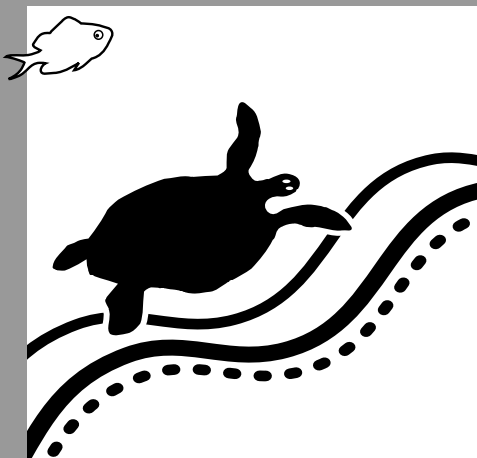
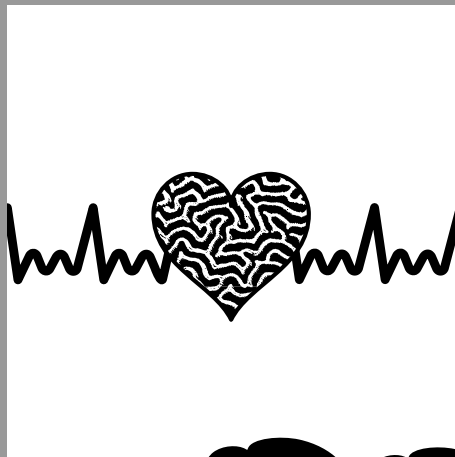
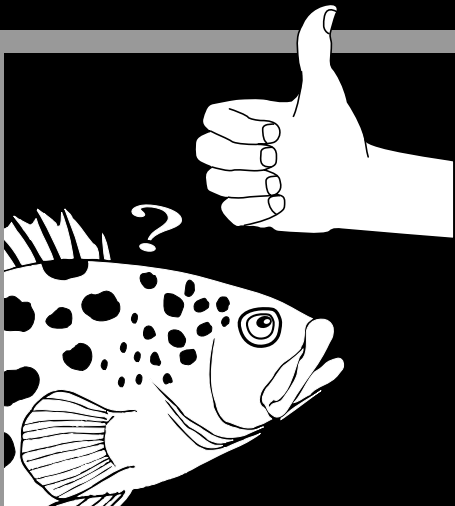




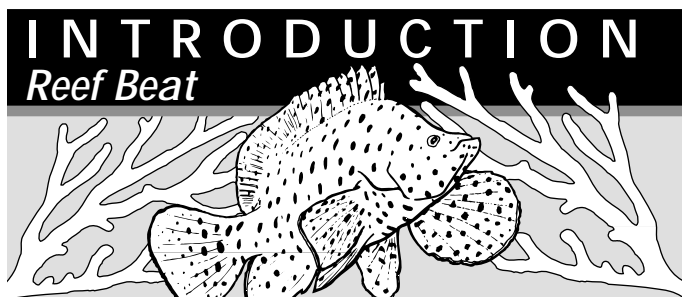
GREAT BARRIER REEF
MARINE PARK AUTHORITY

Reef Beat Resource Kit

A Great Barrier Reef Marine Park Authority
and Newspapers in Education Initiative



let's keep it great



Reef Beat has been produced by the Great Barrier Reef Marine Park Authority and the *Townsville Bulletin's* Newspapers in Education team.

This resource is a response to an on-going demand by students and teachers for more information about the Great Barrier Reef, and activities in which they could participate to learn more and assist the recovery of precious reef communities.

The charter of the Great Barrier Reef Marine Park Authority's Education Unit is to deliver education programs and activities about the Great Barrier Reef Marine Park and World Heritage Area throughout Australia.

To meet this charter, the Education Unit has developed a range of new programs and educational activities that deliver key Great Barrier Reef Marine Park Authority messages.

The NIE team is committed to producing a quality In Print section for schools this term that has up to date information and high quality artwork about the Great Barrier Reef.

The Great Barrier Reef Marine Park Authority and NIE have a long relationship with schools in developing appropriate resource material to assist all regional primary and secondary schools.

Newspapers play a crucial role in the education of students about the Great Barrier Reef. A daily habit of reading the newspaper will ensure that many students will read the newspaper well into their adult lives to keep ahead of what is happening on a local, national and international scale.

The articles about the Great Barrier Reef can be cut, marked on and pasted by even very young students. While for older students they develop knowledge about the Great Barrier Reef, independent reading skills, improve vocabulary, enhance comprehension and critical thinking.

For enquiries about this resource '*Reef Beat*', please contact:

The *Townsville Bulletin*
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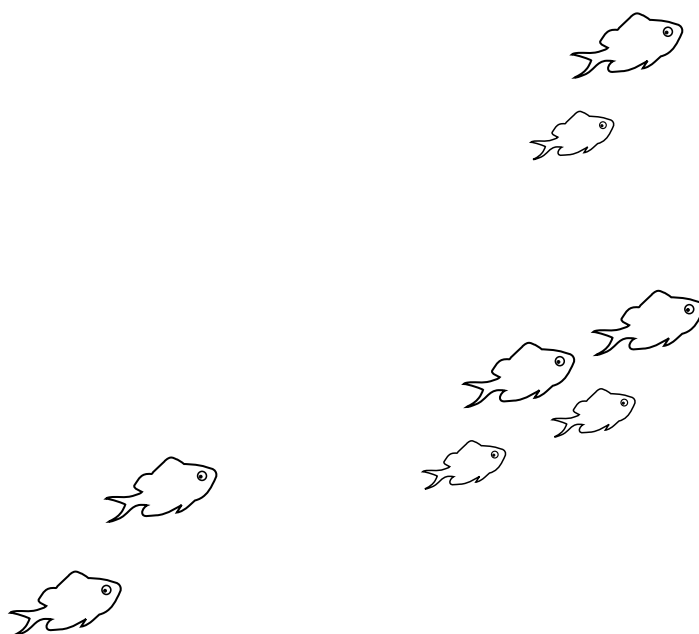
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GREAT BARRIER REEF
MARINE PARK AUTHORITY



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THE RATIONALE



The Great Barrier Reef is recognised worldwide for its unique habitats and biological diversity. It's a national icon and one of the world's natural wonders. It provides homes and food for thousands of different species, and is a learning ground and prime site for initiating the development of understandings and values about the reef and the need to use the reef wisely, to protect the animals and habitats that live there and to protect our future enjoyment of it.

The Great Barrier Reef Marine Park Authority recognises the need for schools to be supported with the appropriate information. Our goal is to foster and understanding of, and support for, ecologically sustainable reef management, in line with Government policy. The Authority is concerned with conservation of biological diversity, environmental protection, economic development, community use and the recognition of the range of benefits that the reef provides. Through education we promote:

- An understanding and appreciation of the values of the Great Barrier Reef and its biological diversity
- An understanding of conservation and management issues in the Great Barrier Reef Marine Park
- Appropriate values towards the species, habitats and ecosystems in the Great Barrier Reef World Heritage Area, and
- Skills useful for understanding the reef environment, and the pressures affecting it.

We hope this resource will help teachers and students understand the nature of the Reef and its management, and to explore reef biodiversity matters related to Studies of Society and Environment and Science plus other learning areas in school years 4-9.

It aims to increase awareness about the importance of the species, habitats and ecosystems in the Great Barrier Reef World Heritage Area and encourage all schools to actively adopt best environmental practice, both on land and in the water.

WHY GET INVOLVED?



The Great Barrier Reef Marine Park contains much of Australia's distinctive biodiversity. It is home to many unique species, 43 of which are listed as rare or threatened by the World Conservation Union (formerly IUCN).

When considering the Marine Park, most people think only of coral reefs, but in fact, 94% of the Marine Park is made up of other communities such as sponge gardens, mangroves and sea grass beds. This unique and rich biodiversity must be protected for future generations.

The Great Barrier Reef Marine Park is home to approximately:

- 1500 species of fish
- 360 species of hard corals
- One-third of the world's soft corals
- 4000 species of molluscs (e.g. shells)
- 1500 species of sponge
- 800 species of echinoderms (starfish, sea urchins, etc)
- 500 species of seaweed
- 23 species of marine mammals
- 6 of the world's 7 species of marine turtles, all listed as rare or threatened

Life in the Great Barrier Reef is a complex web of interactions, which connects tens of thousands of species together to sustain life – including human life.

The Great Barrier Reef is under pressure. Some clear indications include:

- Increasing levels of nutrients and sediments washing into the Marine Park each year from rivers and estuaries;
- Crown of thorns starfish outbreaks;
- Coral bleaching events; and
- Continuing alarming declines in some of our threatened species, such as dugong and loggerhead turtles.

To turn this around, all communities are invited to become informed about best environmental practices, and to adopt a code of behaviour that is best for the reef.

HOW TO USE THIS RESOURCE



The activities within this resource can support teachers:

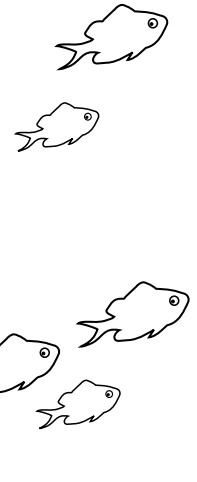
- When planning learning activities which focus on the Great Barrier Reef;
- To give students opportunities to explore the current ways we use, value and manage the plant and animal communities that make up the Great Barrier Reef;
- To take an active role in teaching about the Great Barrier Reef;
- To contribute to the responsible development of our future citizens and the relationship with both plant and animal communities that make up the Great Barrier Reef;
- To empower students to take positive action for sustainable reef management, and to support the principles of ecological sustainability.

You can use the resource to plan, provoke, stimulate, support and inspire your teaching and learning program.

OBJECTIVES



- **To have fun and appreciate the Great Barrier Reef.**
- **To support curriculum in schools.**
- **To promote good classroom practice and the sharing of it.**
- **To promote discussion of the Great Barrier Reef issues within education.**
- **To support, value, and encourage all individuals involved.**
- **To develop ownership and responsibility in the community for the Great Barrier Reef.**
- **To encourage commitment of individuals, classes, schools, and communities to think, make decisions and take action in order to conserve and protect the Great Barrier Reef Marine Park.**



Activities for use with Feature 1

'The Great Barrier Reef'



Read the first feature article about the Great Barrier Reef. In groups talk about features of the Great Barrier Reef such as:

- Size;
- Location;
- How it differs from other reefs and why;
- Types of corals found;
- Types of other habitats found;
- Types of animals found;
- Types of plants found;
- Areas for boating, fishing, visiting and other recreational activities;
- Areas people are not allowed in, and why.

