Curriculum

Module 3

Ocean Care

Section 3: Teaching and Learning Sequence

Suitable for Lower Primary to Middle Secondary

Core Learning Outcomes Levels 2 - 6

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In partnership with:

Department of Education and the Arts

Association of Independent Schools of Qld

Brisbane Catholic Education

Qld Catholic Education Commission

Earth Charter

The State Of Our Oceans: What have we done?

Examine the human activities that have an impact on the health of our oceans

LEVELS 1 & 2
Focus question:
How do people use the ocean?
Outcomes:
Place & Space 2.2 Students predict possible consequences for an ecological system when an element is affected
Earth & Beyond 2.3 Students discuss how their community uses resources and features of the Earth and sky

LEVELS 3 & 4
Focus questions:
How do human activities affect the health of oceans?
Outcomes:
Earth & Beyond 3.3 Students collect information that describe ways in which living things use the Earth and the sun as resources
Place & Space 4.2 Students predict the impact of changes on environments by comparing evidence

LEVELS 5 & 6
Focus question:
How do human activities affect the health of oceans?
Outcome:
Place & Space 5.4 Students use maps, diagrams and statistics to justify placing value on environments in Australia and the Asia-Pacific region

OVERVIEW OF TEACHING AND LEARNING ACTIVITIES IN THIS SECTION

Stage of inquiry	Activity/strategy	Levels	Resource sheets
Tuning in	Using picture books	1-6	
Preparing to find out	Concept mapping	1-6	
	Asking questions	1-6	Types of questions 1-2
Finding out	Making contact with organisations	2-6	
	Using visual texts	1-6	
	Looking at threats	3-6	State of the ocean slips 1-4
	Revisiting the Global 200	5-6	Brink hotspots 1-2
Sorting out	Sorting pictures of human activities	1-2	Pictures of human activities
	Consequences of human activities	3-6	Sample consequence wheel
Going further			
Making connections			
Taking action			
Reflecting	Reflecting on your understanding	1-6	

TEACHING AND LEARNING ACTIVITIES

USING PICTURE BOOKS
Students view pictures books about human impacts on the ocean.

- Select and read one or more picture books that focus on human impacts on oceans. (Older students will also enjoy this activity too.) Look in your school and local libraries for suitable texts.
- Ask students a number of questions after reading the book/s. Though the questions will depend on the chosen book/s and students' developmental level they may include:
- What is the environmental problem described in this book?
- What techniques does the illustrator use to engage us in the story?
- How did the characters react to the situation/ problem?
- Was a solution to this situation/ problem suggested/acted upon?
- What do you think was the author's intent?
- Animations can also provide a visual stimulus for discussing ocean issues. The animated adventures of "Greena Worrier Princess" found on the Planet Slayer website (www.planetslayer.com) contain a number of episodes that humorously consider environmental issues that impact on oceans and ocean life.

ADDING TO YOUR CONCEPT MAP
Students add their ideas about human impacts on oceans to their concept maps

- Invite students to return to the concept map they drew in part 2 of this module and add their ideas about human use of marine resources and the impacts of human activities on oceans. Suggest to students they use a different coloured pen. If the concept map they drew earlier has little or no space left to add anything, ask them to extend this section of their map onto another page.

ASKING QUESTIONS
Students learn to ask different types of questions

Who, what, when, where, how and why questions
- Who, what, when, where, how and why questions are an ideal starting place for young students when learning to ask different types of questions. Return to one of the picture books you read earlier and model the question types. E.g. What did Lenny see when he went to the beach? How did it make him feel? Where did he go for help? Who helped him? Why did so many people come to help?
- After modelling these questions a number of times to reinforce the different question types invite students to ask their own questions. Copy and cut up the who, what, when etc, flash cards (see *Resource sheet: Asking questions 1*) and after reading a story, invite a student to choose one of the cards and then ask that type of question about the story.
- Invite students to look back at their concept map and write questions (one of each type) about human impacts on oceans that they would like to investigate.

Four-step questions
- These question types can be used with middle primary to middle secondary students with increasing levels of sophistication. Central to this four-step model is the assumption that students often only ask descriptive questions and need to be encouraged to ask 'deeper' questions. Each step or type of question in this model builds on the one before (see *Resource sheet: Asking questions 2*). Students will need to practise asking these types of questions so provide a number of opportunities to do so. E.g. Instead of asking students to answer questions

after reading literary and non-literary texts and viewing videos, invite them to write questions instead.

- Invite students to look back at their concept map and write questions (one of each type) about human impacts on oceans that they would like to investigate.

MAKING CONTACT WITH ORGANISATIONS
Students consider how they will gather the information they require

- Work with students to determine how they can investigate their questions. This may include contacting organisations by phone, email or using their websites. A list of useful contacts is provided on the Brinkx website.

