Curriculum

Module 3
Ocean Care
Section 4: Teaching and Learning Sequence

Suitable for Lower Primary to Middle Secondary
Core Learning Outcomes Levels 2 - 6
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Fishing in Troubled Waters: A call for action

Examine the sustainability of our fisheries and work out what you can do to help

LEVELS 1 & 2
Focus question:
How can we use what we need without hurting the ocean?
Outcome:
Systems Resources & Power 2.2 Students create a representation of various people and resources involved in the production and consumption of familiar goods and services

LEVELS 3 & 4
Focus question:
How can we use the oceans' resources more wisely?
Outcomes:
Place & Space: 3.2 Students create and undertake plans that aim to influence decisions about an element of a place
Place & Space: 4.1 Students make justifiable links between ecological and economic factors and the production and consumption of a familiar resource
Systems Resources & Power 3.2 Students create a representation of occupational specialisation and interdependence in an industry from the past, present or future
Systems Resources & Power 4.1 Students outline how Australian industries link to global economic and ecological systems

LEVELS 5 & 6
Focus question:
How can we use marine resources sustainably?
Outcomes:
Place & Space 5.2 Students design strategies for evaluating environmental impacts of a proposed project, highlighting relationships within and between natural systems
Place & Space 6.2 Students create proposals to resolve environmental issues in the Asia-Pacific region
Systems Resources & Power 5.2 Students evaluate a relationship between an ecological system and a government and/or an economic system

OVERVIEW OF TEACHING AND LEARNING ACTIVITIES IN THIS SECTION

Stage of inquiry	Activity/strategy	Levels	Resource sheets
Tuning in			
Preparing to find out	Discovering what you know about the fish on your plate	1-6	
Finding out and Sorting out	Finding out where our seafood comes from Looking at fishing in Australia	1-6 1-6	Flowchart graphics Impacts of fishing methods Development impact matrix
Going further	Undertaking an individual research project	5-6	Planning your research 1-2
Making connections	Making a personal connection	1-6	
Taking action	Taking consumer action Campaigning for change	1-6 3-6	How to organise a campaign
Reflecting	Completing your reflection logs	1-6	

TEACHING AND LEARNING ACTIVITIES

DISCOVERING WHAT YOU KNOW ABOUT THE FISH ON YOUR PLATE
Students find out what they know about the fish they eat

- Invite students, working in pairs, to list the seafood they eat, including raw food (E.g. caught and purchased fresh/frozen raw fish and shellfish), preserved food (E.g. frozen fish fingers, tinned tuna, bottled anchovies, dried seaweed, fish sauce) and prepared and take away food (E.g. fish burgers, calamari, seafood sticks, marinara pizza/pasta, honey king prawns, sushi).
- Create a whole group list. Then ask students to look at their own lists and record the type of fish they eat on their burger, in their fish cakes, on their pizza etc. Is it hake, southern blue fin tuna or mangrove jack? If its flake on their burger – what kind of shark is it from? Many students won't know and this can serve as a stimulus to find out what they (and their pets?) are eating.

FINDING OUT WHERE OUR SEAFOOD COMES FROM
Students explore the origins of seafood

- Return to the whole group list and ask students to add any other seafood they know of to the list. (Add things that you eat too.) Invite students to consider how the foods on the list might be categorised. Alternatively use the categories shown here i.e. raw, preserved and prepared and create a table to record information about its origin (This includes the name of the species, where it was bought and where it was caught. E.g. locally, elsewhere in Australian waters, or imported from overseas.) The final column could be left at this stage and returned to later when fishing methods are explored.

Raw seafood	Where was it purchased?	Where was it caught?	How was it caught?
barramundi fillet			

Preserved seafood	Name of marine species	Where was it purchased?	Where was it caught?	How was it caught?
Seaways tinned tuna in spring water				

Prepared seafood	Name of marine species	Where was it purchased?	Where was it caught?	How was it caught?
fish burger				

- This research, or parts of the research, may be done as a whole group, in small groups or individually. For example students can bring preserved seafood packaging from home (or check it at home) and share the information found on the labels with the whole group. Finding out information from retailers is best done in a coordinated way so that local fish shops, cafes, restaurants and supermarkets are asked once and the information shared. To facilitate this

process prepare a list of places that sell unpackaged seafood and ask students to nominate who they will contact.

Name of retail outlet	Name of products	Who is going to ask/email/ring/write?

- Facilitate a session where students can report their findings to the whole group. It is possible that sometimes retailers won't know where their seafood is from or how it was caught. In that case students can write "unknown" in their table. Alternatively students can then contact manufacturers and suppliers to see if they can and will provide this information. This activity will possibly raise further questions including ones about the location of commercial fisheries and methods of catching fish and other seafood.

LOOKING AT FISHING IN AUSTRALIA
Students examine commercial fisheries and methods

The process
- With younger students use pictures, books and video to explain the process of providing seafood from ocean to table. Discuss the different steps and the people and places involved at each step E.g. from ocean – fishing boat – market – factory – supermarket – home. This process could be reinforced by asking students to put pictures of the activities, places and/or people involved in sequence. Students, operating at a higher level than this, could be invited to create a flowchart to describe the steps from harvest to consumption using *Resource sheet: Flowchart graphics* to assist in the task.