Use the following questions to examine the Great Barrier Reef from a geographical perspective:

- Where is this place?
- How big is it?
- What does it look like?
- How does it connect to other places?
- What is the weather/climate like there?
- What is the scenery like there? Why?
- How do people travel within this place?
- What sort of work do people do in this place?
- What animals live there?
- What plants live there?
- Is there any evidence that this place is changing?
- If so, how will this change affect the local people?
- If so, how will this change affect the reef environment?
- Would you like to visit this place?

Re-read the article and ask students:

- What is this place?
- What is this place like?
- Where is it?
- How is it used?
- What is happening at this place at this time?

Re-read the article and respond personally by:

- Recreating stories about the reef and its unique creatures;
- Acting out the story;
- Making individual books;
- Illustrating the story.

Collect other stories about the reef from the 'Press Clippings'.

(See <http://www.reefed.gbrmpa.gov.au>) Create a file and keep a journal documenting thoughts and ideas.

Predict and list features students think would be the most common in the Great Barrier Reef and its surrounding environment. Test these by counting the number of times the feature occurs. Make a class graph of results.

Read and discuss other stories about the Great Barrier Reef in the 'Press Clippings' where the Great Barrier Reef is the major setting. Draw students' attention to the variety of settings, features and uses of the Great Barrier Reef.

Collect and download photographs of the Great Barrier Reef from the Great Barrier Reef Marine Park Authority's website.

See www.gbrmpa.gov.au Share these and talk about features of the Great Barrier Reef and activities undertaken there. Identify things that are found only on the Great Barrier Reef as opposed to other areas.

Ask students:

- What do we mean by the Great Barrier Reef?
- Why is it important?
- What does it support?
- What plants and animals live on the Great Barrier Reef?
- What is the Reef made of?
- What activities might be undertaken while in and on the waters of the Great Barrier Reef?
- What can be seen in the photographs that cannot be found in other familiar places?

Make charts of students responses and use these to develop questions about the Great Barrier Reef for further exploration.

Create a concept map showing important facts about the Great Barrier Reef.

Discuss how the reef is important to education, tourism, the economy, and scientific research.

Initiate a 'Magic Circle' by placing incomplete statements about the Great Barrier Reef on cards and placing them in a box. Students answer incomplete sentences such as:

- A reef is...
- Reefs are more than...
- Reefs produce food and shelter for...
- We depend on reefs for...
- Coral reefs are...
- Reef plants...
- Reef animals...
- The Great Barrier Reef is special because...

Write factual pieces describing the Great Barrier Reef. Describe features that make it unique.

Encourage students to think of ways to present information about the Great Barrier Reef
For example: web pages, brochure, pamphlet, cartoon, poster, badge, sticker, postcard, etc.

Make shape-cards for significant creatures of the reef.

Design a T-shirt, slogan, bumper sticker, poster, or newspaper headline promoting the protection and conservation of the Great Barrier Reef.

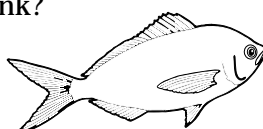
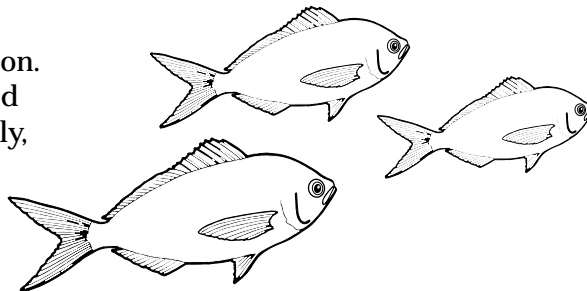
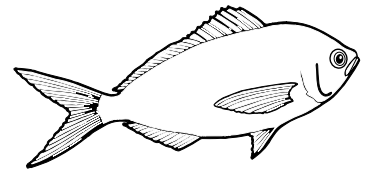
Write a letter to an alien about the Great Barrier Reef.

Write an open letter in The *Townsville Bulletin's* NIE section about the Great Barrier Reef and why it is so important.

Use Edward de Bono's 'Six Hat Thinking' to explore the Great Barrier Reef. Place cut out hats on the floor and group responses as a class.

- **Red Hat** represents feelings and emotions.
Ask: What are your feelings about the Great Barrier Reef? Alternatively, how do you feel about the Great Barrier Reef?
- **White Hat** represents facts and information.
Ask: What are some facts we have learned about the Great Barrier Reef? Alternatively, What do we know to be true about the Great Barrier Reef? What are the facts?
- **Yellow Hat** represents the positives.
Ask: What are the good points we have learned about the Great Barrier Reef? Alternatively, What are the positives about the Great Barrier Reef?
- **Black Hat** represents the negatives.
What questions or issues does our learning about the Great Barrier Reef raise?
Alternatively, What are the negatives about the Great Barrier Reef?
- **Green Hat** represents creativity.
Ask: What is possible for us to do as users of the Great Barrier Reef? Alternatively, What are some of the solutions to the Great Barrier Reef's issues?
- **Blue Hat** represents thinking about thinking.
Ask: What questions or issues does our learning about the Great Barrier Reef raise? Alternatively, What is the Great Barrier Reef all about? What are some of the main things? About what has it made you think?

Introduce the nature of the six hats, one at a time and practice using them in response to a general event and issues that arise during the day. Once the students are familiar with the nature of each hat, use them in an activity to discuss the Great Barrier Reef. Record the different discussion points and encourage groups to report on the varying vies presented.



Activities for use with **Feature 2**

'A short history of the Great Barrier Reef'



Read the second feature article about the Great Barrier Reef's natural, geological and cultural history. In groups talk about:

- The age of the Great Barrier Reef;
- What the Great Barrier Reef was like in the Ice Age;
- How reefs form;
- How reefs developed over time;
- When indigenous groups began exploring the Great Barrier Reef;
- The first European explorer who entered the waters of the Great Barrier Reef;
- How the Great Barrier Reef got its name;
- Subsequent voyages and expeditions by explorers and scientists;
- Historical shipwrecks of historic importance known to exist on the Great Barrier Reef; and
- Architectural sites of historical importance on the Great Barrier Reef.

Collect pictures, charts, artifacts, newspaper cuttings (including letters to the editor or reader access columns) and magazine articles about indigenous people and the Great Barrier Reef in traditional and contemporary settings. Set up a class display. Identify similarities and differences observed in lifestyles on the Reef over time.

Collect other stories about the reef in the past from the 'Press Clippings'. Create a file and keep a journal documenting thoughts and ideas.

Prepare questions to ask an explorer of the Great Barrier Reef if there were an opportunity to interview one. Topic areas to investigate could include:

- Locations explored during expeditions on the Great Barrier Reef.
- Reasons the Great Barrier Reef was explored.
- Purpose of the expeditions.
- Important equipment and resources taken.
- Crewmembers on the journey.
- Challenges undertaken.
- Achievements on the expedition.
- Exciting or important things that happened on the expedition.
- Ways the expedition might help people better understand the Great Barrier Reef.

Brainstorm the contributions different explorers made in the discovery of the Great Barrier Reef.

Read the names of numerous explorers on the Great Barrier Reef in the chart on the next page and develop a data chart highlighting 4-6 explorers, the year of their exploration, contributions made, problems encountered and how they were solved.

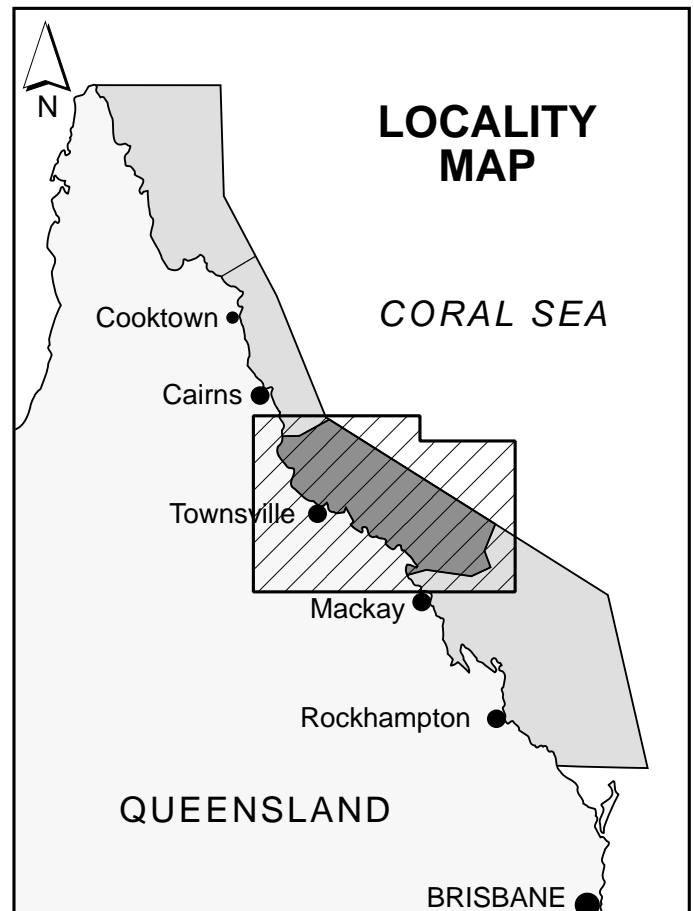
Create a timeline and record important events in the Great Barrier Reef's history.

Record the Great Barrier Reef's past on a timeline.

Discuss why, with the settlement of Europeans and Asians, the Great Barrier Reef changed as needs for food were met.

List the changes imagined with the advent of European settlement on the Great Barrier Reef.

Create a cartoon or fact sheet describing how the Great Barrier Reef was formed.