USING VISUAL TEXTS
Students view visual texts that illustrate problems with the health of our oceans

- To assist younger students, or those with limited literacy skills, use drawings or photographs (from books, magazines, posters and websites) to illustrate human activities and the threats they pose to oceans. This activity can be done instead of using the written text in the activity below. After showing an image/s to students, facilitate a discussion by asking them to identify what is happening in the picture/s, the purpose of activities and what, if any, environmental issues they raise.
- Students will also benefit from viewing a video that examines human activities and threats to oceans. Although there are videos that can be borrowed from libraries, video libraries and video rental stores, many good programs are broadcast on television and can be legally taped for educational purposes. (For younger students, the ABC "For the Juniors: The Sea" series is worthwhile. Many documentaries about marine issues and places are suitable for older primary and secondary students. Of particular note is "Empty Oceans, Empty Nets" broadcast on SBS as part of the "Cutting Edge" series.) After viewing the video invite students to ask/write questions (see "Asking questions" activity) in response to the program.

LOOKING AT THREATS
Students use the expert jigsaw strategy to learn about problems with the health of our oceans

- To engage students in reading *Resource Sheet: State of the Ocean 1* or *2,* use a peer teaching strategy called expert jigsaw. Students read only a part of the resource sheet and give that information to their peers. The text in *Resource Sheet: State of the Ocean 1* is simpler and shorter than the text in *Resource Sheet: State of the Ocean 2* and can be used with younger students or with older students who have lower literacy skills.
- Before you start, photocopy and cut your chosen sheet into the desired sections. Groups of three or four are usually most productive. This may require you to give some students more than one slip depending on the numbers of students you have.
- Invite students to form groups (of the number you have decided on) and assign each group member a section/s of the fact sheet.
- Next, ask students to meet with the members of other groups who have been assigned the same section/s, forming a new group. This new group learns together and becomes expert on their portion of the assigned material by talking it through and asking the teacher any clarifying questions.
- Students return to their original groups and give this new information to their peers.
- Invite each student to summarise the information to create a picture of threats to oceans. This can be done by recording a threat in each section of *Resource Sheet: State of the Ocean 3,* writing threats in speech bubbles of marine creatures such as those in *Resource Sheet: State of the Ocean 4,* or using another form of graphic organiser.

- To extend this exploration, invite students to read the fact file entitled "Threats to the Great Barrier Reef" found on the Brinkx website. (Further information can be found at the Great Barrier Reef Marine Park Authority (GBRMPA) website at www.gbrmpa.gov.au .)

REVISITING GLOBAL 2000
Students revisit the Global 200 marine ecoregions and discover their environmental threats

- Provide a copy of *Resource sheet: Brink hotspots* for each student and invite them to complete the table using:
  www.panda.org/about_wwf/where_we_work/ecoregions/global200/pages/list.htm
- Following the completion of the table, facilitate a whole group discussion about the type and range of threats indicated.
- If students undertook additional research earlier they can find out the threats to these ecoregions and add this information to their previous notes. After sharing this information with the whole group students can begin to get a fuller picture of the threats that face marine ecosystems globally.
- Invite students to consider whether the activities listed as threats to the Mediterranean Sea (ecoregion 199) reflect natural, economic, social or political interests in the area. To do this, provide students with a copy *of Resource sheet: Brink hotspots 2.* Consider each threat and list them in the natural, economic, social or political quarter. If activities show a connection or relationship between two quarters e.g. the discharge of effluent from industrial sources is an outcome of an economic activity and has an impact on the natural world, it can be placed between the two quarters – in the north-east position (see diagram below). You may choose to do this as a whole group activity initially. Use the following as a guide to determine where to place them:
- Natural: ecological interests i.e. concerned with the health of ecosystems (living things and their habitats) including the soil, water, atmosphere and their cycles.
- Social: social and cultural interests i.e. concerned with people, their relationships and traditions including how age, class, disability, ethnicity, gender, race, religion and sexual orientation affect these social relationships
- Economic: economic interests i.e. concerned with financial profit including money, trading, ownership, buying and selling
- Political: political interests i.e. concerned with power and decision making including who makes choices, and who benefits and loses as a result of decisions made.

N

discharge of effluent from industrial sources

W   E

S
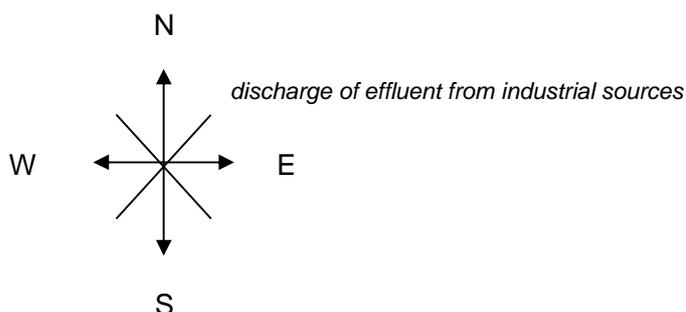
- Make an oht of the map of the Mediterranean Sea found at:
  www.deh.gov.au/coasts/mpa/nrsmpa/global/volume1/pubs/region3.pdf
  Show students the map and draw their attention to the number of countries that border the sea.
  Invite students to find out about marine protected areas in the Mediterranean (there are currently

53 of them) by going to the report at
www.deh.gov.au/coasts/mpa/nrsmpa/global/volume1/chapter3.html
Draw students' attention to the list of organisations and conventions in the section headed "International and Regional Initiatives Relating to Marine Protected Areas" and the summary of the difficulties faced by people working towards protection of the Mediterranean Sea in the conclusion of the section headed, "Priorities and Recommendations".

