and Rome, suggest that the great Taupō eruption was likely to have occurred in AD 186. The massive caldera it left behind subsequently filled with water; now it offers peaceful surroundings, boating opportunities, and excellent trout fishing.

Figure 8

With dome volcanoes, as the lava cools and shrinks, the top of the mountain is often drawn down and flattened out while the crumbling of the outer layer results in a ring of loose material. The upper slopes may project from this ring as steep cliffs.

Figure 9

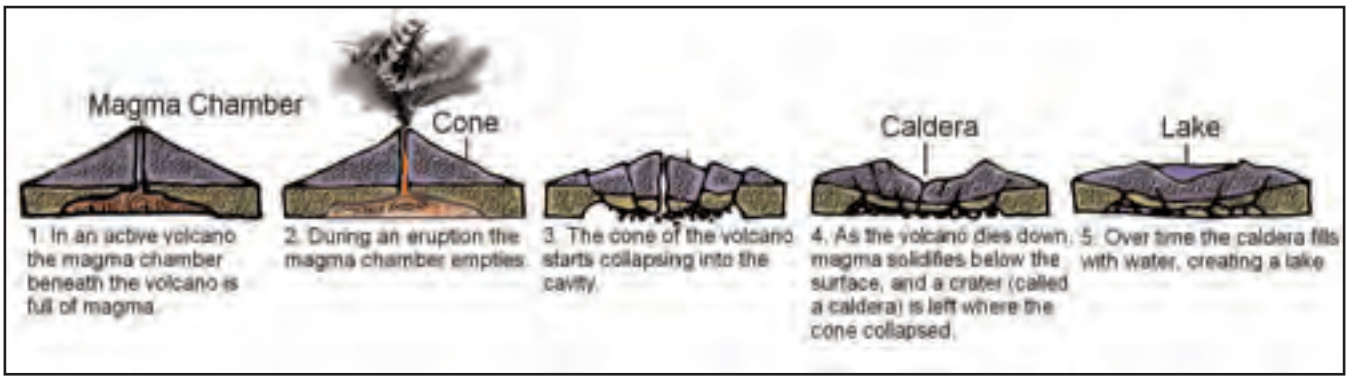
Caldera volcanoes produce violent eruptions from magma that accumulates in a huge chamber. An eruption occurs when the internal pressure of the chamber is released.

Diagrams: Elspeth Wingham and Robin Slow

Figure 10

The sequence of stages in the formation of a caldera

Diagram: Elspeth Wingham and Robin Slow



Suggested Student Activity 3

Structure of Volcanoes – Eruptions and Activity

Objective:

To assist students to identify and name different types of volcanoes and some forms of volcanic activity




A wide variety of volcanic forms is found in New Zealand and throughout the Pacific. The appearance of some volcanoes can change significantly and quickly if there is a high level of volcanic activity. The impacts caused by weathering and erosion, while slow, can, over time, be significant.

Your students could:

- View a video of an erupting volcano.
- Set up a wall display of images illustrating volcanic landscapes in the Pacific and identify the features of these landscapes, including the different shapes that volcanoes have.
- Explain the ways in which volcanoes can form and why there are different-shaped volcanoes.
- Identify and describe the status of volcanoes in their area or country. That is, are the volcanoes extinct, dormant, or active?
- Write a detailed description, with images, of one type of volcano. Present this information to the rest of the class and collate the reports into a booklet for future reference.
- Imagine that they are a newspaper or television reporter who will prepare a detailed and descriptive report on a volcanic eruption they have witnessed first-hand.
- Identify and record any observable changes that have occurred to a volcanic landscape due to weathering and erosion.
- Discuss the consequences of weathering and erosion on landscapes surrounding volcanoes and suggest how these changes might have influenced land use.

Note: Teachers may consider using the New Zealand Ministry of Education's resource *Weathering and Erosion* (2001), Book 2 in the Building Science Concepts series, to support their work on the above student activities.

New and old islands

Most volcanic activity in the central parts of plates occurs on the floor of the South Pacific. This activity produces numerous submarine volcanoes and volcanic islands, both as isolated features and in chains. These volcanic island chains are a feature of the Pacific. Some examples are: the Hawaiian Islands, the Tuamotu Archipelago in French Polynesia, the Gilbert Islands in Kiribati, and the Marshall Islands (see Figure 11).

Geologists believe that these islands are formed as the oceanic plate moves over a hot spot (see Figure 12). Volcanism occurring over a hot spot produces a submarine volcano that can grow, through successive eruptions, into an island. If the hot spot's position in the mantle remains fixed for a long time, the moving oceanic plate carries the volcano past the magma source. This volcano then becomes extinct or dormant, and a new volcano forms over the fixed hot spot. As this process continues, one volcano is built after another, and so a chain of volcanoes is produced.

How islands age – from new to old

A new volcanic island or seamount is formed by eruptions from a fixed hot spot or source of magma in the mantle (see Figure 12 a).

As the oceanic plate moves, the volcano is carried away from the source of magma, and the volcano then becomes extinct. The surface of the island is gradually eroded over time to sea level, and reefs can grow to form an atoll. A new island is then formed over the hot spot (see Figure 12 b).

The oceanic plate continues to move and so produces a chain of islands (see Figure 12 c).

The islands of the chain are progressively older the further away from the hot spot they are situated. The oldest islands eventually become submerged (see Figure 12 d).

This raises the interesting question of whether the sea level is rising in places like Kiribati and Tuvalu or the islands are ancient and are sinking in a natural process. It is also possible that what is happening could involve a combination of the two processes and other factors.

Isolated volcanoes

Isolated volcanoes can result from small hot spots that do not last long enough to produce a volcanic chain, or they can develop from minor pockets of magma carried with the moving asthenosphere.

An aerial view of "the sacred peaks" – Ruapehu, Ngāuruhoe, and Tongariro. Ruapehu is the volcano at the southernmost extremity of the Taupō Volcanic Zone.

Photo: Lloyd Homer, copyright © Institute of Geological and Nuclear Sciences

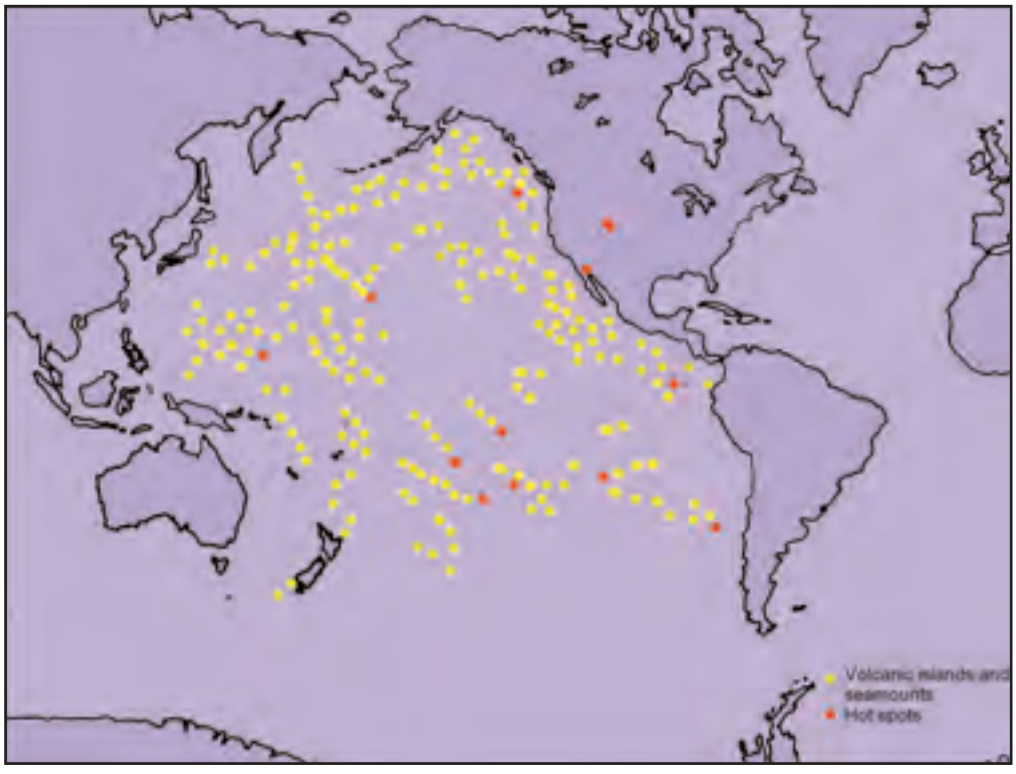


Figure 11

The main hotspots and resulting volcanic islands and seamounts in the Pacific.

Map: Elspeth Wingham and Robin Slow

Hot spots

Within the Pacific Plate, hundreds of islands and seamounts have been formed by volcanism. These are believed to be produced by masses of hot mantle material, called mantle plumes, rising beneath the plate. Chains of islands formed from volcanoes can be produced as a plate moves over a hot spot (see red dots).

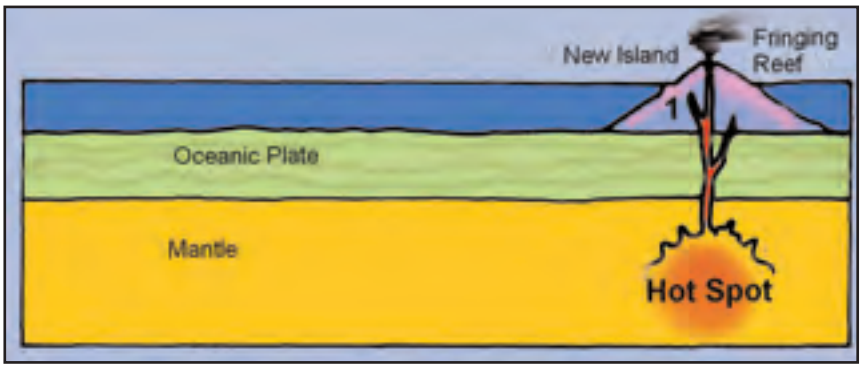


Figure 12 a

A volcanic island or seamount is built up by explosions and flows from a fixed hot spot, or source of magma, in the mantle.

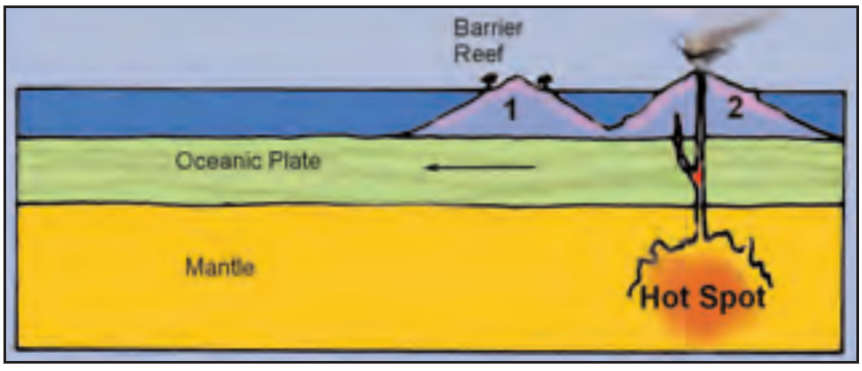


Figure 12 b

As the plate moves, the volcano is carried away from the source of the magma and becomes extinct. The surface of the island is gradually eroded over time to sea level, and reefs can grow to form an atoll. A new island is then formed over the hot spot.

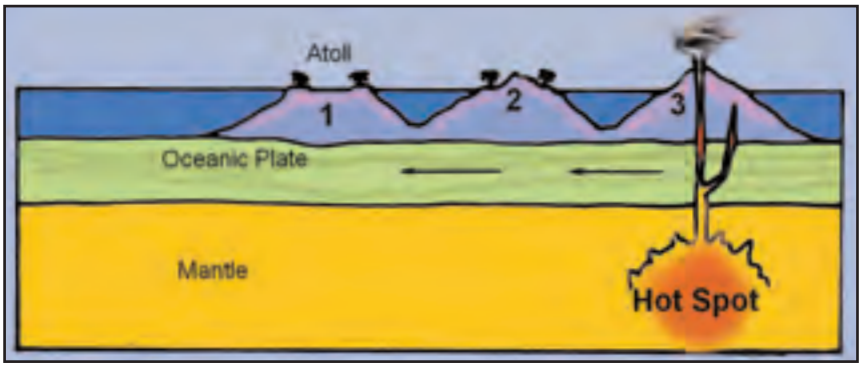


Figure 12 c

Continued plate movement produces a chain of islands.