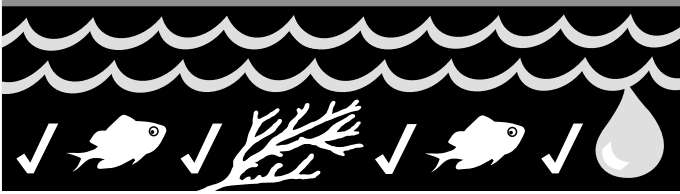


Explorers' Chart

<i>Name</i>	<i>Year of exploration</i>	<i>Contribution</i>	<i>Problems encountered</i>	<i>Problem. If solved how?</i>
Cook				
Flinders				
Bauer				
Brown				
Parker King				
Stokes, Wickam & Byrne				
Blackwood, Jukes and MacGillivray				
MacGillivray, Stanley and Huxley				
Denham				
Mosely				
Coppinger and Miers				
MacFarlane				
W. Saville-Kent				
Headley				
Yonge				
Steer				
Stoddard				



Activities for use with **Feature 3** 'The importance of clean, clear water'



Read about why water is essential for life on the Great Barrier Reef. Discover why clean, clear, warm and moving water provides the basis for the growth of the world's largest living structure.

Talk about how the Great Barrier Reef's water is of importance to aquatic habitats and animals.

Use a circle formation and talk about what is known about the waters surrounding the Great Barrier Reef, including how we use it and care for it.

Collect other stories about the reef's waters from the 'Press Clippings'. Create a file and keep a journal documenting thoughts and ideas.

Use a PNI (Positive, Negative and Interesting analysis). Sort information into three categories:

- Positive things about the waters of the Great Barrier Reef;
- Negative things about the waters of the Great Barrier Reef; and
- Interesting things we know about the waters of the Great Barrier Reef.

Talk about the most important things we need to know if we are going to ensure we have clean, safe and reliable water sustaining the Great Barrier Reef for our use and for future generations.

Write about reef creatures use of or reliance on clear, clean, water.

Produce a poster of things that affect water quality in the Great Barrier Reef.

Construct concept maps to show the causes and effects of environmental issues in marine areas.

Survey local residents and school peers to gauge their awareness of environmental issues facing the Great Barrier Reef.

Investigate how we can ensure a continuous supply of clean, clear sunlit waters with extremely low nutrient levels. Explain to the class that water quality is central to the life of the Great Barrier Reef. Flooding by freshwater runoff, silt from muddy creeks and rivers, nutrients in sediment, residues of pesticides and herbicides and effluent from human activities create water conditions that negatively impact on the Great Barrier Reef.

Present the following scenarios to the class:

- *Scenario one:* You go to the Great Barrier Reef. The area is potentially available for some form of 'use', however the Government has declared restrictions on when and for what purposes you can use it. What do you do?
- *Scenario two:* A factory lets polluted water flow into the river and into the waters of the Great Barrier Reef. What can people at the factory do to stop this happening? What types of partnerships might factory staff seek with others in the community to address such an issue?
- *Scenario three:* Lots of silt and impurities flow into the waters of the Great Barrier Reef from rivers. What can you and other people do to improve the situation?
- *Scenario four:* The Great Barrier Reef Users Committee is concerned about visitor impact on the waters of the Great Barrier Reef. What might be some of their concerns? What could be done about them?
- *Scenario five:* Due to the distance between the Great Barrier Reef and most of the urban and agricultural users region, many people don't make the connection between the water on the Great Barrier Reef and the water that flows from their homes, gardens, factories and farms. What is the connection? How might urban and rural communities heighten their appreciation and awareness of this?

In groups, students investigate and discuss one scenario. They then present solutions to the class using role-plays, oral presentations, poster displays or visual presentations. Discuss how practical the solutions might be as well as peoples' rights and responsibilities in each situation.

Produce a Great Barrier Reef art sign, poster, series of posters, television advertisement or web page to promote the Great Barrier Reef, water quality and safe water for humans and reef creatures.

Draw flow charts explaining how people in rural and urban areas impact on the Reef's waters and make recommendations on how to ensure this remains clean, clear and low in nutrients. Encourage students to consider the main problems or issues for plants and animals living in the waters of the Great Barrier Reef.

Imagine the possible characteristics of the waters of the Great Barrier Reef and the environment in and around the area that might exist when they are adults.

Ask students:

- What changes do you think might occur?
- What might waters of the Great Barrier Reef 'look like' in the future? Why?
- What might the areas surrounding environment 'look like', 'sound like', and 'comprise'?
- What current trends might return?

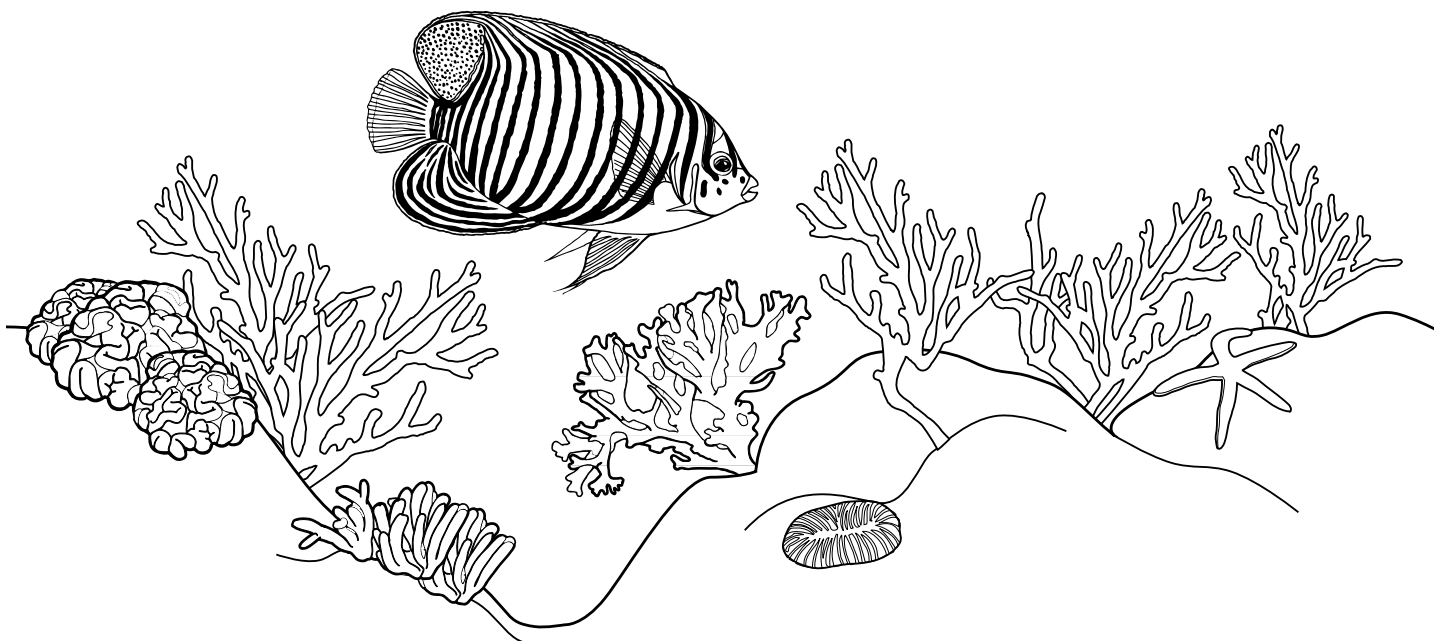
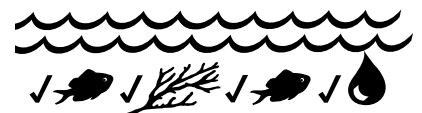
Decide on how to best market the Great Barrier Reef and its waters, to heighten community awareness and appreciation of the reliance on its water supplies.

Decide how you could introduce the idea that there are many and varied ways urban and rural communities can become involved in protecting the Great Barrier Reef or helping to raise community appreciation that the Great Barrier Reef is under pressure.

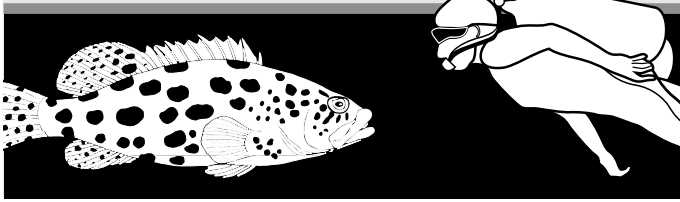
Consider the consequences of not increasing involvement and appreciation of Great Barrier Reef water quality issues. Use a consequence wheel to examine first, second and third order consequences.

Choose one local issue associated with the Great Barrier Reef's water quality. As a class, brainstorm possible solutions and talk about why something should be done about each of these. Discuss what the class could do. Suggestions might include:

- Raising public awareness by speaking at a school assembly, writing an article for the school newsletter, or writing a letter to the editor of a newspaper.
- Developing stickers, pamphlets or an action-chart showing how students and their families can improve water quality.
- Writing to Members of Parliament, Local Government, and the Department for Environment about water quality problems that concern them.
- Participating in Waterwatch, Clean Up Australia Day, Sea Week, Biodiversity Month, Threatened Species Day, Weedbuster Week, Arbor Day, Water Week and Catchment Care activities.



Activities for use with Feature 4 'Tourism and the reef'



Talk about travel. Find out how much travel the class has done to the Great Barrier Reef.

Ask questions like:

- Who has travelled to the Great Barrier Reef? Where?
- Who has most recently travelled to the Great Barrier Reef?

Invite students who have visited the Reef to recall a visit to the Great Barrier Reef that affected their idea of 'how things are'. Talk about what happened, how they felt, what they thought and what they learned about the Great Barrier Reef.

Read travel brochures and articles about the Great Barrier Reef as a holiday destination. Identify the most visited places and the major tourist attractions. Draw or write responses to the following questions:

- What can we say about the Reef's tourist sites?
- In what ways are they the same/different?
- Where are the popular reef areas off the coast between Cairns and the Whitsunday Islands, which account for only about five per cent of the total reef area?
- Why might tourists like to go there?
- Where would you like to travel and why?

Use photographs from tourist brochures about the Great Barrier Reef and discuss the following:

- What images are shown in the photographs?
- Which images are not shown? Why?
- What particular features of the Reef are highlighted?
- Are there things that tourists might want to do in the places that are not shown? If so, why might they have been left out?
- What are the tourists in the photographs doing?
- How strongly do the photographs stimulate your interest? How do they do this?
- What have people who selected these photographs assumed that tourists want?
- What kind of person might the tourist be?
- Consider how the photographs have been used to show a particular point of view or to persuade the viewer.

Collect other stories about tourism and the reef from the 'Press Clippings'. Create a file and keep a journal documenting thoughts and ideas.

Consider what the Great Barrier Reef has to offer tourists, and write down some catchy phrases that create images of interesting places and spaces on the Reef.

Research how and where tourism takes place on the Great Barrier Reef.