- Invite students to add the activities they have just read about (the establishment of marine protected areas) to their compass rose. Are different interests represented in this activity? Discuss the need to look at number of sources to get a more complete picture of what is happening. You may like to mention that both sources used in this activity (Worldwide Fund for Nature International and the Australian Department of Environment and Heritage) are coming from a conservation perspective. Other sources may present additional activities (i.e. those with social and cultural values) or present the same activities differently. Invite students to consider that the way we use places reflect the value we place on it and facilitate a discussion about the way they think the Mediterranean Sea is valued.

SORTING PICTURES OF HUMAN ACTIVITIES
Students consider the positive and negative impacts of human activity on oceans

- Use the images in *Resource sheet: Pictures of human activities* and/or other diagrams or photographs and facilitate a discussion about the positive and negative aspects of these activities on the health of oceans. Invite students to consider that one activity can have both positive and negative effects for the same or different groups. This can be done orally or recorded on a chart or workbook as it is below.

Commercial fishing

+

People have jobs fishing
We can buy fish to eat

-

If too many fish are caught they might die out
Other sea animals die when some fish are caught

- You may also wish to ask students to rank the activities in order of how serious they think the illustrated threats are to the health of oceans. The value of ranking in this context is in the discussion it encourages rather than the final ranking chosen.
- Invite students to consider what they think might happen if a human activity caused a change to a place E.g. What would happen if fish in one place were caught before they were old enough to reproduce? Encourage students to see beyond the immediate impact of less of that type of fish and consider the impact in terms of disruption to food chain/web and an ecosystem. Provide a number of examples and ask students to predict the consequences. Talk about the need for rules about where people are allowed to fish recreationally including, bag limits, size limits and not taking the females of some species in breeding season.

UNDERSTANDING THE CONSEQUENCES OF HUMAN ACTIVITIES
Students explore some of the consequences of using the oceans in different ways.

- Drawing a consequence wheel provides students with an opportunity to organise what they have learnt and consider the impact of human activities on the health of oceans. Students may choose an event such as the grounding of an oil tanker or global warming or an activity such as clearing of mangroves or using ocean outfalls for sewage. With younger students undertake this activity with the whole group only – the teacher recording student responses on a chart or board.

- An example of a consequence wheel is provided in *Resource sheet: Sample consequence wheel.* The event depicted is global warming. There are two <u>first order consequences</u> included. One of these is 'rising sea levels'. A direct consequence of 'rising sea levels' could be 'submersion of low lying coastal areas'. This is a <u>second order consequence</u>. A direct consequence of this maybe a 'loss of farming land'. This is a <u>third order consequence</u>. A direct consequence of this could be 'shortage of food', and so on. There are many more consequences not listed.
- The directions for drawing a consequence wheel are:
  1. In the centre circle, write an event or activity.
  2. Think of and write a direct consequence of this event in an oval and connect it to the centre with a *single* line. This is a <u>first order consequence</u>. Think of some other first order consequences and draw/write them in.
  3. Think of and record <u>second-order consequences</u>. These are things that resulted from the first order consequence. Join it to first-order consequence by a *double* line.
  4. Keep going until you can think of no more consequences.
- The consequence wheel can be added to as students learn more. Ask students to make any additions in different colours.

REFLECTING ON YOUR UNDERSTANDING SO FAR
Students add to their reflection logs

If you wish to provide students with a structured reflection activity, choose one appropriate to the level of your students from the examples below.
- Invite students to make a list of the ways that people use the ocean. Then ask students to rank each or a number of activities according to its impact on oceans. E.g. « = very negative effect, « « = negative effect, « « « = little or no effect, « « « « = positive effect, « « « « « = very positive effect.
- Choose a particular marine environment you have learnt about (ecosystem i.e. estuary or place i.e. Great Barrier Reef) and list changes which have occurred due to human activity, the impact of that change and the activities that caused them. This can be recorded in a table such as the example below.

Marine environment	Change that has occurred	Impact of change	Human activity that causes this change and how
coastal waters	*more algal blooms*	*loss of marine life*	*application of fertilizers on farms – some of this runs off into waterways and causes eutrophication which removes oxygen from the water*
coral reef	*bleaching of coral*	*loss of some reef ecosystems*	*burning coal for electricity generation – this produces greenhouse gases, causing global warming including increased water temperatures and sea levels*

- Choose a particular marine environment you have learnt about and justify its value. In your response include:
  - A brief physical description of the place including special features and location

- A brief description of the ecological health of the place (supported by statistical data from maps, tables, graphs etc)
- A summary of the different groups of people that have an interest in this place, what their interests are and how that is reflected in how they use the place, and
- A brief statement justifying the conservation value of this place and outlining the issues and conflicting interests that need to be addressed to make the place healthy and sustainable.