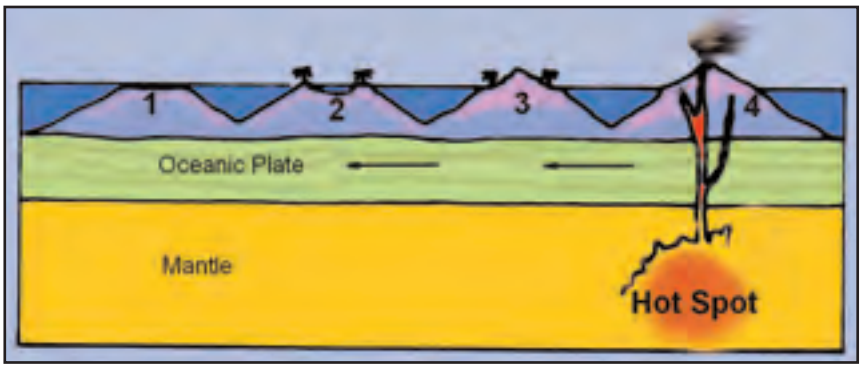


Figure 12 d

The islands of the chain are progressively older the farther away they are from the hot spot.

Diagrams: Elspeth Wingham and Robin Slow

Suggested Student Activity 4

New and Old Volcanoes

Objective:

To assist students to understand how an island can be formed over a hot spot and that over time the movement of the oceanic plate will shift the island away from the hot spot

In the South Pacific, there is a significant amount of volcanic activity. A new volcanic island or seamount is formed by eruptions from a fixed hot spot or source of magma in the mantle.

Your students could:

- Identify the nearest hot spot(s) to where they live and identify the status of the volcano(es), using the information contained in Figure 11.
- Locate an example of a Pacific volcanic island chain and write a description of its formation, its movement, and how erosion has changed the older islands of the chain.
- Explain how learning about volcanic island chains can help their understanding of plate tectonics.

The sacred peaks of Tongariro National Park: a cultural dimension

The sacred peaks of Tongariro National Park – Ruapehu (2797 metres), Ngāuruhoe (2290 metres), and Tongariro (1968 metres) – dominate the landscape of New Zealand's central North Island. For days and sometimes weeks at a time, their powerful stature can lie hidden in cloud. But when the cloud clears, the volcanoes reappear, towering above the heavily etched landscape that surrounds them. To the original inhabitants of the central North Island, the local Māori or tangata whenua, the mountains represent the home of their ancestors. They are tapu areas, revered in legend and story, to be passed by with respect.

Tongariro National Park welcome sign.

Source: Department of Conservation, New Zealand

Mountains have particular significance for the Māori people. Most will name one mountain as having particular significance for their tribe or iwi. That mountain will be sacred to the tribe and one of the sources of their sense of identity and their mana (or pride) and strength of spirit.

Suggested Student Activity 5

Tongariro National Park: A Cultural Dimension

Objective:

To assist students to understand the cultural significance of the sacred peaks of Tongariro National Park

Tongariro National Park became New Zealand's first national park and the fourth national park anywhere in the world. It was also the first national park to be created from a gift of land by an indigenous people.

At the international level, after having been inscribed as a natural World Heritage Site in 1990, it was also nominated for its cultural value as the first World Heritage Cultural Landscape on the World Heritage List in 1993.

Your students could:

- Identify and list the reasons why the sacred peaks of the Tongariro National Park hold special cultural significance for Māori.
- Identify and list the special features of the Tongariro National Park and the reasons that led to it becoming a national park.
- Identify the reasons for which Tongariro National Park was nominated as a cultural landscape on the World Heritage List.
- Identify and describe a site in their community that is significant in both natural and cultural terms to the local people.
- Write and illustrate poems about the sacred peaks, using the images of Tongariro National Park included in this unit and/or other images obtained elsewhere.

A Mountain Explodes

On 23 September 1995, fifty years after its previous large eruption and 108 years to the day after the mountain peaks had been given as a gift to the people of New Zealand, Ruapehu erupted again. It was the biggest explosion of the mountain in over a century, and it caused disruption to air travel, tourists' itineraries, and business operations and threatened power generation. Some would believe that the mountain was having its say – perhaps demanding greater respect from the wider community.

The ash eruptions of Mt Ruapehu were repeated in 1996. Such eruptions are relatively frequent events on this very active volcano.

Next to the physical presence of the mountains, the most striking feature in much of Tongariro National Park is its lack of trees. Instead, there are large areas of tussock shrub, alpine herbs, and desert lands. The often stark landscape results from centuries of volcanic eruptions and fires that were purposely lit, first by Māori and later by Europeans. Both sought to ease access and travel and to open areas for cultivation and grazing. The forest shrank back, and the tussock spread. This landscape contrasts with most other areas in the North Island, which, if they have not been converted into farmland or towns, are often covered in lush native bush.

Red tussock grasslands on the slopes of Mt Girdlestone with Mt Ruapehu in the background.

Source: Department of Conservation, New Zealand

Suggested Student Activity 6

A Mountain Explodes

Objective:

To assist students to understand the cultural and environmental impacts of a volcanic explosion

When a volcano erupts, it can affect a number of things. Changes to the atmosphere can cause changes to the weather. Landscapes can be altered, and many living things can die. A volcanic explosion can markedly alter ecosystems and people's interactions with their environment.

Your students could:

- View a video, study images, and/or visit a site where a volcanic eruption has occurred. Discuss the before-and-after landscapes and land uses (if the site is inhabited).
- Plan, then write, a newspaper report of an imaginary severe volcanic explosion, describing the impact this has had on the people living in the area and their culture and traditions.
- Identify and describe the advantages that a volcanic eruption could have for the people living nearby.
- Make murals or paint pictures that show the impacts of a volcanic explosion on its surrounding environment.
- Create an image, in the medium of their choice, of a landscape a hundred years after a volcanic explosion.

Different Cultures with Different Needs

The land wars of the nineteenth century disrupted the traditional Māori way of life. This, coupled with the expansion of European land laws, culture, and religion, opened the way for continuing exploration on the mountains of Tongariro National Park. However, the tapu still remains and, because of the gift of the sacred peaks to the Crown, all New Zealanders have a responsibility to ensure the integrity of Tongariro National Park.

National parks are rapidly becoming islands of ecological history within areas of development and settlement. They also represent glimpses of the way the world once was and are cultural icons that tie their inhabitants to the land. The parks attract hikers, mountaineers, skiers, photographers, botanists, geologists, and sightseers.

Visitor facilities at Tongariro National Park.

Source: Department of Conservation, New Zealand

Suggested Student Activity 7

Different Cultures with Different Needs

Objective:

To assist students to understand the different values that can be placed on an environment by different cultures

Different cultures can have different perceptions about the value of a particular environment, and people's descriptions of places and environment reflect their particular purposes and points of view.

Your students could:

- Investigate, and then report to the rest of the class, why different people, including those from different cultures, respond differently to a particular environment.
- Identify and discuss in small groups how different perceptions and values can influence the attitudes towards a particular environment.
- Write a paragraph explaining why people attach importance to their culture and heritage.
- Invite a local elder to speak to them about the values he or she holds for a particular site and the reasons for this belief.
- Make murals using a variety of media to depict either the traditional values that Māori hold for Tongariro National Park or, alternatively, the values that young New Zealanders hold for the park.

Glossary

Ahi-kā	To burn; a fire; to bring about a new action or condition; fire of occupation
Andesite	An igneous (volcanic) rock that has a fine-grained texture
Andesitic	See andesite.
Asthenosphere	The layer of rock 100–350 kilometres below the Earth's surface
Basalt	The dense, black rock formed from lava
Caldera	A large depression formed when part of a volcano collapses inward
Dome volcanoes	See shield volcanoes.
Geologist	A person who studies the science of the Earth's crust, its strata, and associated relationships and changes
Ignimbrite	The rock formed from pyroclastic flows
Iwi	A tribe; people
Lithosphere	A 100-kilometre-thick layer of rock that lies on top of the asthenosphere and contains the Earth's crust
Mana	Status
Moana	A lake
Pākehā	A non-Māori New Zealander
Pyroclastic flow	A volcanic flow that explodes away from the vent and contains pumice and gas
Raupata	The rights to claim the fruits of conquest
Rhyolite	The rock formed from magma that has risen above a subduction and has melted continental crust
Scoria volcanoes	Volcanoes built up from scoria, which is rock with countless bubble-like cavities
Shield volcanoes	Volcanoes, also known as lava domes, that are characterised by gently rising, smooth slopes that tend to flatten near the top
Stratovolcanoes	Volcanoes that are often steep and high and are built up of layers of cinder and ash alternating with layers of lava
Subducted	When one of the Earth's plates is forced beneath another plate that it is colliding with
Tangata whenua	The original inhabitants; the people of the land
Tapu	Forbidden; inaccessible; not to be defiled; sacred
Tohunga	A high priest
Tupuna/Tipuna	An ancestor (plural tūpuna/tīpuna)

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East Rennell World Heritage Site

Author:

Linda Puia Tamaika

Solomon Islands

Intended age group: 10–13 years

Category: World and national heritage – natural and cultural

The Creation of Rennell and Bellona

In the beginning, there was nothing but ocean. In the depths of the ocean, a sisi (a nerita shell) grew. It grew and grew until it broke through the surface of the sea. It continued to grow until it became an island. So there, in the middle of the ocean, stood the island of Bellona. The first living thing to appear on the island was the pagati (the fast-running tiger beetle). Not long after that, a soi tea (an arrowroot) sprouted and grew.

Tangagoa (a god that lived in the sea) came out from the depths of the ocean and saw the island. He watched the soi tea grow with much interest. However, the plant could not grow very tall because it was stopped by the sky, which was almost touching the land. Tangagoa decided that he was going to move the sky and make it distinct from the land so that the soi tea could grow. He grabbed the sky in both hands and slowly stood up. He pushed it upwards until it was resting on his head. Then he lifted the sky from his head and stretched his hands upwards. When he was on tiptoes, he got his ga'akau tu'uti (his sacred, priestly staff) and rested the sky on it. So the sky was then separated from the land and the ocean.

All of this was watched by Tehainga'atua (the most important sky god, the provider and ruler of nature), and he liked what he saw. He was the eldest son of the gods Tepoutu'uigangi (the father of all sky gods) and Guatupu'a (the most high goddess, Tepoutu'uigangi's wife). He decided that he wanted the island, so he descended on to Bellona and confronted Tangagoa. The two gods had a fearsome fight until Tehainga'atua beat Tangagoa, who fled back to the depths of the ocean.

Ataganga was the first person to find Bellona. He had three sons, Mautikitiki, Anabeka, and Maui. One day Mautikitiki went fishing with his brothers. The younger boys caught many fish, but Mautikitiki was not as lucky. When the canoe was almost full, the younger brothers suggested that they return home, but Mautikitiki was annoyed that he had not caught one fish. He insisted that they waited until he caught a fish. He fished and fished, but nothing happened.

Fishermen in an outrigger canoe.

Photo: Paddy Ryan

When it was almost nightfall, he felt a tug on his fishing line. He started to pull it in, but it was heavy, so his brothers helped him.

They pulled and pulled, and out of the ocean an island appeared. "It's an island!" shouted Mautikitiki. It was rocky and had corals all over it. "Let's turn it over so that the smooth underside of it is turned up," Mautikitiki suggested. But as soon as they started to roll the island onto its side, the eastern end of the island started to sink. Mautikitiki and his brothers tried to hang on to the line, but it was sinking fast. In despair, Mautikitiki cried out to his god, "O Tehainga'atua, may your soil rise and stand!" The island stopped sinking, and so stood the island of Rennell or "Te Ika a Mautikitiki" (Mautikitiki's fish).

Rennell and Bellona were just barren islands. The only source of food for Mautikitiki and his family was the fish they caught in the sea. One day, Mautikitiki saw some people fishing off the coast of Rennell. The group caught many fish, among them a giant flounder. While Mautikitiki watched from behind the rocks, the group came ashore. They offloaded their catch and went out to sea again. Mautikitiki crept down to have a closer look, but suddenly he heard voices, and he saw that the people were coming back. There was no place to hide, so he opened the flounder's mouth and jumped inside. The travellers packed their fish in baskets and left.