- **Find out** how many tourism operators move tourists around the Reef and coastal areas.
- **Find out** how many tourists visit the Reef annually.
- **Explore** where the tourists originate.
- **Determine** how much money tourism pours into the local reef economies each year.

Investigate the hospitality providers and tour operators who are offering 'educational tourism' opportunities to those who see a visit to the Reef not only as a holiday, but also as a learning experience.

Research operators offering an 'eco tourism' experience. Locate the wilderness or natural areas of the Reef that are visited as part of eco tourism opportunities.

Using a large map of the Great Barrier Reef, mark on natural features that might be of interest to visitors and holiday makers.

Choose places to visit on the Great Barrier Reef and mark them on a map.

- **Label** the locations.
- **Suggest** where more information can be found about the places labeled.
- **Divide** the class into small groups and ask each group to research one of the places students have said they would like to visit including information about the people who live there.
- **Decide** how this information can be creatively and effectively shared by the class.
- **Focus** on the different environments of these places.
- **Design a postcard** highlighting some of the natural attractions of one of them.
- **Design a poster** promoting one of the places.

- **Use the following questions** to examine a tourist destination on the Great Barrier Reef from a geographical question:
 - Where is this place?
 - How big is it?
 - What does it look like?
 - How does it connect to other places?
 - What is the scenery like?
 - How do people travel within this place?
 - What grows well there?
 - What animals live there?
 - What would it be like to live there?
 - Is there any evidence that this place is changing?
 - If so, how will this change affect this place?

Read tourist brochures about the Great Barrier Reef or view travel advertisements in magazines and on television and consider the following questions:

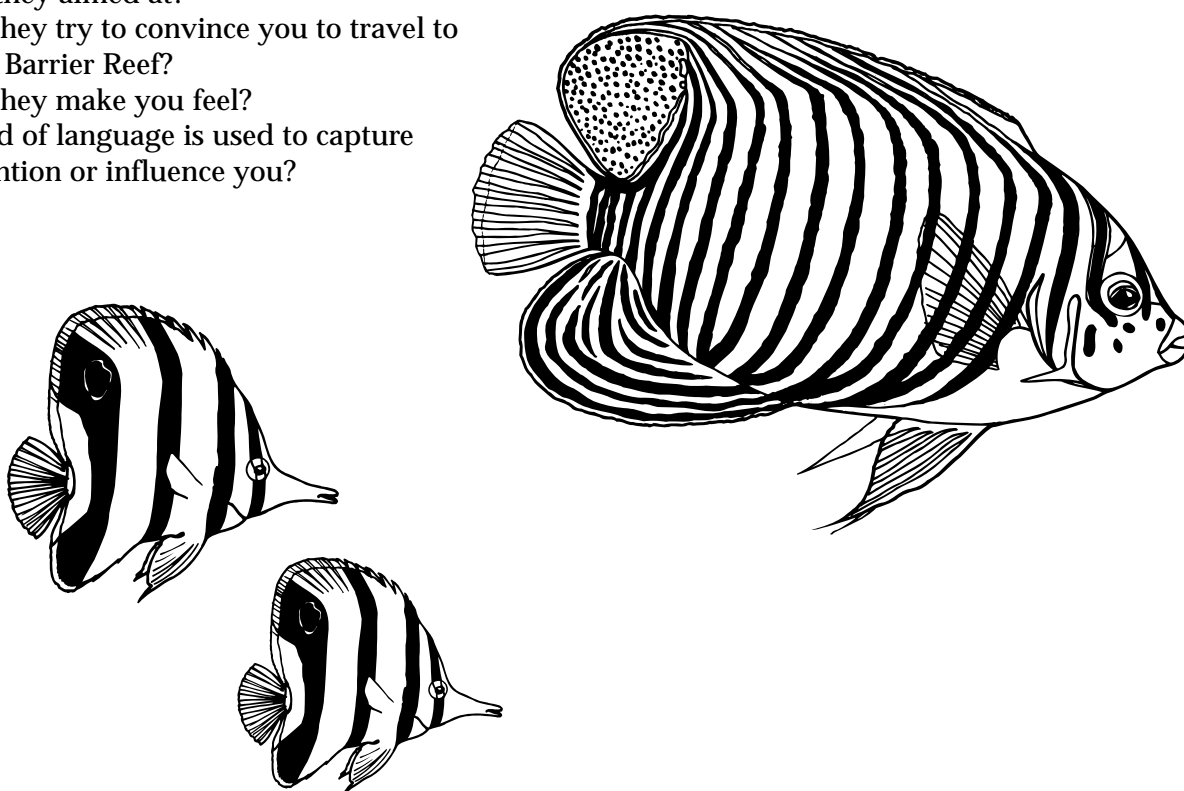
- How is the Great Barrier Reef portrayed?
- What is being offered to the visitor?
- What kind of visitor is the material trying to attract?
- How might the travel organisation be selling reef tourism? E.g. by creating excitement, by emphasising a places remoteness, by describing the hospitality offered and the luxury to be offered.
- What are the tourism brochures selling?
- Who are they aimed at?
- How do they try to convince you to travel to the Great Barrier Reef?
- How do they make you feel?
- What kind of language is used to capture your attention or influence you?

Set up a tourism display based on information gathered. Groups of students could be assigned to set up different aspects of the display.

Invite a guest speaker from the tourism industry to speak to the class. Prepare questions to ask the guest speaker before the visit.

Investigate what resources are used to provide for tourism on the Great Barrier Reef. View a selection of photographs showing resources. List resources shown in the photographs and identify how each resource might be used by tourists. Classify the resources and suggest who might own them.

Interview a range of people who visit the Great Barrier Reef. Develop a profile of tourists visiting the Great Barrier Reef.



Activities for use with **Feature 5** *'Indigenous relationships with the reef'*



Investigate tourist sites on the Great Barrier Reef that have cultural or spiritual significance to local indigenous groups.

Investigate how tourism is managed on the Great Barrier Reef. Produce a policy statement/management plan for the Great Barrier Reef.

Read the feature article. Use this information to make statements about:

- Aspects of Aboriginal and Torres Strait Islanders' traditional and contemporary lifestyles, and cultural connections to the Great Barrier Reef
- Aboriginal and Torres Strait Islander relationships with the Great Barrier Reef
- Disruption of traditional lifestyles on the Reef and contemporary solutions
- Issues of importance to Aboriginal and Torres Strait Islander groups along the Great Barrier Reef today.

Find out about the Aboriginal and Torres Strait Islander history on the Great Barrier Reef. Describe why the Reef is so important to them.

Collect other stories about Aboriginal and Torres Strait Islanders and the reef from the 'Press Clippings'. Create a file and keep a journal documenting thoughts and ideas.

Research the relationship and importance of the coastal and marine environment to Aboriginal and Torres Strait Islanders, past and present.

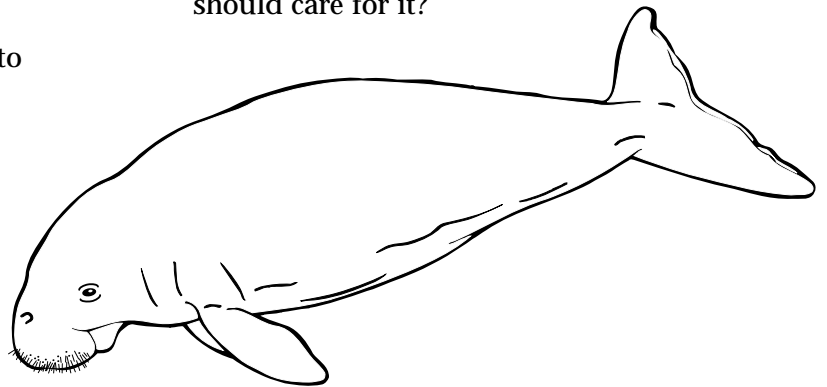
Describe the ways in which Aboriginal and Torres Strait Islanders use the coastal and marine environment today. Investigate how their use of coastal and marine environments and their attitudes towards these areas have changed since the colonization of Australia.

Investigate cultural rules and lore for reef resource use and protection. Write about one of the regulations affecting the use and management of the Great Barrier Reef. Include the regulation, the body responsible, the reasons for the regulation and the sanctions involved.

Examine the ways the Great Barrier Reef is represented in Aboriginal and Torres Strait Islander art, music, dance and oral traditions. Support students to demonstrate this understanding by drawing what the Great Barrier Reef means to them using their own design symbols.

Ask students:

- How is the Aboriginal and Torres Strait Islander relationship with the Great Barrier Reef different from the European view of the Reef?
- What can we learn from the Aboriginal and Torres Strait Islander relationship with the Great Barrier Reef, its use and the way we should care for it?



Prepare a concept map to show the similarities and differences in the Aboriginal and Torres Strait Islander and European relationships with the Great Barrier Reef.

Make a mural or poster that explains the main messages or ideas conveyed in the feature article.

Form expert groups and investigate an aspect of Aboriginal and Torres Strait Islander life on the Great Barrier Reef or an issue identified in the feature article. Each group prepares a list of questions to investigate and ways to find the information. Findings can be reported back to the class using an oral presentation.



Activities for use with **Feature 6** 'Conservation and management practices on the Great Barrier Reef'

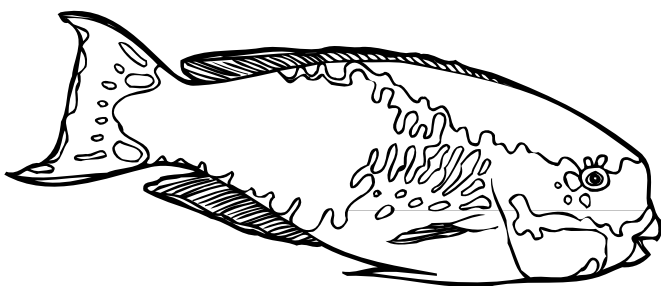


Ask the following questions:

- Where is the Great Barrier Reef?
- How large is it?
- Is the Great Barrier Reef a biologically diverse ecosystem? Why or why not?
- What resources does the Great Barrier Reef provide?
- How do people use the Great Barrier Reef?
- List the different specific groups of people that use the Great Barrier Reef;
- What are the benefits that come from using Great Barrier Reef resources?
- Outline the negative impacts that can and have occurred from using the resources of the Great Barrier Reef;
- Why is the Great Barrier Reef important?
And
- Why is the Great Barrier Reef "under pressure"?