The methods
- Facilitate a discussion about how wild seafood is harvested and invite students to find out the methods used. Four main methods of catching marine fish are listed on *Resource sheet: The impacts of fishing methods*, which can be used to record findings. Some useful websites are:
- www.api4animals.org/71.htm
- www.starfish.govt.nz/science/facts/fact-methods.htm

The fisheries
- Taking the investigation further requires some understanding of the fisheries themselves. To find out about the overall plan to regulate Australia's fisheries go to www.oceans.gov.au. A detailed report can be found in the 'Policy and Planning' section under 'Australia's Ocean Policy'. (See also the National Marine Atlas.) For more student friendly material go the 'Features' section and choose 'Release of South East Regional Marine Plan'. Scroll to the bottom of the page and you'll find five fact sheets that provide brief overviews.
- New Great Barrier Reef zoning came into effect in July 2004. This decision has increased the amount of protected areas and closed some areas to commercial and recreational fishing. This obviously has considerable impacts. Check newspapers for articles of various opinions on the changes. Also check the website of the Great Barrier Reef Marine Park Authority at www.grumpa.gov.au.
- To examine the impact of a particular event or development, use *Resource sheet: Development impact matrix*. Provide students, working in pairs, with a copy of the sheet and ask them to read (or record if you provide the sheet without the first column filled in) the possible impacts of the creation of the new

marine parks on the Great Barrier Reef. Discuss these ideas including the relationship between ecological and economic issues. Invite students to consider and record the likelihood of these consequences occurring and the possible effects of those consequences. Discuss students' deliberations.
- Additional websites that may be useful include:
- www.reef.edu.au
- www.panda.org/index.cfm
- www.dpi.qld.gov.au/fishweb/
- www.actionbioscience.org/environment/index

UNDERTAKING AN INDIVIDUAL RESEARCH PROJECT
Students plan and undertake their own research project

- Facilitate a discussion about outcomes and investigations that would address these outcomes. For an example see *Resource sheet: Planning your investigation 1,* which can be made into an oht and used with high school students. Provide students with a choice and assist students who want to frame their own investigation. Negotiate with students the criterion by which their investigation will be assessed and provide an opportunity for self assessment too.
- This process can extended to include the development of a rich task such as the one in *Resource sheet: Planning your investigation 2,* which could be used with students from middle primary to lower secondary school. In this example you can see how the task has been drawn from the outcomes and also includes a student statement of intent. It is desirable for students to develop and write their own intentions though most will require some scaffolding in order to do this effectively, especially if they have not done it before.
- Teachers can assist students with their individual project by facilitating some or all of the following activities. Alternatively they can be undertaken as part of a whole group process with higher levels of teacher direction and without students undertaking an individual research project.

MAKING A PERSONAL CONNECTION
Students consider the ways they contribute to problems about and solutions to healthy oceans

- Invite students to consider the ways in which they are personally connected to oceans including recreational activities (swimming), travel (ferry) , food (eating seafood), parent's work (tourism, fishing), volunteer work (Lifesavers, Clean up Australia) etc. Then ask students to rate each activity according to its impact on the ocean. This will be a very individual activity. E.g. Some students may have little or no impact on the ocean when they go fishing and others may have a negative impact because they leave empty bait bags on the beach or keep undersized fish.

Activity	Impact on ocean		
	Positive	Neutral	Negative
swimming		ü	

- Invite students to consider the things they do that aren't as obviously connected with oceans that still have an impact. You could refer students back to the work they did in section three of this module about human activities and impacts. You could facilitate the development of a whole group list or invite small groups of students to develop their own list. Older students could develop this as a questionnaire. E.g. do you litter? (If you do you can have a negative impact on the ocean because your wrapper is probably washed into storm water drains and into the sea becoming a hazard for marine life such as turtles, who mistake it for food, swallow it and die.) Follow through the consequences for some of these activities together before inviting students to develop a longer list, encouraging them to list the justification for the inclusion of the activity or question as one that has a negative impact on oceans. These ideas could be recorded in a table.

Activity What human activities are harmful to the health of oceans?	Justification Why is it harmful to the health of oceans?
littering	*Litter is usually washed into storm water drains and into the sea becoming a hazard for marine life such as turtles who mistake it for food, swallow it and die*

- When complete, students will have a list of their own unhelpful behaviours. This can be used when students consider which of their behaviours they could change to contribute to a healthier ocean. This could be done now, as part of their reflection log or as part of their individual research project.

TAKING CONSUMER ACTION
Students discover the ways they can support sustainable fisheries

- There are a number of websites that contain information about seafood and seafood products that are a better choice in terms of sustaining healthy oceans. Invite students to find out which fish are vulnerable and should be avoided by visiting:
- Australian Marine Conservation Society www.amcs.org.au
- The Fish List www.thefishlist.org
  Students can find out which preserved (frozen and tinned) seafood products available in Australia are produced in a sustainable way by visiting:
- Marine Stewardship Council www.msc.org
- Once students (and teachers?) have this information they can use their power as consumers to support sustainable fisheries and refuse fish that are over-harvested and vulnerable. We can ask our supermarkets if they carry products with the Marine Stewardship Council (MSC) tick of approval and if not can they? We can ask what type of fish is in their burger or sweet and sour. Then if it's a vulnerable fish such as orange roughy we can refuse it and say why.

CAMPAIGNING FOR CHANGE
Students consider how they can work together with others to bring about change

- Invite students to work together with other students on an issue of interest to them. Alternatively if there is an issue that your whole group got excited about, the campaign could be a whole group one. Either way the *Resource sheet: How to plan a campaign* can be a useful guide. Negotiate with students prior to starting, what and how they will assess and be assessed. This activity could be part of a student's research project. It could constitute a considerable piece of work and take up a lot of school and personal time.

COMPLETING YOUR REFLECTION LOG
Students complete their reflection logs

- Final log entries could be structured around the following format.
  a) How does this issue touch my life? What are my thoughts about it? How do I feel about it?
  b) What was the most interesting or surprising thing I have learnt?
  c) If I was "in charge" what would I do? What do I think needs to happen?
  d) What things can I do now to help to address this issue? Which of these things will I do?