When Mautikitiki opened the flounder's mouth and looked out, he saw that he was in a different place. The place was lush with green, and he could see taro, bananas, and other crops growing nearby. Mautikitiki could not believe his eyes. He jumped out of the flounder's mouth and just stood there and stared.

Suddenly he heard someone shouting. Startled, he looked behind him and realised that he had been spotted. He saw a great number of people running towards him. They seemed very angry and were waving adzes and clubs. Terrified, Mautikitiki climbed up a coconut tree and did not dare to come down. He knew he would be killed because he had entered Tu'a gangi (the invisible heaven), where no mortal man was allowed to enter. All he could do was sit at the top of the coconut tree, and he hoped that the people below would get tired and go away. But they did not, and Mautikitiki began to wonder whether he would ever escape.

It began to rain heavily. The rain poured down in torrents, and the wind was relentless. All Mautikitiki could do was hang on to the coconut leaves, but the leaves became slippery in the rain. Mautikitiki lost his grip and went tumbling down. He fell down so hard that he fell through the clouds and landed on Rennell. When he looked around, he saw that he was outside a hole that was guarded by a mugikaakoni (a common sandpiper). He was so glad to be safely back home with his family. However, he could think of nothing else but Tu'a gangi and the riches he had seen there. He remembered how much more attractive it looked.

Eventually, he decided that he would find a way to bring some of the riches from Tu'a gangi to Earth. First, he went and collected many parasites and beetles, which were the only animals living on the island. Then he wrapped them up in a leaf and went back to the hole he had seen when he fell down from Tu'a gangi. He hid in the bush and watched the mugikaakoni, wondering how he was going to get past the bird before it alerted the Tu'a gangi people. Then rain fell, and the mugikaakoni hopped into the hole and went to sleep. Mautikitiki crawled out of hiding and grabbed the bird, but it begged to be spared and agreed to lead Mautikitiki to Tu'a gangi.

When he reached Tu'a gangi, Mautikitiki opened the parcel of parasites and beetles and threw them into the people's eyes and blinded them. While they struggled to get the parasites out of their eyes and hair, Mautikitiki grabbed all the fruits and garden crops that he could get his hands on and threw them down to earth. The Tu'a gangi people recovered just in time to see Mautikitiki jumping down with the betape (a type of taro). They made a grab for the leaves, but the plant fell down with Mautikitiki.

From that day, there was plenty to eat on Rennell and Bellona. The leaves of the betape are the only taro that the people of Rennell and Bellona do not eat because the Tu'a gangi people have touched the leaves, and so it is taboo to eat them.

An East Rennell man harvesting taro from his garden.

Photo: Paddy Ryan

Unit Abstract

This unit focuses on East Rennell on Rennell Island in the Solomon Islands as a World Heritage Natural Site. The unit provides information and opportunities to learn about the features that are significant to East Rennell and that give the site its value as a natural heritage site. The unit explores issues relating to management and promotion. The information provided is primarily for teachers, but individual teachers may decide how it could be presented to and used by students.

Kangava Bay from Aloatal Village, East Rennell.

Photo: Paddy Ryan

Relevant Curriculum Links

Social studies	Investigate why particular places and environments are significant for people and why and how people regulate the use of places and the environment.
Science	Investigate and describe adaptations that ensure the survival of animals in their environment.
	Investigate a local environment and explain the reasons for the community's involvement.
Language	Gather, select, record, interpret, and present coherent structured information from a variety of sources using different technologies.

Unit Objectives

Knowledge

To help students develop knowledge and understanding of:

- The importance of the environment to community survival
- The environmental features that are unique to their places
- How the environment can be protected and promoted through community awareness and participation
- The importance of this site to the rest of the world as well as to East Rennell and the Solomon Islands.

Attitudes

To encourage students to:

- Appreciate the need to conserve and look after our places
- Value the local environment and its cultural aspects.

Skills

To help students to develop their ability to:

- Carry out investigations and gather information
- Make decisions and construct alternatives from the information at hand
- Make assessments through observation.

Heritage Site Selection

East Rennell is listed as a World Heritage Site. It is located on Rennell Island, an upraised coral atoll in the southern part of the Solomon Islands. The island is of outstanding geological, biological, and scenic value. East Rennell was included in the World Heritage List because it is the world's second largest coral atoll and contains the largest freshwater lake in the insular Pacific region (excluding those in Australia and New Zealand). This designation means that the natural environment, which contains ecosystems and plant and animal communities, can be protected and preserved. It encourages programmes and projects that aim to protect the natural environment of the site as well as that of other islands.

The site also provides opportunities for visitors to enjoy and appreciate the natural values, which, in turn, make a positive contribution to tourism and the economic development of the Solomon Islands.

Natural Values

- Rennell Island is the world's second largest upraised atoll. It has been uplifted at least five times and is presently in an uplift phase.
- East Rennell has the largest lake in the insular Pacific region, which is home to sea snakes.
- The biodiversity of the site is high.
- The site houses endangered animal and plant species.
- The site houses many endemic species of animals and plants.

Cultural Values

- The site contains evidence of the early cultures that inhabited the Pacific region, for example, fragments of distinctive Lapita pottery.
- There is evidence of major occupation, which gives Rennell great cultural significance in the history of Polynesian migration and settlement across the Pacific.
- There are sites that have significant archaeological evidence of past activities and artefacts of the present-day Polynesian inhabitants of Rennell.

Tourism and Recreational Values

- The site is the subject of prominent scientific studies, especially zoological studies.
- It provides great opportunities for birdwatchers, natural scientists, and photographers.
- It houses relics of World War II.
- It exemplifies village life and cultural activities.
- It provides opportunities for recreational activities, such as bush walking, snorkelling, and kayaking.

Economic Values

- With limited employment opportunities on Rennell, the site provides an opportunity for local people to earn money by selling handicrafts to visitors and operating small tourist lodges.
- With more tourist facilities in place because of the designation as a World Heritage Site, more visitors will come to Rennell, making a contribution to the country's economy.

A dugout canoe on the edge of Lake Tegano, East Rennell.

Photo: Paddy Ryan

East Rennell World Heritage Site: A Natural Heritage Site

The natural environment

The East Rennell World Heritage Site is located on the eastern half of Rennell Island. The island is the southernmost outlying island in the Solomon Islands archipelago. It is covered with lush tropical rainforest from coast to coast and circled with limestone cliffs that fall sheer to the sea.

For its size, Rennell is probably the least environmentally disturbed island in the South Pacific. It is the only location for a number of bird, animal, and plant species and is home to several species that are considered endangered. The island contains the biggest brackish lake in the insular Pacific region (excluding those in Australia and New Zealand). Lake Tegano takes up most of the eastern end of the island, occupying approximately one-fifth of the island's area.

The lake has around two hundred small, forested islands at its northern end. The natural environment is mostly untouched and still retains its beauty and value. The lake, its islands, and the marine reefs are under customary ownership, whereas the lake is considered to be the common property of the people living in the four villages on its banks. Rennell is also significant for being one of the westernmost islands to be colonised by the Polynesians in the Western Pacific region. East Rennell has a paramount chief and a council of chiefs.

A house at edge of Lake Tegano, Nuipani Village.

Photo: Paddy Ryan

Creating a World Heritage Site

New Zealand was invited to be the sponsor country to enable the government of the Solomon Islands to become a State Party to the World Heritage Convention. Becoming a State Party allowed the Solomon Islands government to nominate East Rennell for inscription on the World Heritage List.

It was important that the people of East Rennell were aware of what was going on because it concerned their land. More importantly, as the site is customarily owned, it was vital that the local communities were able to make informed decisions.

With the assistance of the New Zealand Ministry of Foreign Affairs, a project was formulated to disseminate information that promoted public awareness about the World Heritage programme. The project personnel held many meetings with the Paramount Chief and the people of East Rennell. Through such meetings, the Paramount Chief and the people gave consent for their land to be nominated for World Heritage listing. This happened in 1998, the year when East Rennell was listed as a World Heritage Site.

Paramount Chief of East Rennell Newman Tegheta.

Photo: Elspeth Wingham

Rennellese girls waiting to present leis to the officials at the celebration of East Rennell's listing as a World Heritage Site (December 1998).

Photo: Elspeth Wingham

Suggested Student Activity 1

Location and World Heritage Site Nomination

Objectives:

To have students:

- Find the Solomon Islands and Rennell on a map and identify the features that are significant to the site
- Identify the participants involved in the process of nominating East Rennell as a World Heritage Site and their roles

Your students could:

- Locate the Solomon Islands and Rennell on a map of the Pacific and explain what the term "archipelago" means.
- List the features and the World Heritage criteria that justified East Rennell's nomination and inscription on the World Heritage List.
- Write a description of the process involved in getting East Rennell nominated as a World Heritage Site. Who were the participants, and what were their roles?

The World Conservation Union (IUCN) experts (Dr Jim Thorsell and Dr Les Molloy) and Paramount Chief Newman Tegheta at East Rennell to evaluate the site for World Heritage listing.

Photo: Elspeth Wingham

Features of the site

The formation of Rennell and Lake Tegano

Rennell is the world's best example of an upraised coral atoll. An atoll is a ring of coral reef that has nothing in the middle except water or a lagoon. Rennell and Bellona were originally rings of coral submerged in the ocean. Scientists believe that near the end of the Pliocene age (5 million years ago), tectonic movements of the Earth's crust raised the seabed and allowed coral to build on Bellona, Rennell, and the Indispensable Reefs. Since then, there have been at least five uplift events, and former sea levels are indicated in the terraces. Both islands are currently in an uplift phase.

Because both islands were originally atolls, they both have basin-like interiors and are surrounded by cliffs. The cliffs formed from the coral ring and the basin interior from the ancient lagoon it once contained. During the uplift, there was a greater amount of upward movement in the western side, and so Bellona and West Rennell were pushed right out of the water. The south-eastern side had uplift, and this resulted in the formation of a downward slope.

Lake Tegano, in the eastern basin of Rennell, is a remnant of the ancient lagoon, which was partially cut off from the sea as a result of the uplift. Rennell and Bellona are younger than the other islands in the Solomon Islands group. The age of the lake as a body of near-fresh water is not known. The lake's water is brackish as a result of a subterranean duct system that connects the lake with the sea. There are no streams or rivers on Rennell, although there are freshwater springs around the edge of the lake, and these springs emerge at various places between the cliffs and the coast. Rainwater flows underground from the higher western end towards the east, where it enters the lake.

An aerial view of the northern coast of Rennell with the old reef crests visible in the bands of vegetation.

Photo: Paddy Ryan

Suggested Student Activity 2

The Formation of Rennell and Lake Tegano

Objective:

To have students research and report both the legends about and the facts of how Rennell and Lake Tegano and/or the students' own islands were formed

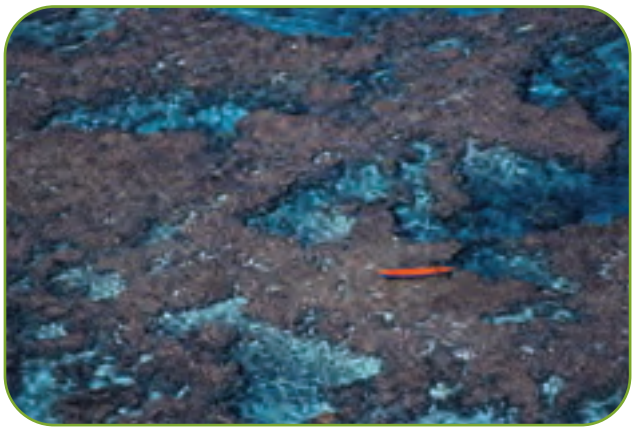
Lake Tegano is the remains of an old lagoon.

Your students could:

- Find legends about how their own island was formed and report them to the class.
- Investigate the scientific facts about the formation of their island and list the features that are unique to its formation along with any significant physical changes that have taken place over time.
- Hypothesise what has happened over time for the water in Lake Tegano to become almost fresh water.