Ask students what they think are the most important things we need to know if we are going to ensure we have a Great Barrier Reef Marine Park for recreational and commercial fishing purposes, tourism opportunities, shipping activities and for the habitat requirements of the Reef's animals. Visit the Great Barrier Reef Marine Park Authority website and consider issues affecting the Great Barrier Reef Marine Park. Find information about the need for user groups to use the Great Barrier Reef Marine Park's resources in a sustainable way.

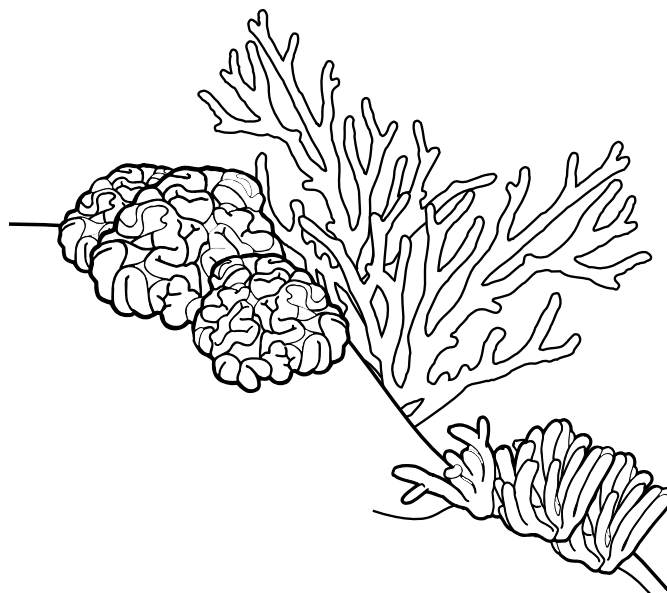
Read the feature article to gain information about the uses and activities affecting the Great Barrier Reef.



Read additional newspaper articles in the 'Press Clippings' file about human impacts on the Great Barrier Reef and answer the following key questions:

- Who are the people involved?
- What impacts (environmental, economical, Social/cultural and political) have resulted?
- Where are these impacts occurring?
- Why are these humans causing these impacts?
And
- How will these impacts affect the Great Barrier Reef?

Encourage students to review local and national newspapers, e.g. *The Townsville Bulletin*, *The Cairns Post*, *The Innisfail Advocate*, *The Herbert River Express*, *The Advocate*, *The Courier Mail* and *The Australian* newspapers for information. Press Com www.presscom.com.au is a helpful Internet site for articles. Collate all of the articles into a media folio.



Talk with students about who makes Great Barrier Reef Marine Park management decisions and encourage students to visit <http://www.gbrmpa.gov.au> to find out how it is managed and how decisions are made. Ask students to construct a flow chart showing how decisions are made. Encourage students to explore the meaning of "multiple-use management" and the range of uses and values that are managed within the Great Barrier Reef Marine Park.

Talk with students about biodiversity being the variety of species, populations, habitats and ecosystems. Encourage them to find out about the biodiversity within the Great Barrier Reef Marine Park. Similarly, discuss and explore how the Great Barrier Reef Marine Park contributes to the protection and conservation of biodiversity in partnership with other Government agencies, communities and schools.

Talk about the meaning of 'ecological sustainability' and why the management and protection of the Great Barrier Reef by government, concerned groups and individuals is important if we are to conserve the Reef's natural assets.

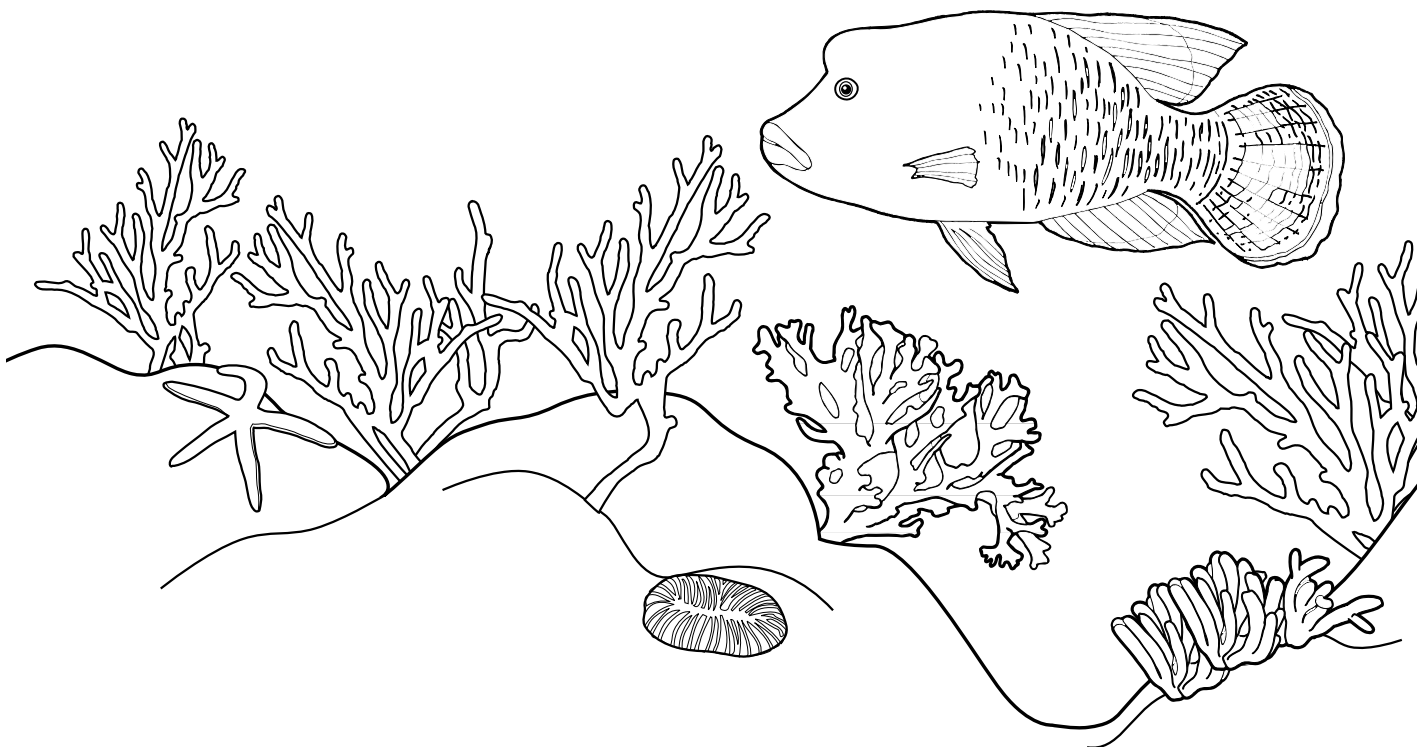
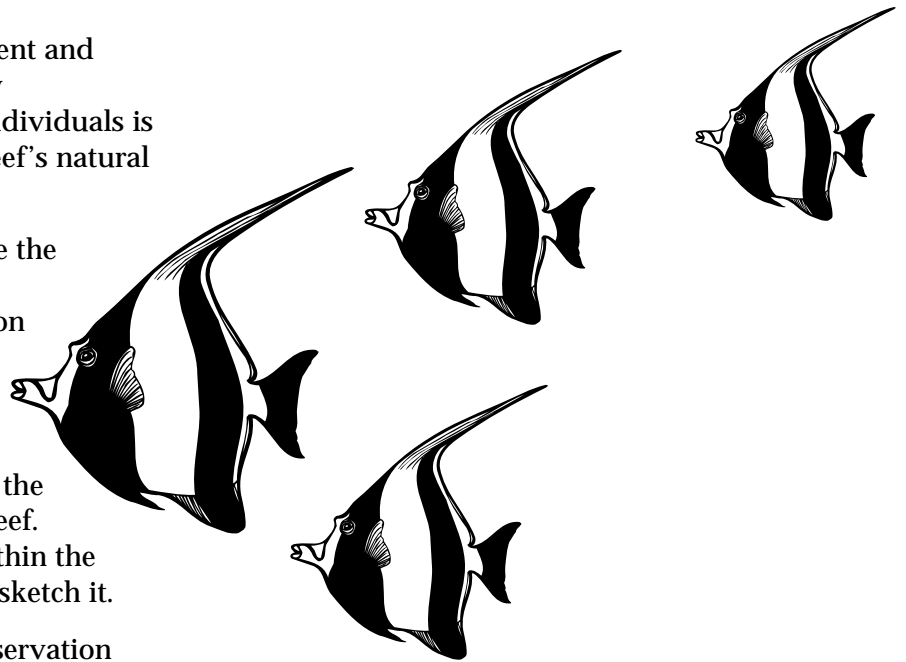
Discuss why people need to recognize the importance of:

- Reef stewardship and conservation
- Good water quality
- Catchment care
- Biological diversity.

Think about the preferred future and the probable future of the Great Barrier Reef. Illustrate these and share products within the class. Visualize a sustainable reef and sketch it.

Design educational materials on conservation and management of the Great Barrier Reef Marine Park.

Undertake active roles in promoting conservation and management of the Great Barrier Reef Marine Park. Become involved in the Reef Guardian Schools Program, Water Watch, Sea grasses Watch and Coast Care activities. Enquire about the programs and what they do to help protect the Great Barrier Reef and then tell family and friends about the many threats to the Great Barrier Reef and what they can do to help.



Activities for use with **Feature 7** 'Reef Habitats'



Read the feature article and exchange information about the various reef habitats described. Interpret the feature article and brainstorm a list of questions on reef habitats, their features, best environmental practices in reef habitats, or protecting and preserving reef habitats. Use the information gathered on a graffiti board to illustrate findings.

Present students with the question "What is a reef habitat?" Present students with a sheet containing the following sentence to complete: "When I hear the words 'reef habitat', I think of..." Students write down as many things associated with the words as they can. They then share responses in small groups or with the whole class.

Create a concept map showing what reef habitats are.

Talk about the natural features of the reef habitats. Record information about coral atolls, coral cays, ribbon reefs, fringing reefs, platform reefs, reef flats sea grass beds, continental shelves, mangroves, rock pools, lagoons and continental islands.

Collect other stories about reef habitats from the 'Press Clippings'. Create a file and keep a journal documenting thoughts and ideas.

Collect and download photographs of reef habitats. Visit <http://www.gbrmpa.gov.au>. Discuss features of reef habitats.

Discuss what reef habitats might be like if people:

- Pollute, degrade and use reef habitats irresponsibly
- Dive, snorkel, and fish without regard to environmental impacts in reef habitats
- Act without environmental consciousness in reef habitats.