The formation of a coral reef

Corals come in all forms and are often shaped like branching trees, tiny pipes, or saucers. They are ridges of limestone formed by millions of tiny animals called coral polyps. The polyps that build the reefs are known as stony corals. They live together in colonies. The cells on the outside of the polyps' bodies collect a chemical called calcium carbonate from the sea water. Calcium carbonate hardens to form limestone, and this grows into a protective shell around each polyp. When the polyps die, their shells remain. The reef becomes larger as new polyps grow on the old limestone shells.



A kayak over the reef in Tuhugago Bay, East Rennell.

Photo: Rob Greenaway

Reef-building stony corals cannot live in water that is colder than 18 degrees Celsius, so the world's coral reefs are found in the warm seas that lie on either side of the Equator. Corals always develop in clear, shallow water that is no more than 45 metres deep. Scientists believe that stony corals choose clear, shallow water in which to develop because of their special relationship with tiny algae known as zooxanthellae. Zooxanthellae live inside the cells of the coral polyps' bodies. They use energy from sunlight to make food and, as they do this, they provide the polyps with nourishment. Sunlight does not reach into deep ocean water, so the zooxanthellae need to remain close to the surface. The polyps, in turn, need the food provided by the zooxanthellae, so they too must stay in shallow water.

Suggested Student Activity 3

The Formation of a Coral Reef

Objective:

To have students identify coral reefs in the Pacific, along with reef inhabitants and how these can be harvested in a sustainable way

Your students could:

- Use a world map, or a map of the Pacific, to identify where atolls and coral reefs are commonly found. They could look for well-known coral reef formations, such as the Great Barrier Reef in Australia and the Indispensable Reef near Rennell.
- Discuss the location of coral reefs and atolls and establish why corals and atolls are found only in certain parts of the world.
- If possible, carry out a survey of a coral reef within the local area. They could identify the creatures that inhabit the reef, along with the food resources that the local people harvest from the reef.
- Write a description of the state of the food resources in the local area. This could include:
  - how long it takes for coral reefs to grow
  - how the resources from the reef are harvested
  - how often they are harvested and how much is usually taken
  - the impact that overharvesting may have on a resource over time
  - the impact of modern human activities on coral reef sites
  - suggested ways of preventing overharvesting.

A blue starfish, Linckia laevigata, *moving over some coral.*

Fish caught from the reef at East Rennell.

Photos: Paddy Ryan

The people of Rennell

Rennell and Bellona were first settled by the Lapita people around 130 BC. Another major occupation occurred around AD 1000. The two islands are the two western-most Polynesian settlements in the Pacific. There are artefacts on the islands, such as pottery and old settlements, that are significant to the history of Polynesian migration and settlement across the Pacific.

According to oral traditions, the present-day inhabitants' ancestors landed on Bellona twenty-six generations ago, in about AD 1400. There were eight couples, led by a chief called Kaitu'u. They settled on Rennell and Bellona with their gods, Tepoutu'uigangi and Guatupu'a, who were embodied in two sacred stones, and Tehu'aingabenga, who was embodied in a sacred staff. The people were converted to Christianity in 1938.

The present-day inhabitants of Rennell and Bellona are Polynesians and speak the same language. Both islands have cliffs on all sides with a basin interior. In the areas close to the coast, the breaking of the surf can be heard over the cliffs, giving one the sensation of being on board a canoe in the middle of the ocean. This is why the local people refer to the two islands in their poetry and songs as Te baka (the canoe) or Gua baka (the two canoes).

The people of Rennell and Bellona still live a largely subsistence lifestyle. Their staple diet consists of taro, sweet potatoes, yams, and pana. The protein in their diet comes from food taken from the lake and the sea, such as fish, shellfish, and seaweed. They catch some birds and flying foxes for food. The environment is very important to the people for their survival. The Rennellese and Bellonese people also have strong connections with and obligations to their respective tribal places. These places are significant to their culture and history.

Suggested Student Activity 4

The People of Rennell

Objective:

To have students discuss migration in the Pacific and how migration shaped the history of the Pacific, including their own

Your students could:

- Look at migration in the Pacific, both past and present, and discuss some things that make people migrate, including discovery, land shortage, their need for employment, and their need for education.
- Discuss how people took their cultural practices, gods, plants, and animals with them when they migrated and what impact this has had on the Pacific of today. They could also do this as a written exercise.
- Invite someone from the community to tell them stories and legends about how their people came to be in the area.

The Forests of Rennell

Rennell is mostly covered by rainforest. Tropical rainforests grow in areas of the world where the climate is hot and rainfall is heavy. Plants and trees grow very quickly in the hot and steamy climate. They grow close to one another and become tangled together. Rennell Island is covered by a tropical lowland rainforest, mostly in the interior basin of the island. This forest is unusual in its composition of main tree species. Trees that are common throughout Rennell are not usually found elsewhere in the Solomon Islands group. On the other hand, trees that are common on other islands and in the western–central Pacific region are not found in Rennell. On Rennell, the forests are home to animals and plants that make up the island's flora and fauna. They are also home to the land and water birds that are endemic to Rennell. Some of the bird species found on Rennell are considered endangered.

The forests are storehouses for the Rennellese people. They provide thatch for roofing, flooring materials, timber, poles, rope, vines, cane, firewood, food, medicine, bark for making tapa cloth, and wood for carving and building canoes. The practices of harvesting on an as-needed basis and customary land ownership protected the forests well from exploitation and serious depletion.

Because of its land formation, Rennell has three types of forests.

The interior rainforest

The forest that covers the interior basin of the island is a lush rainforest. The soil is richer, deeper, and moister in the interior basin, and so the trees grow in better conditions. This area is well sheltered, and the forest flourishes in these excellent tropical conditions.

Rainforests are made up of several layers:

The forest floor

This layer of the forest is quite dark because the canopy above blocks out most of the sunlight. The forest floor is usually covered with dead leaves and twigs. Fungi and mushrooms grow in these dark, moist conditions. The dead leaves and fungi provide food for the many different creatures that inhabit this layer of the forest. Creatures such as beetles, ants, woodlice, centipedes, and thousands of other tiny insects make up the ecosystem that exists in this part of the forest.

The understorey

This gloomy part of the forest is just below the canopy. There is hardly any wind in this section, and so it is still and humid. Here we find palms, liana, and cane vines as well as other creeper plants. Creatures such as spiders and lizards live at this level. Some bird species are also found in this section.

The canopy

It is less gloomy and a lot less humid in this layer of the forest. The leaves and branches are quite thick, and it is at this level that the overhead covering of the forest is formed. The average height of the forest canopy on Rennell is around 20 metres. This is where the many birds of Rennell make their homes, close to the flowers for nectar and to the fruits of fruit-bearing trees. Rennell has three species of large, fruit-eating bats, and they are important in spreading the seeds of the trees.

*This photo shows a young Pacific flying fox (*Pteropus tonganus*) or peka. They are widespread and are good flyers. They may have colonised Rennell naturally, or they could have been introduced by Polynesians.*

Photo: Paddy Ryan

The emergent layer

The emergent layer is made up of the tallest and oldest trees in the forest. There are not as many trees in this layer as there are throughout the rest of the Rennell forest. Most of the trees in this layer are fig trees, which grow to a height of 30 metres. Birds are also found in this section.

The ridge karst forest

Since Rennell is a raised atoll, what used to be the coral reef is now cliffs that surround the island. The cliff region is called the karst ridge. While the island was still in the ocean, water dissolved the limestone over time, leaving it honeycombed, a feature that is common in the cliff formation of Rennell. The forest growing on this ridge karst comprises trees of low stature that grow in extremely rocky conditions and steep terrain. The trees growing in these parts of the island are exposed to extreme weather conditions, such as strong winds, aerial salt deposition, and dry conditions.

Forest that grows in these harsh conditions is sparse. The trees reach only about 4 metres in height. They are spindly and gnarled, with leaves that are smaller and thicker and that commonly have a waxy surface. The canopy is not thick, and so sunlight reaches the forest floor, allowing plants such as orchids and ferns to grow more abundantly than in the interior rainforest.

The Lake Tegano forest

The forest of Lake Tegano contains tree species typical of the beach and mangrove environment commonly found in the Indo-Pacific tropics. Some of the species in this forest are normally dispersed by sea. Some of the tree species growing in this forest could possibly be a result of seeds entering the lake by subterranean channels that connect to the sea. They could also have come from some strand flora that were trapped by the island's uplift.

Coral limestone (or makatea) on the island rim on the way to Tuhungago Beach.

Photo: Paddy Ryan

Suggested Student Activity 5

The Forests of Rennell

Objective:

To have students explore and recognise the features of forest growth and how plants adapt to environmental conditions and identify the living systems existing at each section of the forest

Your students could:

- Use a site of their choice, where there is reasonable forest or vegetation growth to identify different layers of the forest or vegetation, and record the different living systems existing at the various layers. They could do this in small groups.
- Draw and label the different layers of the area observed and include the different creatures living in each layer.
- Present their drawings to the class. They could then display them in their own classroom and/or give them to other classes to display and use as a resource.
- Use resources such as the school library and the Internet to investigate why it is claimed that:
  - rainforests are the lungs of the Earth
  - forests protect the soil from erosion.
- Identify two sites within the area of the school, one sheltered and one exposed. Make observations of the plants growing on both sites and the different features identified, such as:
  - their height
  - the size of their leaves
  - the texture of their leaves
  - the texture of their bark.
- Use their recorded observations to write up a descriptive comparison of how trees and plants adapt to cope with the conditions of their environment.

Sina and the Birds of the Forest

A long time ago, there were not many birds on Rennell or Bellona, and the birds looked quite different from the way they look today. The events of this story all happened during a terrible drought, when the land was parched and dry. The drought was so bad that even the springs dried up, and all the plants and trees in the forest turned yellow and brown.

Early one morning, a woman named Sina decided that she was going to dye her tapa cloth. She dug up some turmeric and started preparing her dye. She grated the turmeric and put it into a coconut shell. She then ground the turmeric with tama. While grinding the turmeric, Sina added some soot and ash to her mixture until she got the colour she wanted. When she'd done this, Sina laid her tama aside and left her dye to stand so that the residue could sink to the bottom and the reddish colour she wanted would rise to the top.

As Sina waited for her dye to set, the thirsty birds flocked to the coconut shell, thinking that it was water. The higi (the pink-spotted fruit dove) tried to dip its beak into the shell, but Sina pushed it away with her hands. While pushing the dove away, she got dye on the dove's breast and it became red. In the flurry, the sibigi (the yellow-bibbed lory) fell into the turmeric and became reddish all over. A gupe (a Pacific pigeon) hopped onto the side of the coconut shell. Sina caught it by its legs, but it escaped with its legs turned red.

Yellow-bibbed lories are often kept as pets. They are not endemic to Rennell.

Photo: Paddy Ryan

The katogua (the pheasant dove) and the baghigho (the cardinal honey-eater) dived into the turmeric and got red dye all over their feathers before Sina managed to fish them out and chase them away. In all the confusion, Sina did not see the ligobai (the yellow-eyed greybird) until it had dived right into her dye. It fluttered about in the dye as Sina tried to catch it. In doing so, the yellow-eyed greybird stirred up all the residue of the dye. Sina finally managed to get hold of the bird and threw it out of her dye. The yellow-eyed greybird flew off tinted with red along with flecks of black, white, and grey. The ligho (the white-collared kingfisher) came and landed on the heap of unground turmeric and received a yellowish stain on its feathers.

Sina's dye was ruined, so she decided that she would not dye her tapa cloth that day. Her dye stained the birds' feathers forever, and that is how the birds of the forest received their different colours.

Bird life

Rennell has the greatest number of endemic birds for an island of its size in the world. The island is famous for many unique species of birds having evolved there because of its isolation. This unique fauna is an educational and scientific resource of worldwide importance. Little is known about the ecology and habitat of many of the animal species found on Rennell. However, extensive studies have revealed that Rennell has a high diversity and endemism in its bird life.

There are forty-three bird species in total. Four of these are endemic to Rennell, nine are subspecies endemic to Rennell, and seven are subspecies endemic both to Rennell and nearby Bellona.

A red-footed booby chick on a nest on Bird Island, Lake Tegano.

Photo: Paddy Ryan

The East Rennell site is very important because it contains all the bird species found on Rennell. Even more important are the natural conditions that provide breeding grounds and natural habitats for birds in and around the Lake Tegano region. The islands on the eastern end of Lake Tegano are breeding areas for most of the waterbirds common in the area, such as the little pied cormorant, the black cormorant, the red-footed booby, and the brown booby.