Make predictions about the role of reef habitats in the reef ecosystem.

Write character descriptions for each habitat.

Write creative stories using reef habitats as a story setting.

Make a class mural depicting scenes of reef habitats.

Describe and draw a preferred future for a reef habitat and its plant and animal species.

Find Aboriginal and Torres Strait Islander stories related to reef habitats. Invite local Aboriginal and Torres Strait Islander parents to come and work with students in this area.

Discuss and decide on how schools can help care for reef habitats and their biodiversity.

Consider what might ensure our quality of reef habitats. Discuss these in a class meeting.

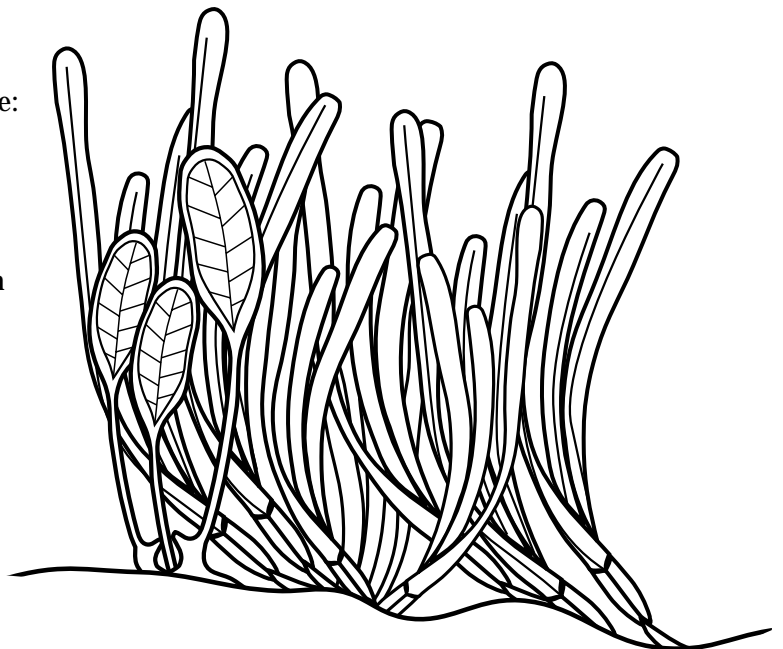
Contribute to your school newsletter, write advice columns, announcements, poems, or explanations about reef habitats, as they are now, and as they might be in the future.

Brainstorm effective means of preventing the further degradation of reef habitats and the communities that rely on them.

Identify good practice in maintaining healthy reef habitats. Devise a code of good practice for others to follow.

Talk about human activities in reef habitats that can impact on them. Draft ideas that address these issues and make recommendations. Seek out what should and should not be done and any possible alternatives. Design leaflets, posters, announcements and advertisements promoting best environmental practices when in reef habitats.

Design a T-shirt, slogan, bumper sticker, poster or newspaper headline promoting the protection of reef habitats.



Organise a class display in the school or local community library on a reef habitat theme. Include drawings, photographs, and short stories that examine how students feel about reef habitats, what the class is doing to help reef habitats, and what other people can do to help.

Imagine you are visiting a reef habitat and think about what it might be like:

- Tomorrow
- During different times of the year
- In 10 years time
- In 100 years time
- In 10,000 years time.

Prepare either a multi-media presentation, a report or a brochure which conveys detailed information about the:

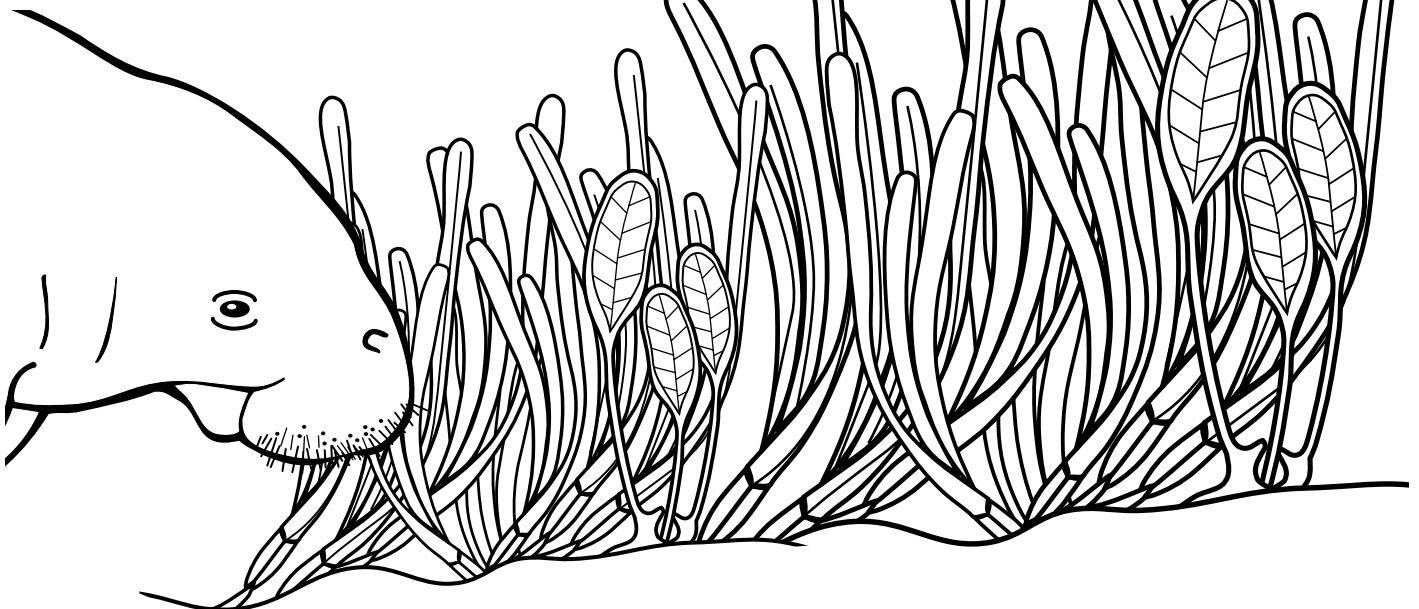
- Current use
- Distribution
- Biodiversity
- Future uses
- Management of North Queensland's reef habitats

Display these details as an on-going reference for students to use. Use brainstorming to guide the investigation and suggestions as to where relevant information might be found. Students work in groups to prepare for their investigation.

Discuss and record why it is important to find out about reef habitats and their resources, now and in the future.

Ask these questions:

- What patterns can you see when you look at how our reef habitats are used now and in the past?
- Do you think our reef habitats will be used sustainably in the future?
- What types of resources do you think they will or won't be able to provide?



Consider the different habitats found within the Reef ecosystem. Discuss why different species are found in different habitats. What special features do species have that help them survive in that habitat?

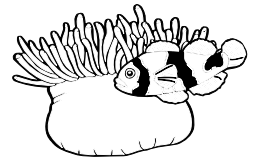
Develop further awareness about reef habitats. Using the feature article and other information, ask questions like:

- Where are these reef habitats?
- What is this reef habitat like at this place and time?
- Why is it like this?
- What might be happening at this place at this time, and what factors influence this?
- How could this place change?
- Why might this place change?
- What grows there?
- What animals live here?

Research threats to reef habitats. As a class, discuss which issues are most important to draw the attention of others. Develop a web page, brochure, and segment for television or radio program, case study for a journal or newspaper or piece of art to communicate the issue.

Discuss how reef habitats are important to education, tourism and scientific research.

Locate information from the Great Barrier Reef Marine Park Authority website about the way reef habitats are managed. See:
<http://www.gbrmpa.gov.au>



Activities for use with **Feature 8** 'Reef Creatures'

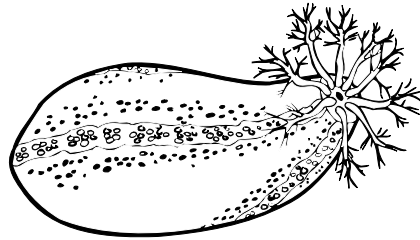


Read the feature article about reef creatures and answer questions such as:

- What are reef creatures?
- Why are they important?
- What do they support?
- How can we protect them?

Brainstorm and list creatures in and around reefs. Identify the range of reef creatures on the Great Barrier Reef. For example:

- Coral
- Fish
- Molluscs
- Crustaceans
- Sponges
- Sharks
- Echinoderms
- Cnidarians
- Reptiles and
- Mammals



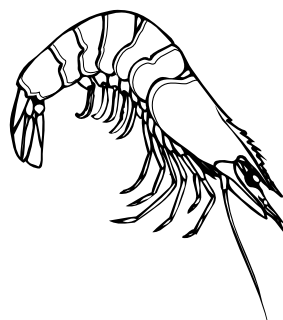
Make a chart describing Molluscs, crustaceans, fish, echinoderms, corals, and mammals on the reef. Sort and classify descriptions into categories.

Choose a creature that lives on the Great Barrier Reef and examine all the things that it needs to survive. Create a web map to show what has been discovered.

Collect other stories about reef creatures from the 'Press Clippings'. Create a file and keep a journal documenting thoughts and ideas.

Collect data on a variety of reef creatures. Develop a retrieval chart and choose animals to find out about their:

- Habitat
- Appearance (colour, size, shape, etc)
- Special characteristics
- Food
- Mode of locomotion
- Mode of reproduction
- Threats
- Mode of defense.



Investigate reef creatures that are:

- Herbivores – animals that eat plants
- Carnivores – animals that eat other animals
- Omnivores – animals that eat both plants and animals
- Piscivores – animals that eat fish
- Planktivores – animals that eat plankton
- Detritivores – animals that eat detritus

Illustrate examples of the relationships between these different types of reef creatures and the foods they eat.

Consider the ways that humans use the Great Barrier Reef and the effects on populations of animal species.