Rennell has evolved its famous endemic status because it is by far the largest outlying island in the Solomons group. From the relationships of the Rennell species to those found elsewhere, the origins of the forty-three breeding species have been traced to other islands in the Solomon Islands, Vanuatu, Papua New Guinea, and Australia. Some of the bird species are related to species found in these places, but because of Rennell's isolation, they evolved over time into a particular subspecies found only on Rennell.

Suggested Student Activity 6

Bird Life in Your Local Area

Objective:

To have students recognise and name birds common in their local area and identify the importance of these birds to the environment

Your students could:

- Identify the birds that are common in their local area, draw these birds, and label them with the names they are known by.
- Discuss how birds are protected in the local area and, if appropriate, draft a bird conservation policy.
- Talk about the importance of birds in the environment, including their role in the dispersal of seeds.
- Carry out a survey of local birds, which they could do at school and/or at home so that they can ask questions of other members of the community. They could use a survey form similar to that on page 32, entitled Survey of Local Birds.

Six birds of Rennell

The Rennell shrikebill
Clytorynchus hamlinii

Native name: ghoghobiu

This is a species endemic to Rennell. It can be found in the understorey of the forest. It is a rare and endangered bird that is usually seen singly or in pairs and feeds on locusts, grasshoppers, stick insects, snails, and lizards.

Photo: Paddy Ryan

The island thrush
Turdis poliocephalus rennellianus

Native name: gagango

This bird is quite common and can be found in the understorey of the forest. It tends to stay close to cover. It is a solitary bird and is usually seen on the ground looking for earthworms and snails.

The Rennell white-eye
Zosterops rennelliana

Native name: suusuubagu

This bird is not common and is found mainly in the understorey of the forest. It is seen singly, in pairs, or in groups. Its food is mostly insects and certain fruit.

Photo: Mary LeCroy

The white ibis
Threskiornis molluccus pygmaeus

Native name: tagoa

This bird is a subspecies that is unique to Rennell and Bellona. It is a common bird that is often found in groups of up to thirty. It feeds on earthworms and grubs. It is frequently seen in and around villages.

The white-collared kingfisher
Halcyon chloris

Native name: ligho

This bird is fairly common and can be found in the middle storey of the forest. It is a solitary bird but is sometimes seen in pairs. It feeds on lizards and large insects.

Photo: Mary LeCroy

Woodford's white-eye
Woodfordia superciliosa

Native name: ghagha

This bird is a subspecies that's endemic to Rennell. It is quite common and is often seen in pairs but occasionally singly or in threes. Its diet consists of fruits, such as figs and pawpaws, as well as insects and snails.

Survey of Local Birds

Name of bird	Habitat	Description of claws	Description of beak	Food	Origin	Numbers
e.g., parrot	Tall trees	Sharp and curved	Short, sharp, and curved	Fruit	Native	Plenty

Suggested Student Activity 7

Finding out More about the Birds of the Local Area

Objective:

To have students identify birds' habitat and diet from their adaptive or special features

Your students could:

- Find out how a bird's features are adapted to its habitat and diet. For example, does the shape of the bird's beak have anything to do with the sort of food it eats?
- Find out whether there are more native birds or more introduced birds in the local area and why this might be so.
- Find out how many local birds are at risk of being endangered and what the causes are.
- Find out what could be done in the local area to reduce the risks or threats that birds face.

Mautikitiki and the Coconut Crab

A long time ago, the coconut crab had a smooth shell on his back and was very proud of it. He was also mischievous and liked playing tricks. One hot day, the coconut crab grew bored and went for a walk on the beach. He walked past Mautikitiki's house and saw the man napping under the shade of a tree. The coconut crab walked up to the sleeping Mautikitiki and gently shook him.

"Hey, Mautikitiki! Wake up! I need your help."

Mautikitiki opened one sleepy eye. "What is it, coconut crab?" he asked.

The coconut crab explained that he had just returned from fishing only to find that his fire had gone out.

"I'm hungry and too tired to make a fire from my sika. Could you give me some fire to save me the hard work?" the crab asked.

"Grab a piece of charcoal from my fire," Mautikitiki replied, and he went back to sleep.

The crab took a piece of charcoal and went down to the beach. When he was sure no one was looking, he threw the charcoal into the sea. Then he went back to Mautikitiki and woke him up a second time.

"What do you want this time?" Mautikitiki demanded in an annoyed voice.

"The hermit crabs stole my charcoal, so I have come to ask for another one," the crab explained.

"Oh, all right, take a piece of charcoal and leave me alone," Mautikitiki replied as he turned on his side and went back to sleep.

The coconut crab took the charcoal, and when he had gone some way from Mautikitiki's house, he flung the charcoal into the sea. He went back to Mautikitiki and woke him up a third time. Now Mautikitiki was really annoyed.

"It's you again! What is your problem, coconut crab?" he growled.

The coconut crab told him that a heron had stolen his charcoal and that he'd come back to ask for another one. Mautikitiki was not only annoyed but was also starting to get suspicious of the coconut crab. He told the crab to take a piece of charcoal and pretended to go back to sleep.

When the crab started walking down to the beach, Mautikitiki got up and stealthily followed him. After some time, he saw the crab stop and look around. When the crab saw that the coast was clear, he threw the charcoal into the sea. Mautikitiki jumped out from his hiding place and ran towards the crab. "You sneaky animal! Wait until I get my hands on you!" he cried.

But when he was about to grab the crab, the coconut crab bit Mautikitiki's leg with his big pincer. Mautikitiki howled with pain. He tried to shake the crab off and kicked this way and that, but the crab would not let go. Mautikitiki pulled out his hakatautoki and smashed it into the crab's back. The crab let go of Mautikitiki's leg and scuttled off.

When the coconut crab reached home, he was horrified to discover that his beautiful shell had been cracked by Mautikitiki's adze. The crack mended and healed, but it left a scar on the crab's back, and this is the reason why coconut crabs now have marks on their back shells.

Close-up of a coconut crab, showing the pattern on its shell.

Photo: Paddy Ryan

Harvesting a food source in a sustainable way

Both an increase in the population and commercial activities by local people pose a risk to some species that are food sources. One such species is the coconut crab, *Birgus latro*, known locally as kasusu. Coconut crabs were once abundant in the coastal regions of many Pacific islands. They are considered a delicacy by most Pacific cultures and have now been eaten to extinction in most parts of the Pacific. Today, Rennell is one of the very few places where the crabs appear to be still plentiful.

The World Conservation Union, or IUCN, has listed coconut crabs as a vulnerable species. It is vital to the crab's survival that precautions are taken to protect them. Coconut crabs are nocturnal and normally live in coastal areas. They mature slowly – it takes about fifty to sixty years for a crab to become full-grown.

Growth is very slow. A crab weighing 2 kilograms will be 12–15 years old. Big crabs weighing 5 kilograms may be 50–60 years old.

Suggested Student Activity 8

Coconut Crabs

Objective:

To have students identify the threats that coconut crabs face and the conservation steps taken to protect them

Your students could:

- Study the life history of the coconut crab, discussing and recording their findings.
- Find out what environmental threats or changes could affect the crab's life history.
- Research the implications of the slow growth of coconut crabs on harvesting them.
- Identify an animal that they think is a very popular food among local people and is possibly overharvested. They could suggest measures that could help to protect the animal.

The information and images on the poster *Uga (Coconut Crab) on Niue – The Need for Conservation* could assist with this and the following activity. There is a copy of the poster at the back of this unit. It has been reproduced with the permission of the Department of Agriculture, Forestry and Fisheries, Niue.

A coconut crab climbing a coconut tree.

Photo: Paddy Ryan

Harvesting coconut crabs in a sustainable way

The World Conservation Union (IUCN) has carried out extensive studies in the Pacific region on coconut crabs and has suggested a management method for sustainable harvesting. The IUCN recommended that the smallest size at which a crab can be taken should be fixed at a thoracic length (TL) of 43 millimetres. At this size, the crab weighs about 0.6 kilograms. This method results in a greater number of male crabs being captured because they grow faster than females. The length of the thorax is measured as shown in the diagram using a ruler or callipers.

Note: The length of the carapace is used in Niue to determine the hunting size and is based on the fact that female coconut crabs are slower growing and will therefore be left to breed. (Refer to the *Uga* [*Coconut Crab*] *on Niue*: *The Need for Conservation* poster enclosed in this kit.)

Suggested Student Activity 9

The Protection of Coconut Crabs

Objective:

To have students formulate constructive awareness campaign methods for local communities

Your students could:

- Produce a small group presentation to show what they would do if they were IUCN officers sent to local communities to inform people about coconut crabs being a vulnerable species. They should show how they could convince people not to overharvest the crabs. Each group could prepare pictures, drawings, and, if possible, photos for their campaign. While planning, they should take the following into consideration :
  - The land is owned by the local people.
  - Some members of the community may be illiterate and so could not read prepared pamphlets or diagrams.
- Each group will deliver their presentation while the rest of the class acts as the community.
- Discuss the effectiveness of the suggested management methods and the implications that these methods might have for the local people.
- Discuss how the ideas suggested for coconut crabs could be adapted and used to protect other animals at risk.

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Glossary

Archipelago	A sea with many islands; a group of islands
Baghigho	The cardinal honey-eater
Betape	A type of taro
Brackish	Between salt water and fresh water
Endemic	A species that is found nowhere else in the world or is native to a certain area
Ga'akau tu'uti	A sacred priestly staff
Gupe	The Pacific pigeon
Hakatautoki	An adze made from stone or shell
Higi	The pink-spotted fruit dove
Karst	A honeycombed limestone region formed under the sea and uplifted
Katogua	The pheasant dove
Lapita	An early culture in the Pacific whose people created a distinctive style of pottery
Ligho	The white-collared kingfisher
Ligobai	The yellow-eyed greybird
Mugikaakoni	The common sandpiper
Pagati	The fast-running tiger beetle
Sibigi	The yellow-bibbed lory
Sika	Fire-making sticks that people used to rub to get fire from
Sisi	The nerita shell
Soi tea	Arrowroot
Subterranean duct system	A system of underground drainage channels
Tama	A tool used to grind turmeric
Tapa	Bark cloth
Tectonics	The processes by which the Earth's crust moves
Tu'a gangi	The invisible heaven
Turmeric	A plant of the ginger family

‘O le Pūpū Pu‘e National Park: Sāmoa’s First National Park

Authors:

Aniseko Fruean and Andrea Wuttke

Sāmoa

Intended age group: 12–17 years

Category: Local and national heritage – natural and cultural

Unit Abstract

This unit focuses on on ‘Upolu, the main island of Sāmoa. It provides students with the opportunity to learn about features of Sāmoa’s natural heritage and how to protect it. The student activities use process-oriented instructional concepts to create an environment where students’ active participation is encouraged.

The first activity is a case study role play. In it, your students will discover ‘O le Pūpū Pu‘e National Park’s key features and participate in a creative presentation of work on it. The role play links the knowledge, attitudes, and skills of students together. It provides a good base to continue discussions on a range of topics, such as biodiversity and resource management.

The second activity is a “for and against” debate. It focuses on the values of natural heritage that are important to different stakeholders.

Photo on section cover:
Andrea Wuttke

Relevant Curriculum Links

Social studies	Research the implications of changes to places, for people and the environment, and why and how people regulate the use of places and the environment.
Science	Research and develop a defensible position about a selected issue affecting the environment. Consider the social and ethical implications involved in making responsible decisions about living things.
Language	Gather, select, record, interpret, and present coherent structured information from a variety of sources using different technologies.

Unit Objectives

Knowledge

To help students develop knowledge and understanding of:

- The role of national parks
- The location and geographical features of ‘O le Pūpū Pu‘e National Park
- The natural and cultural features that make this site important, including its special species of fauna and flora
- The biological diversity of Sāmoa and its importance
- The positive and negative impacts of human actions on biodiversity.

Attitudes

To encourage students to:

- Develop a conservation ethic and take responsibility for the environment, leading to an understanding that this heritage should be kept intact for future generations
- Identify and recognise the value of local and national heritage sites
- Become more aware of, and empathetic to, the threats that may face heritage sites
- Appreciate the need to protect a heritage site
- Appreciate the need for management procedures in national parks
- Adopt a more protective attitude towards cultural and natural heritage sites.