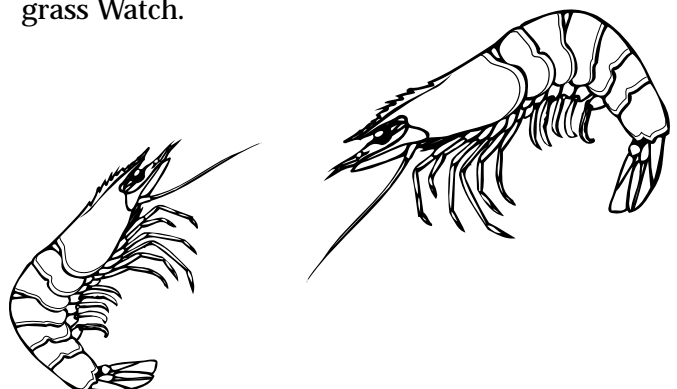
Undertake a study of one or more animals living within the Great Barrier Reef. Address some of the following issues:

- Which reef species are endangered, vulnerable or threatened?
- Where are these species found?
- Describe the natural habitat of these creatures.
- What does each species need to survive?
- Does this species have adaptations to enable it to live in different habitats? If so, describe them.
- Why is this species threatened?
- What strategies are in place to protect/ manage this species?
- What is the role of the Great Barrier Reef Marine Park Authority in the management of this species?

Use effects wheels to investigate the changes likely to lead to species becoming endangered and ultimately extinct. Consider the immediate effects of such a change and then second and third order effects that may result.

Talk about ways endangered reef species can be conserved.

Get involved in volunteer efforts that support the monitoring of our reef species. Find out about the Order of Underwater Coral Heroes (OUCH), Waterwatch, Fishwatch, COTSwatch, and Sea grass Watch.



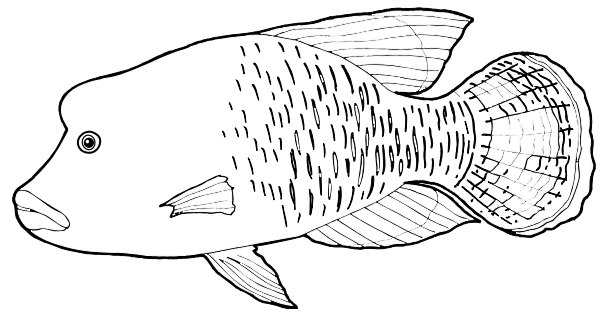
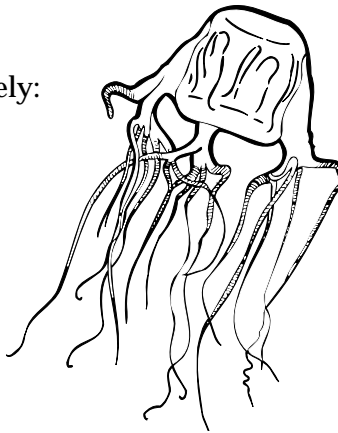
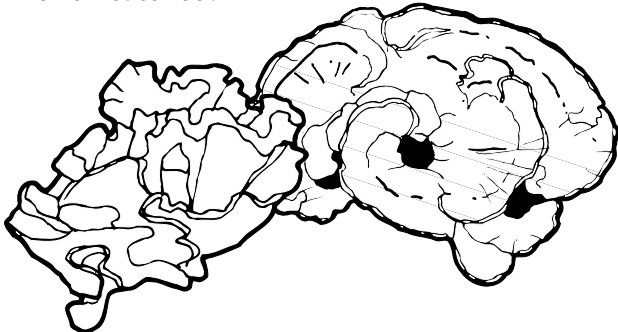
Choose a problem associated with reef creatures and their future in the reef environment. Use a problem-solving approach that includes:

- Identification of a problem
- Investigation, wherein solutions are proposed, investigated and tested by drawing, collecting information or making models
- Decision-making
- Modification, wherein the model or drawing is evaluated and modified
- Presentation, where models are presented with explanations of how they work
- Evaluation, where work is evaluated for its effectiveness.

Use the following information and explore a range of mathematical problems.

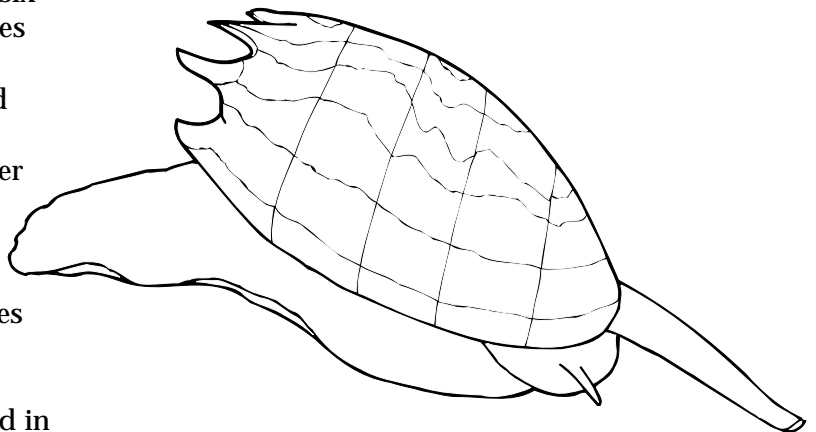
The Great Barrier Reef is home to approximately:

- 1500 species of fish
- 360 species of hard corals
- One-third of the world's soft corals
- 4000 species of molluscs (e.g. shells)
- 1500 species of sponge
- 800 species of echinoderms (starfish, sea urchins, etc)
- 500 species of seaweed
- 23 species of marine mammals
- 6 species of marine turtles, all listed as rare or threatened.



Six of the seven species of marine turtles in the world are found on the Great Barrier Reef. All six species are threatened. An estimated 1750 turtles are caught in trawl nets each year.

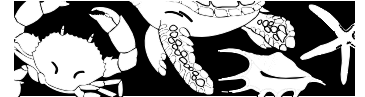
- The Queensland population of loggerhead turtles are facing extinction
- 70-90% population decline in numbers over the last 30 years
- 14% of turtles caught in trawl nets are loggerhead turtles
- Average size of nesting female green turtles has been reducing over last 20 years.
- Analysis of 10 years nesting data of hawksbill turtles shows a downward trend in numbers of breeding females



Utilise this information to visually represent the numbers cited. For example, draw a graph highlighting marine turtle information.

Imagine you have been transported into the future, to the year 2091. Investigate the Great Barrier Reef and its potential biodiversity in 2091 and report back to the class in the present. Report on the condition of the ocean, reef, animals, plants, and catchment that feeds into it.

Contribute to the school newsletter, write advice columns, announcements, poems, or explanations about reef biodiversity, as it is now, and as it might be in the future.



Activities for use with Feature 9 'Dangers to the Reef'



Read the ninth feature article about dangers on the Great Barrier Reef. In groups, talk about features of dangers on the Great Barrier Reef such as:

- Water pollution
- Crown of Thorns Starfish
- Coral bleaching
- Ship damage
- Natural disasters
- Over fishing
- Poor environmental practices
- Poor diving and snorkeling practices
- Dangerous animals

Present each student with the following sentence to complete 'When I hear the phrase "dangers to the reef" I think of...' Students write or draw about as many things associated with the phrase as possible. Share responses.

Build up a class bulletin board of newspaper articles and pictures about 'dangers to the reef' from the Press Clippings.

Survey local families and school peers to gauge their awareness of environmental issues affecting the Reef.

Tell stories about 'dangers to the reef'. Students might:

- Clearly identify the danger
- Describe how it happens
- Use correct terms for reef landforms and features affected
- Describe the damage it does to the Great Barrier Reef
- Describe any technology used to overcome the danger
- Describe how the reef and its plants and animals react to the danger
- Identify ways people and agencies help out in the danger area
- Talk about the effects of the danger on the Great Barrier Reef.

Categorise dangers using a sorting wheel. Categorise dangers into types of dangers including natural, environmental, those caused by humans, and scientific dangers.

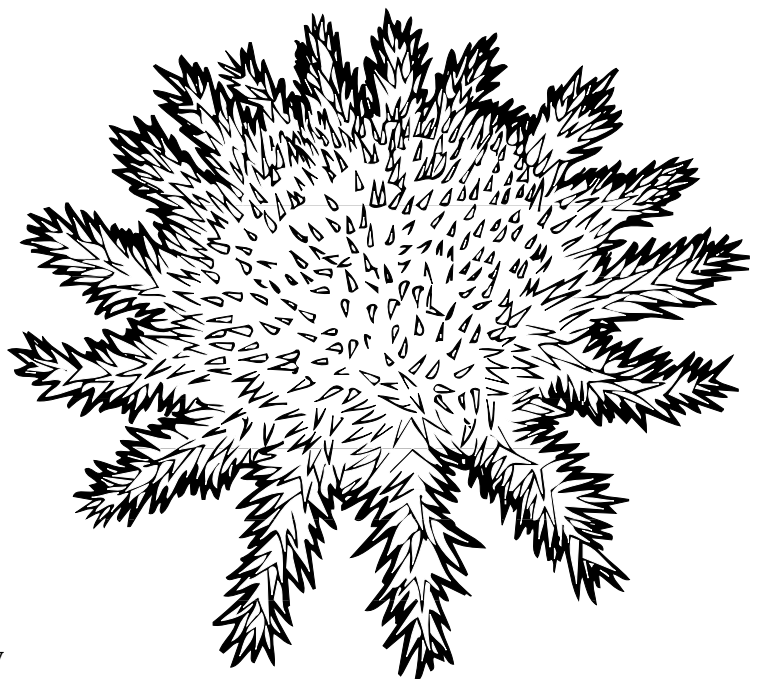
Interview parents, grandparents and friends about dangers to the Reef that can be recalled. Encourage students to prepare questions to ask related to:

- When
- Where
- What happens/happened
- Why it happens/happened
- What is/was the impact on the Great Barrier Reef.

Form expert groups, make enquiries about dangers of your choice, and investigate the following questions:

- Why and how do these dangers occur?
- Where do these dangers usually occur?
- What happens during these 'dangers to the Reef'?
- What damage do they do?
- How is the Great Barrier Reef impacted on?
- Are precautionary measures possible? If so, what might these precautions be?

Create an annotated frieze. Students consider the information collected in their 'expert groups' and decide on the most important events or stages that help explain the dangers causes and effects upon the Great Barrier Reef. They place these events or stages in logical order. Students then paint scenes to portray these events, and attach written statements to inform people about what happens and how people can work together to help protect the Great Barrier Reef from dangers.