Skills

To help students develop their ability to:

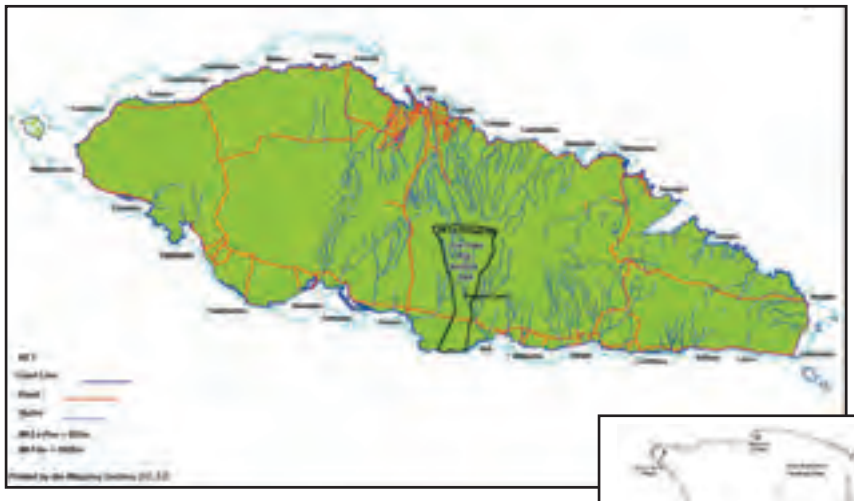
- Work co-operatively
- Create presentation materials that reflect the knowledge and attitudes they have developed
- Interpret and communicate information effectively
- Provide links between different kinds of information and think independently
- Develop imaginative skills.

Heritage Site Selection

‘O le Pūpū Pu‘e National Park and Togitogiga Recreation Reserve

Background

‘O le Pūpū Pu‘e National Park was established in 1978. It was one of the first national parks in the South Pacific. It protects over 2800 hectares (7000 acres) of lush lowland and montane rainforest, deep stream valleys, cascading waterfalls, and crater lakes. The Togitogiga Recreation Reserve, covering 2.5 hectares (6 acres), is adjacent to the park. Both areas are visited by locals and by tourists from around the world.



‘Upolu, the main island of Sāmoa.

Source: Mapping Section, Department of Lands, Surveys and Environment (DLSE), Āpia, Sāmoa

Location map of ‘O le Pūpū Pu‘e National Park on ‘Upolu.

Source: Mapping Section, Department of Lands, Surveys and Environment (DLSE), Āpia, Sāmoa

Welcome board of ‘O le Pūpū Pu‘e National Park.

Photo: Andrea Wuttke

‘O le Pūpū Pu‘e means “from the cliffs to the mountain”. The name is appropriate for the park as it stretches from the ridges formed by Mt Fito (1100 metres) and Mt Pu‘e (800 metres) down to the Pūpū lava coastal cliffs on the southern coast. The park forms a strip between 1.5 kilometres and 6 kilometres wide and protects 2800 hectares of land that includes a variety of Sāmoa’s native ecosystems, such as littoral vegetation, coastal rainfores, lowland rainforest, montane rainforest, and crater lake wetland ecosystems. But the park does not protect all of the native ecosystems existing in Sāmoa. Ecosystems such as mangroves, coral reefs, and coastal wetlands are not within its boundaries.

View towards crater lake and south coast from Mt Pu‘e.

Source: Courtesy of Department of Lands, Surveys and Environment (DLSE), Āpia, Sāmoa

Waterfalls and picnic fale at Togitogiga Recreation Reserve

Source: Courtesy of Department of Lands, Surveys and Environment (DLSE), Āpia, Sāmoa

Photo: D. Butler

The Togitogiga Recreation Reserve is adjacent to the park and includes picnic areas, barbecue facilities, a changing shed, and toilets. The deep pools created by the twin waterfalls on the Mataloa River are perfect for swimming. Overnight camping is also permitted at Togitogiga.

Geology

‘O le Pūpū Pu‘e National Park has a unique geology. It’s the only area on the south coast where the three major volcanic formations from which the whole island was formed can be found close together. This volcanic rock was deposited by a number of eruptions that occurred over a long period. This area also features a range of soil types that have formed over the rock.

Around three million years ago, Sāmoa emerged from the ocean as a chain of volcanic cones. These first volcanoes are known as the Fagaloa volcanoes. As time progressed, the Fagaloa volcanoes eroded. The weathering cut gorges, reduced the size of the original cones, and formed soil.

A hundred thousand years ago, a new period of volcanic activity began. Lava flowed from the Salani volcanoes and covered most of the older Fagaloa volcanoes. Mt Pu‘e, located in the north-west corner of the park, is an example of a well-preserved cinder cone of these Salani volcanoes.

Then, only three thousand years ago, the Pu‘apu‘a volcanoes (the youngest on ‘Upolu) erupted from Mt Fito, sending down a river of lava. At this time, a lava cave called Pe‘ape‘a Cave, or Cave of the Swiftlets, with a total length of 850 metres, was formed. The lava flowed to the lowland area and spread, covering older lava, filling in lagoons, and flowing over coral reefs.

The Pūpū coast was once much further out to sea than the present coastline is, but over time the sea has cut the rocks back. Where there is no reef to protect the coast, the waves batter the rocky cliffs and compress air in the cracks. This forces the rocks apart and causes erosion by throwing stones and boulders against the cliffs. Marine erosion, also known as coastal erosion, is the name given to the combination of all these processes.

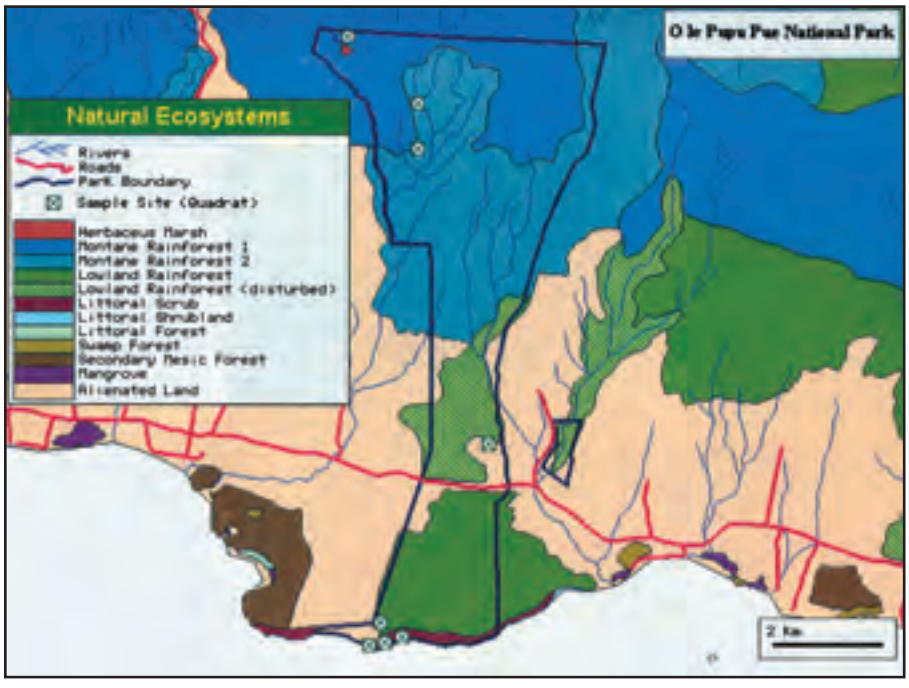
The relatively recent lava flows have resulted in the very rough, poor soils that are characteristic of this area.

Vegetation

Sāmoa has a high percentage of endemic plant species. Nearly a third of all the plant species found in Sāmoa occur nowhere else in the world.

Prior to human settlement, Sāmoa was covered with lush tropical rainforest. Over the years, much of the forest has been cleared (especially in the lowlands) for plantations, villages, timber, and, in Āpia, urban development. The most pristine rainforest remaining on ‘Upolu is found within the park’s boundaries.

The rainforest in the park encompasses nearly all of the different types of forest found on ‘Upolu. The topography, soil, rainfall, and temperature differences over the 1000-metre range in elevation result in a variety of plant communities that grade into one another within the park. Littoral vegetation is found along the coast, changing to lowland rainforest, montane rainforest, and crater lake freshwater vegetation at the top of the park.



‘O le Pūpū Pu‘e National Park.

Source: Courtesy of Department of Lands, Surveys and Environment (DLSE), Āpia, Sāmoa

Wildlife

Sāmoa has a relatively small number of wildlife species. Many of its animals, especially the land birds, are found nowhere else in the world, that is, they are endemic. There are fifty-one species of wildlife within the park’s boundaries. These include forty-two bird species, such as the white-rumped swiflets found in the Pe‘ape‘a Cave and the fruit doves that can be heard throughout the park.

In addition to land birds, ‘O le Pūpū Pu‘e National Park has a particularly large number of nesting seabirds. Brown noddies, white terns, and white-tailed tropic birds regularly move between the forest hills and the sea. The three native mammals in the park are the two species of flying fox and the small cave-dwelling sheath-tailed bat. There are also several species of reptiles, including skinks, geckos, and Sāmoa’s only snake, the Pacific boa.

Cyclones

Two recent cyclones, Ofa (1990) and Val (1991), impacted on the park's forest and its bird and fruit bat numbers. Cyclone Ofa, the most severe in 160 years, had wind speeds in excess of 60 metres per second. The winds lasted for three days. Cyclone Ofa also dramatically changed the structure of the forest in Sāmoa. Density and canopy cover decreased, numerous regeneration gaps were created, and epiphytic flora was reduced in the lowlands.

The cyclones also dramatically affected the birds and bats of the park. Numerous pigeons were reported dead on the shores, having been blown out to sea by the strong winds and brought back by the waves. And because fruit was almost non-existent for a long time after Ofa, the frugivorous birds and bats were forced to feed on ground leaves. Consequently, pigs, dogs, and cats killed large numbers of these grounded starving animals. As well, the broods of many birds were destroyed during the cyclone, especially those of the birds nesting in exposed sites.

Location

'O le Pūpū Pu'e National Park is located on the southern coastal road of 'Upolu, a forty-five-minute drive on the coastal road from Āpia. The southern coastal road passes through the park, and an access road towards the coast leads to the Coastal Trail.

Hiking trails

The Coastal Trail is a one-hour walk that leads from the car park at the end of the coastal road and follows the coast, providing spectacular views of lava coastal cliffs and the ocean.

The Pe'ape'a Cave Trail is a two-and-a-half-hour return trip that winds through lowland rainforest into the heart of the park. The trail ends at a lava tube that is home to white-rumped swiflets, which can be seen circling inside the cave, as well as to small sheath-tailed bats.

View of the cliffs from the Coastal Trail.

Source: Courtesy of Department of Lands, Surveys and Environment (DLSE), Āpia, Sāmoa

Suggested Student Activity 1

Learning about ‘O le Pūpū Pu‘e National Park

Objective:

For students to gain an understanding of the features of ‘O le Pūpū Pu‘e National Park

Introduction to the activity

This role-play activity will give students an opportunity to learn about ‘O le Pūpū Pu‘e National Park, including its features, sights, flora, fauna, and management. The activity can be completed as a single lesson or as a set of several lessons and can be carried out indoors or outdoors. Many of the activities generated for this role play could be applied to the study of other national parks.

Further outcomes of this activity include creative thinking, problem solving, communication skills and information design, and learning about Sāmoan cultural processes.

The goal of this activity is for two teams to create a floor plan of the new visitors’ information fale at ‘O le Pūpū Pu‘e National Park. They will achieve this by working through a range of information-gathering and production processes. They will present their plan in a fale meeting.

The following information will help the students to:

- Understand and manage their given roles
- Understand the context of the activity
- Learn about the various protocols associated with Sāmoan custom and tradition.

Context

In 1990, the large visitors’ information fale in ‘O le Pūpū Pu‘e National Park was destroyed by Cyclone Ofa. A new fale was built, only to be destroyed by Cyclone Val one year later. It has not yet been rebuilt.

In this activity, the ultimate goal is to have the students create a floor plan for a new fale and then discuss this plan in a traditional Sāmoan meeting style.

About fale Sāmoa (Sāmoan houses)

To carry out this activity, the students will need some understanding of the construction and use of traditional fale. The following information is designed to provide this background knowledge.

The traditional Sāmoan fale is an important element of fa‘asāmoa (Sāmoan culture).

The fale is unique in its design and construction, with its oval or round shape, thatched roof supported by wooden posts, and a pebble or broken coral floor covered with woven mats. The absence of walls allows ample ventilation in the hot climate, and dried coconut-palm-leaf blinds provide protection from the wind and rain.

The fale is constructed without nails. The rafters and joints are tied together with strong coconut fibres called ‘afa.

A fale contains little in the way of furniture, and all activities, including meals, take place on the floor. As the fale is a cool place, it is the best place for meetings, and it is where the village councils meet.

The protocols associated with using Sāmoan fale include the following:

- Remove your shoes before entering a fale.
- Sit cross-legged or cover your legs.
- Try not to address people while standing.
- Shake hands as a welcome before joining the circle.
- Lower your head and say “tulou” (excuse me) when walking in front of someone (inside and outside the fale).
- Avoid eating or standing during meetings in the fale.
- Use Sāmoan greetings, such as “tālofa” (hello) or “tōfā soifua” (goodbye) while in the fale.

A Sāmoan meeting fale – fale ‘afolau.

Source: Reproduced with permission of UNESCO Office for the Pacific, Āpia, Sāmoa

Photo: Philippe Laire

To begin the role-play activity

Before beginning the role play, you need to divide the students into groups and assign the following roles. The park groups should have three students in each, whereas the journalist teams need three or more.

The Park Staff

- The park ranger
- A sign design team
- Information pamphlet creators
- Visitors' book and questionnaire managers
- A park guide team, who are also cave experts
- Flying fox experts
- Bird experts

The Journalist Team

- Editorial team 1
- Editorial team 2
- Editorial team 3
- Editorial team 4

After creating the above groups, use the following pre-activity steps to encourage student enthusiasm and interest:

- Give a short explanation of the methods and objectives of the role play.
- Briefly introduce the scenario.
- Explain the rules and the importance of teamwork, interaction, and communication between groups as well as the lead role of the park ranger.
- Give each student a copy of the Student Activity Sheets and a copy of the general information about 'O le Pūpū Pu'e National Park (provided under Heritage Site Selection).
- Encourage each group to introduce itself so that everybody knows the role and tasks of the other groups.
- Organise the students to design their own name badges and a sign for their group to put at their allocated work area.

About the Role of Park Ranger

You are the park ranger for ʻO le Pūpū Puʻe National Park. Your job is to manage all the staff and all the visitors to the park. You must ensure that the park is maintained properly and is free from disturbances. You also need to be aware of the roles of all the other groups who may ask for assistance.

These are your main tasks:

1. Design a park management plan that addresses the following issues:
    - Pigeon hunting still occurs despite being banned by the government.
    - Pigeons, bats, and doves have still not built up large populations after the cyclones, and the protected area within the park is an extremely important refuge for them.
    - Feral pigs that have escaped from villages are in the park.
    - Introduced mammals such as pigs present threats by rooting up vegetation and increasing erosion.
    - Feral dogs and cats kill wildlife, especially the birds.
    - People are still cutting wood with chainsaws within the park's boundaries.
    - The trails need to be cleared at least once every three weeks, with signs pointing towards the top trail. Marking is required for each trail because the pig trails cross the walking trails, and this may confuse visitors, who could easily get lost.
    - Vehicles should drive and park only on defined and existing roads.
    - Campsite management is an ongoing concern.
    - Rubbish left by visitors needs to be managed.
    - Information signs need to be clear.
    - Entrance charges need to be appropriate.
2. The above issues could be dealt with in a park management plan. This could be carefully prepared and displayed in a prominent place on the floor map in the visitors' information fale.

    Organise the role of the night watchman. Write down a plan of where the night watchman will go. Highlight this on the floor map in the visitors' information fale by making small cutouts of a night watchman and placing them on the map.

    Clearly explain both your park management plan and night watchman plan to the other students.

    The journalists will be visiting you to interview you about your daily work. Please give them details of how you will deal with each of the above issues on a daily basis.

About the Role of the Sign Design Team

Your role is to design appropriate signs for the park. A park needs signs to help protect the natural heritage as well as to guide and inform visitors. The signs in the park should be clearly visible. There should be a map, park rules, an information board about popular sights, and information about the flora and fauna.

1. Sketch signs for the ‘O le Pūpū Pu‘e National Park to guide visitors safely through the park and to help them learn as much as possible about the natural features.

2. Throughout the week, villagers from the two villages adjacent to the park come to relax in the deep pools created by the twin waterfalls on the Mataloa River in the Togitogiga Recreation Reserve. Sketch signs for this area to provide interesting information that will encourage the villagers to be aware of the importance of the natural surroundings.

3. Present the completed signs on the floor map of the visitors’ information fale. The visitors’ guide will provide a park map on which you can locate your signs. If these signs are too large, you could place them on the surrounding area with identification links. During the presentation, explain why you think each sign is necessary.

Don’t forget to co-ordinate your signs and their contents with the park ranger, who is responsible for management strategies, as well with your other colleagues, who are experts on the park’s features (especially the bat and bird specialists and the visitors’ guide).

Signs in ‘O le Pūpū Pu‘e National Park.

Photo: Andrea Wuttke

Student Activity Sheet

About the Role of the Information Pamphlet Creators

Your role is to create useful pamphlets for the various visitors to the park. ‘O le Pūpū Pu‘e National Park needs a new information pamphlet explaining the features of this natural heritage site. The new pamphlet should make everybody curious to see ‘O le Pūpū Pu‘e National Park and to learn about its value.

1. Produce a colourful pamphlet with not only information about the park’s features but also practical information about where to find it, its hiking trails, the campsites, and other attractions.

   The new pamphlet should have a well-thought-out place on the floor map of the visitors’ information fale, and you should present it to all the other students when you have completed it.

2. Optional extra: If you have time, you could also design a campaign to help promote the national park within Sāmoa. For example, you could suggest other places where the information pamphlet could be displayed.

   Don’t forget to co-ordinate your pamphlet and the contents with the park ranger, who is responsible for management strategies, as well with your other colleagues, who are experts on the park’s features.

About the Role of the Visitors' Book and Questionnaire Managers

Your role is to create a new visitors' book and a feedback service. 'O le Pūpū Pu'e National Park needs a new visitors' book to monitor visitor numbers and to gather feedback and suggestions from visitors.

1. Design and create an interesting visitors' book for 'O le Pūpū Pu'e National Park that all visitors to the park could use to make comments about their impressions and experiences and suggestions for improvements.

2. Produce a questionnaire to be filled in by visitors to help make improvements to 'O le Pūpū Pu'e National Park. It should inform park management of the main interests and activities of visitors. Include questions about the visitors, such as where they come from and how long they are staying. Make sure the survey is not too long. Remember that visitors come to see the park, not to answer questions!

3. The visitors' book and questionnaire should be given a well-thought-out place on the floor map in the visitors' information fale so that they are inviting for visitors to fill in.

4. You should present your work clearly to the other students, making sure that you explain your reasons for the way you created it. Perhaps you could invite your classmates to sign it.

Don't forget to co-ordinate your questions with the park ranger, who is responsible for management strategies, as well with your other colleagues, who are experts on the park's features.

Student Activity Sheet

About the Role of the Park Guide Team

Your role is to guide the park's visitors and to be cave specialists. Some visitors will ask for a competent guide to help them learn about the special sights and the park's flora and fauna. Other visitors will just want to relax and enjoy their time in the park.

1. You should prepare an interesting guided walk through 'O le Pūpū Pu'e National Park. As cave specialists, you already know a lot about one main feature. Read the general information about the park carefully. You could also ask the other experts to help you complete the guided walk.
2. In addition, you could create a big floor map of the park to be located in the visitors' information fale. Mark the main sights and stops of your guided walk. There should be enough space left round the map for written or illustrated information from other groups explaining the park's features. It is your role to organise the space needed for all the material from the different groups in your class.
3. When all groups have finished the map, you will be required to introduce it to the class and talk about the guided walk that you have designed for visitors.

Your special database

The Pe'ape'a Cave in 'O le Pūpū Pu'e National Park

Pe'ape'a Cave means Cave of the Swiftlets. It is located near the north-western edge of the Puapua lava field and has a total length of about 850 metres.

Entrance of the Pe'ape'a Cave.

Photo: Andrea Wuttke

Lava caves are formed when lava ceases to flow and then cools and becomes solid. However, the entire flow does not cool at once. Instead, the surface, which is in contact with the air, cools first and solidifies while the lava underneath continues to flow as a hot liquid, leaving an empty channel behind it. If some of the lava cools at the edges, it builds shelves and ridges, as can be seen on the sides of some parts of the Pe'ape'a Cave.

Process of the cave formation

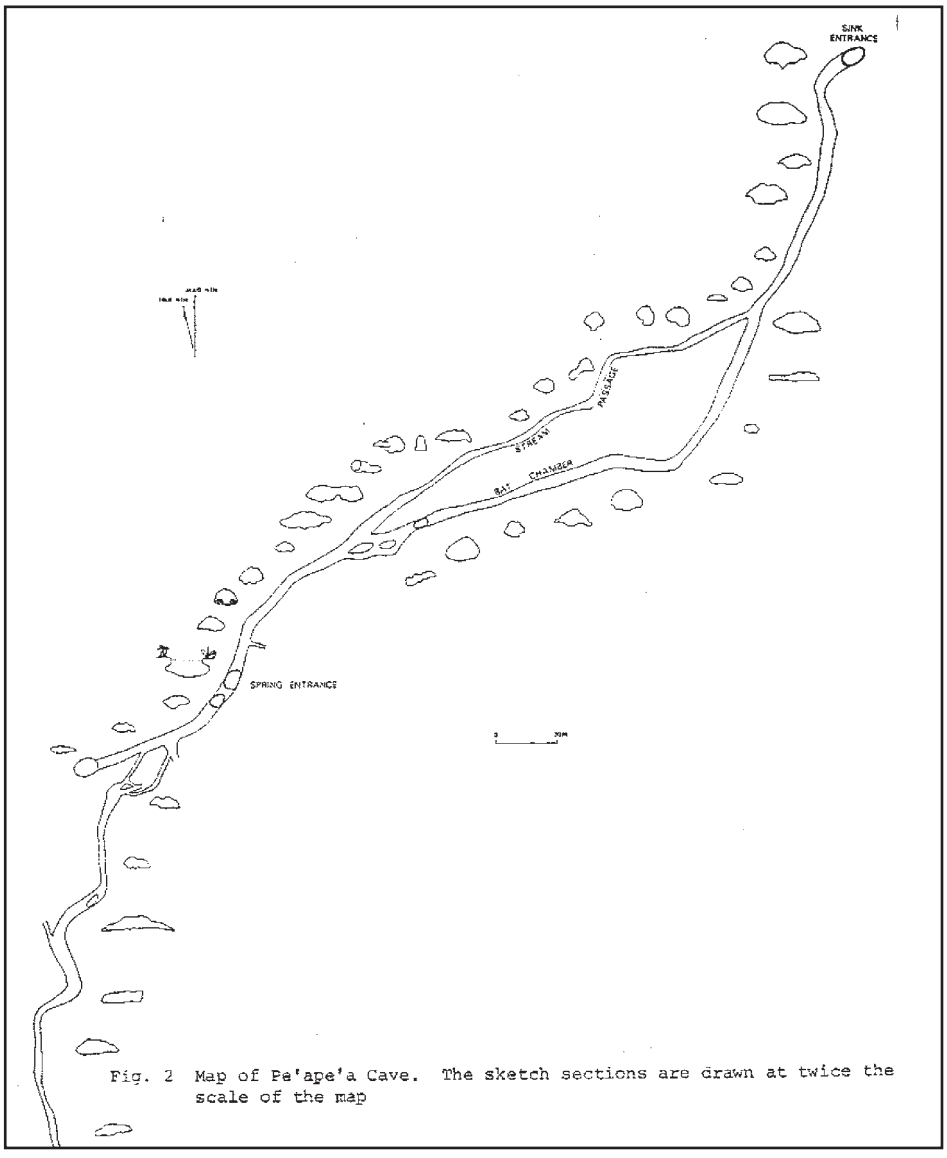


Fig. 2 Map of Pe'ape'a Cave. The sketch sections are drawn at twice the scale of the map

Map of the Pe'ape'a Cave.