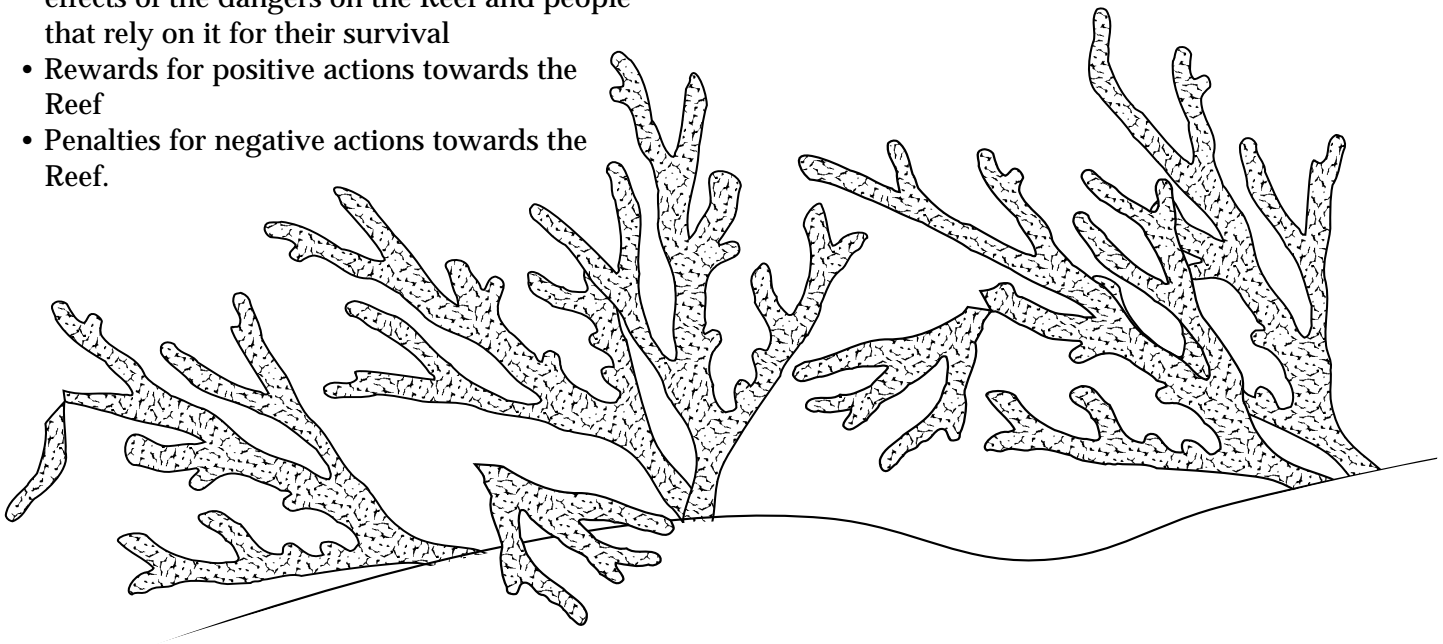


Create an effects wheel. Select an issue or event relevant to a danger and demonstrate ways each consequence leads to another. This issue or event can be stated in either a positive or a negative term to produce a different effect. For example:

- Waterways flowing into the Great Barrier Reef are polluted and can harm marine life, or, we can avoid polluting waterways entering the Great Barrier Reef to improve water quality and protect marine life.

Develop a board game about dangers to the Great Barrier Reef. The game might include:

- Questions and answers about dangers to the Reef
- Information about the positive and negative effects of the dangers on the Reef and people that rely on it for their survival
- Rewards for positive actions towards the Reef
- Penalties for negative actions towards the Reef.



Prepare a news report about a danger to the Reef. Include a description of the danger, the extent of damage it can cause, how people respond to it and what we can do about it.

Research some of the 'nasties' that live on the Reef. Research the Box Jellyfish, Stonefish, and Cone Shell. Find out how they pose a danger to the Reef and people who use it.

Develop a web page, brochure, segment for a television or radio program or piece of art to communicate to others about dangers to the reef.



Activities for use with Feature 10 'Sustainable Practices'



Read the feature article about sustainable practices in the Great Barrier Reef Marine Park.

Talk about the meaning of 'ecological sustainability'. Discuss why people need to recognise the importance of:

- Environmental stewardship and conservation
- Good water quality on the Great Barrier Reef
- Catchment care
- Biological diversity on the Reef.

Show images of the Reef. Initiate class discussion about the interactions taking place and the way the reef scene makes them feel. How would they feel if they were the only person in the scene, if there were twice as many people there, people with dogs, people with jet skis, lots of litter around, there wasn't as much coral or many fish to catch?

Role play the following scenarios:

- You want to stop on an island in the Great Barrier Reef for a picnic. A family is just leaving a beautiful spot and leaves the area littered with rubbish. What might you do?
- You want to use a barbecue on an island during the school holidays, however fires are not permitted from November 1 until April 30. What might you do?
- You notice people cutting down and damaging trees and plants on an island. It is an offence to cut down or damage any standing trees or plants. What might you do?
- Reef walking is allowed on the Great Barrier Reef but it is expected that reef walkers do not damage or remove coral. You come across someone stepping on coral and living matter and picking up species that are attached to the reef flat. What might you do?
- You see someone throwing out his or her bait bag whilst fishing on the Reef. This is against the Fishing Code. What might you do?

Discuss different activities that could be undertaken on the Great Barrier Reef.

For example:

- Fish Feeding;
- Fishing;
- Whale Watching;
- Snorkelling;
- Turtle Watching;
- Observing Seabirds; and
- Boating.

Have the students come up with some ideas under these headings:

- What is good about these activities?
- How could these activities be bad for the reef? And
- What rules should people follow when doing these activities?

Gauge students' feelings and values about the rules they developed by asking them to stand on a continuum. Students who strongly agree should stand at the left of the classroom; students who strongly disagree should stand to the right of the classroom. Students can place themselves anywhere on the continuum based on their feelings. Question students about their placement on the continuum.

Brainstorm how we can all look after the Reef for today and the future.

Discuss how the reef receives large amounts of waste from deliberate dumping or by natural run-off from the land. Talk with students about what we do at home and school and how these actions affect the Reef.

Identify areas in the school and home that involves water and chart these, e.g. drain, gutters, down pipes, sprinklers, taps, showers, laundries, pools, ponds, toilets, drinking fountains. Discuss any environmental issues connected with these areas. Draw cause and effect flow charts to show the issue and its effect on the Reef.

Talk with students about leaf litter and both urban and agricultural run-off that is washed into watercourses or drains. Follow its path to the sea and the Reef.



Select an issue they consider has affected the Reef. Write the issue in the centre of the circle and then surround this circle with three additional concentric circles that grow in size. Students identify first, second and third consequences of the issue – one per outer circle. In groups, students discuss and record why they think it is important to find out about the Reef and its resources, both now and in the future.

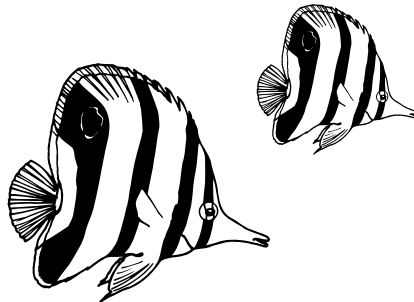
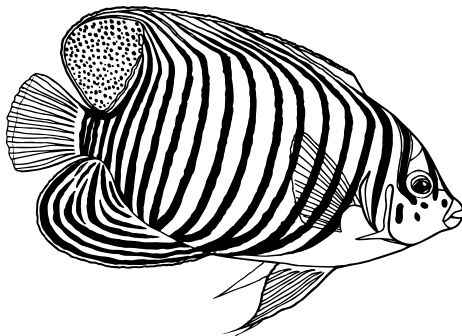
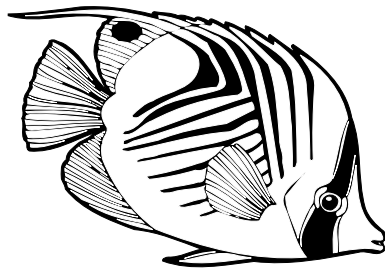
Consider questions like:

- What patterns can you see when you look at how our reef is used now and in the past?
- Is the Reef being used in a sustainable way?
- What do you think we have to do so the Reef will be used sustainably in the future?
- What types of resources do you think the Reef will or won't be able to provide if we continue to use it in the same way as we do now.

Brainstorm ways the class could get involved in activities for the protection of our waterways and the Great Barrier Reef.

Ask students to suggest how we can make sure people care and look after the Reef. Students could:

- Contribute to a class article for the school newsletter;
- Prepare a display of special places and features in the Great Barrier Reef and invite other classes or parents to view it and ask questions;
- Speak to other classes about the use and care of Great Barrier Reef areas
- Make a poster to advertise the use of Great Barrier Reef areas; and
- Create a calendar illustrated with Great Barrier Reef environments and/or plants and animals.

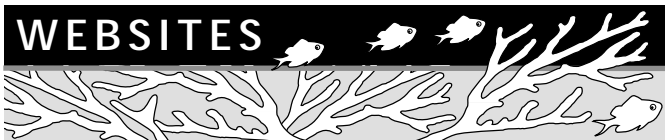


With older students, introduce the concept of sustainable management or ecologically sustainable development. Consider a range of questions (see below). In addition, prepare an effects wheel to illustrate their preliminary thoughts about the issue:

- If we clear vast areas of mangrove habitat, what might this mean in the future?
- If we keep on finding a balance between meeting our present needs for resources while conserving and protecting natural resources for the benefit of future generations, what might this mean for the future? and
- How does what we do at home impact on the Great Barrier Reef and coastal zone?



WEBSITES



- Great Barrier Reef Marine Park Authority
<http://www.gbrmpa.gov.au>
- ReefED
<http://www.reefed.org.au>
- Reef HQ
<http://www.reefHQ.com.au>
- Coastcare
<http://www.erin.gov.au/coasts/index.html>
- Community Biodiversity Network
<http://www.nccnsw.org.au/member.cbn>
- Crustacea Net
<http://www.crustacea.net/>
- Fish Web
<http://www.dpi.qld.gov.au/fishweb/>
- Marine and Coastal Community Network
<http://www.mccn.org.au/>
- Oceans Alive
<http://www.abc.net/oceans/alive.htm>
- Oz Reef Marine Park
<http://ozreef.org/>
- Threatened Species Network
<http://www.peg.apc.org/~ntsnnsw>
- The Coral Reef Alliance
<http://www.coral.org>
- The Townsville Bulletin
<http://www.townsvillebulletin.news.com>
- Turtles – Euro Turtle
<http://www.euroturtle.org/>
- Turtles
<http://www.seaturtles.org/store.html>
- Wetland Care
<http://www.wetlandcare.com.au>