Source: Ollier et al. (1979)

The wildlife of the Pe'ape'a Cave is limited to one species of bird and one species of bat. Previously, both species occurred in large numbers. They are unique in that each has adapted to navigating, roosting, and breeding within the dark and generally moist confines of the cave.

The white-rumped swiftlet, a very small black bird with a white rump, is commonly seen flying above the forest throughout the park. It feeds during the day on small flying insects. This bird never roosts or perches in trees, but at night it roosts inside the cave, where it clings to the roof and walls. Swiftlets make their nests out of moss that they pick from tree branches while flying. They glue the nests to the cave wall, usually supported by a small ledge. Each nest measures about 9 centimetres across. Within the Pe'ape'a Cave, the nests are primarily placed on the upper walls and even on the roof. Several thousand white-rumped swiftlets roost in the northern part of the cave near the large entrance.

The tagiti (the sheath-tailed bat), a very small, greyish-black bat, is seldom seen within the park or elsewhere on 'Upolu because they feed on small flying insects only at dusk and at night. They roost by day, hanging upside down on the roof of the cave. Their numbers have declined dramatically since the 1980s, and they now are listed as an endangered species on the IUCN Red List.

About the Role of the Flying Fox Experts

Your role is flying fox specialist, and your job is to provide interested visitors with useful information about these bats.

1. The journalists will need your help. This is a good opportunity to improve your knowledge and help to start a campaign to protect endangered species.
2. Participate in the creation of the floor map in the visitors' information fale. Prepare written, drawn, painted, or other information that clearly explains about the flying foxes found in the park.

Flying foxes

Most of the mammals in Sāmoa, such as pigs, dogs, rats, and horses, were brought to the islands on Polynesian or European ships. Only three kinds of mammals were in Sāmoa before human settlement, and all three of these are bats. One of them is the tagiti (sheath-tailed bat, *Emballonura semicaudata)*, an endangered small bat that eats insects and lives in caves like the Peʻapeʻa Cave. The other two are fruit bats, also known as flying foxes.

The two species of flying foxes found in Sāmoa both have a 1-metre wingspan and weigh about 500 grams. The endemic Sāmoan flying fox, *Pteropus samoensis*, roosts by itself or in small groups (often a pair of adults plus one young) in the canopy of ridge-top trees. In Sāmoan, it is called peʻa vao, meaning flying fox of the forest, referring to its association with the rainforest habitat. This species is unique because it is active during the day, with two feeding peaks, one in the morning and the other in late afternoon.

The other species, the Tongan flying fox, *Pteropus tonganus*, is colonial, often roosting in groups of up to several hundred. Although found in the primary forest, it also occurs in secondary growth forest, sometimes close to villages. Like most other bats, it is primarily nocturnal, with major foraging flights beginning in the hour prior to darkness. In Sāmoan, it is often referred to as peʻa fanua.

Similarities and differences between the Tongan flying fox and the Sāmoan flying fox

Pteropus tonganus – Tongan Flying Fox	*Pteropus samoensis* – Sāmoan Flying Fox
• Peʻa fanua – "land bat" • Roosts in large groups (of up to several hundred) • Has a black face and a seal-brown body with a light mantle; narrow wings • Active mainly at night, with the first feeding flight one hour before darkness	• Peʻa vao – "forest bat" • Roosts alone or in small family groups • Has a light-coloured face and a brown body; broad wings • Active during the day, with main feeding flights in the morning and late afternoon • Endemic; found only in Sāmoa

The guardian of the forest

Flying foxes feed on fruit and nectar. They transport pollen from one flower to another. They also carry fruit for long distances to their feeding places, dropping seeds on the way. The chance of some seeds germinating is increased after they have passed through the digestive system of a flying fox, so these animals are of great importance to the rainforest. Up to 30 percent of the trees in the rainforest depend on them for pollination or the dispersal of seeds.

Protecting the flying fox

Flying foxes reproduce very slowly. A female flying fox gives birth to only one baby per year and cares for it for six to eight months.

In the 1980s, there was a massive decline of flying foxes in Sāmoa owing to the logging of large areas of rainforest and commercial hunting. Flying foxes were exported to Guam to be sold as a delicacy. In the years 1981–1986, more than thirty thousand flying foxes were exported from Sāmoa alone. This trade has now been banned.

In addition, the cyclones in 1990 and 1991 further reduced the number of flying foxes. They were killed in the storms, they lost their protecting trees, they had no fruit to eat, and they were killed by pigs, dogs, and cats. Up to 90 percent of the flying foxes died in the cyclones and the resulting deforestation.

About the Role of the Bird Experts

Your role is bird specialist. You should be able to discuss selected birds with interested visitors.

1. The journalists will need your help. This is a good opportunity to improve your knowledge and help start a campaign to protect endangered species.
2. Participate in the creation of the floor map in the visitors' information fale. Prepare written, drawn, painted, or other information to help describe different bird species within the park. The poster *Manulele o Sāmoa Birds of Sāmoa,* enclosed with this kit, might be useful.

The tooth-billed pigeon, manumea, *Didunculus strigirostris*

The manumea is a type of pigeon found nowhere else in the world but on the islands of 'Upolu and Savai'i in Sāmoa. It is one of the world's most unusual and rare birds.

The manumea is relatively large (about 30 centimetres long), and it is similar in some features to the other more common pigeons like the lupe (the Pacific pigeon). It has the body and legs of a typical pigeon. It has a large and distinctively shaped and coloured bill. The tip of its bill is white with red, orange, and light brown at the base. The upper part of the bill has a sharp hooked point that overlaps the lower section of the bill. This gives the bird the English name tooth-billed pigeon. Its special beak is adapted to feed on the hard fruit that most other birds cannot open.

The manumea has a vital role in regenerating the rainforest as it disperses the seeds of the fruit it eats and allows new trees to grow. Several fruit trees that the manumea feeds on are endemic to Sāmoa.

Like most pigeons, the manumea has a slow breeding cycle, with each adult female bird laying only one egg a year. As a result, the manumea population can recover only very slowly after a disaster.

A number of factors threaten the existence of the manumea:

- People have been shooting pigeons, the manumea being particularly vulnerable because it flies close to the ground.
- People used to take the eggs from manumea nests for food.
- The rainforest habitat of the manumea is continually being cleared for plantations.
- The numbers of manumea and other pigeons were reduced by the cyclones in 1990 and 1991.

Because of concern for the survival of the manumea, it has been given full legal protection. It has also been declared the national bird of Sāmoa.

Sāmoan proverb: E sa'olele tuamafa i lou finagalo. (Your will is as the flight of an old pigeon.)

Pigeon hunting in Sāmoa

At one time, hunting the larger fruit pigeon (the Pacific pigeon, *Ducula pacifica*), was the most distinguished sport among Sāmoans. This game was called seuga lupe, and high chiefs often spent weeks in the bush enjoying this sport, using tamed birds to attract the wild pigeons.

The need to protect native pigeons

The pigeons of Sāmoa have suffered great losses over the last decades. They have lost much of their native forest habitat to logging, agriculture, and cyclones. But worse, "trigger-happy" hunters have killed up to a hundred birds a day. Today, the pigeons of Sāmoa are under legal protection.

The white-rumped swiftlet, pe'ape'a, *Collocalla spodiopygius*

The white-rumped swiftlet belongs to the family of the cave swiftlets, the only true native swift of the south-west Pacific. It is about 10 centimetres long. The swiftlet is seen in large formations, flying in what appear to be frantically irregular patterns. It eats airborne insects and is found in the forest and open areas during daylight, but it lands only in caves, where it sleeps.

Sāmoan proverb: Fa'ape'ape'a le tū.
(Like the swift that never rests, a homeless person gets no consideration.)

About the Role of the Journalist Team

Your role is a member of an editorial team. The *Sāmoa Observer* newspaper has decided to publish a special section on the environment. ‘O le Pūpū Pu‘e National Park would be a great topic to include. This park was one of the first national parks of the Pacific Islands. This section could be divided into different themes such as:

- General information
- A day in the life of a park ranger
- The campaign to protect Sāmoa’s endemic bird the manumea
- The campaign to protect the endangered flying foxes.

1. One team of journalists could write the general information about the park. This team could contact the park ranger and their staff and experts to gain an insight into the everyday work or experiences of this team. They could include an exciting story about one of the park ranger’s experiences.

2. One team of journalists could launch the environmental protection campaign and work together with the park experts. This campaign could include general information about the species for identification and explain their value to the site. It could use powerful slogans and activities to encourage others to help in protecting these species.

On the floor map in the visitors’ information fale could be a well-thought-out place where this important special section could be presented.

Presenting the Information at a Village Meeting

After gathering and producing the information, each group should present their section of the floor plan to the whole group using the protocol information contained in the earlier sections of this activity.

Suggested Student Activity 2

The Value of Natural Heritage to Different Stakeholders

Objective:

To assist students to present different perspectives on the value of natural resources and recognise the importance of why they should save or conserve these

Background

In 1978, ‘O le Pūpū Pu‘e National Park was created on government land. This ownership status facilitated the foundation of the national park by the Sāmoan Government. Interestingly, 81 percent of land in Sāmoa is owned by families or is held under customary title for subsistence purposes. This concept of common land is an integral part of the Sāmoan way of life.

Today in Sāmoa, this traditional land tenure system remains remarkably strong. Most of the undisturbed forest and other natural areas exist on communally held land. Although westernisation has eroded this system, under the law of Sāmoa, traditional communal lands cannot be bought or sold. Conservation efforts in Sāmoa are likely to be more successful if reserves are based on the traditional land tenure system, ensuring that primary control remains in the hands of village leaders.

For and against debate

The Sāmoan Timber Company in Āpia plans to cut down a large amount of rainforest for timber on ‘Upolu. They will pay a lot of money to several villages that own these areas. They want to build a timber mill right next to the Togitogiga Recreation Reserve. However, the Division of Environment of the Sāmoan Government has heard about this project and is opposed to the logging. They have decided to debate the matter in one of the villages. The Division of Environment has organised a meeting for the stakeholders involved to discuss the matter and reach a conclusion approved by all.

The stakeholders opposed to the proposed logging include:

- The Division of Environment
- A park ranger of ‘O le Pūpū Pu‘e National Park
- The villagers who are against logging
- A bird and bat specialist
- An eco-tourism specialist
- A tourist.

The Sāmoan Timber Company invited the following people to clarify their arguments:

- The company manager
- An economist
- A timber mill worker
- A truck driver
- The unemployed villagers
- The villagers who are in favour of logging.

To begin the activity, the two groups could discuss separately their main reasons for wanting or not wanting the logging to be approved and then record these points on a board.

Then the two groups should come together, taking it in turns to discuss each of their points.

The two sides should try to come to a compromise on this issue.

Finally, the teacher could talk about the discussion between the two groups and highlight the difficulties encountered when trying to agree on such important issues.

Glossary

‘Afa	Strong coconut fibres used to tie the rafters and joists of a fale
Endemic	Found nowhere else in the world
Epiphytic	Deriving moisture and nutrients from the air and rain and usually growing on another plant but not parasitic on it
Fale	A typical Sāmoan house that’s unique in its design and construction: oval or round in shape with a thatched roof supported by wooden posts and a pebble or broken coral floor covered with woven mats
Frugivorous	Feeding on fruit
Littoral	The region lying along the shore
Lupe	The Pacific pigeon, *Ducula pacifica*
Manumea	The tooth-billed pigeon, *Didunculus strigirostris*
Montane	Mountainous country
Pe‘a fanua	The land bat; the Sāmoan word for the Tongan flying fox, *Pteropus tonganus*
Pe‘a vao	The forest bat; the Sāmoan word for the Sāmoan flying fox, *Pteropus samoensis*
Pe‘ape‘a	The white-rumped swiftlet, *Collocalla spodiopygius*
Seuga Lupe	The hunting of the Pacific pigeon, at one time the most distinguished sport among Sāmoans
Tagiti	The sheath-tailed bat, *Emballonura semicaudata*
Tālofa	The Sāmoan word for “hello”
Tōfā soifua	The Sāmoan word for “goodbye”
Tulou	The Sāmoan word for “excuse me”

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