



The Marine Life of Australia's temperate coastal waters

Teachers' Notes Secondary

Years 7-11

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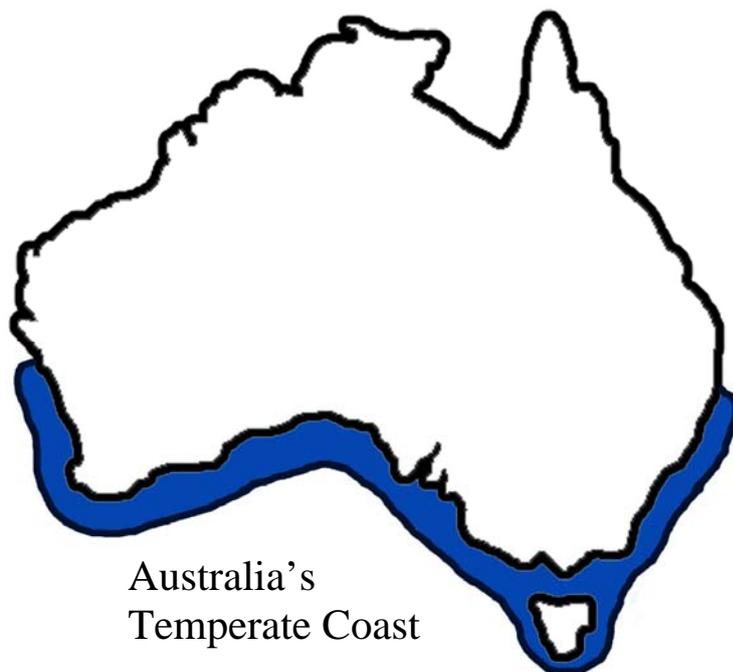
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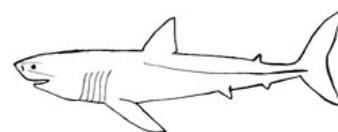
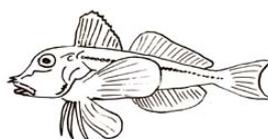
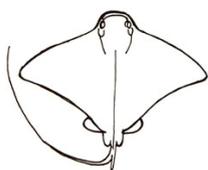
INTRODUCTION

Australia's temperate coastline extends from southern Western Australia through South Australia, Victoria and Tasmania to central NSW. This area is home to some of the most biologically diverse marine habitats on earth. There are more than 1500 fish species and countless invertebrate animals. It is estimated that a staggering 90% of all plants and animals found here are endemic (unique) to the region.



This area is made up of many different marine habitats such as intertidal pools, kelp forests, rocky reefs, estuaries and the open ocean. Some creatures are found in all these different habitats but most prefer a specific area.

Using interactive video, the ***Beneath Southern Seas*** presentation explores this amazing region. We look at the huge diversity of marine life, at ecosystems and the food chain as well as camouflage, predation and reproduction. The presentation also explores human activities around our oceans such as pollution and getting food from the sea. We also suggest student activities for caring for our local marine life.



DISCUSSION TOPICS - BEFORE THE PRESENTATION

Ask students what they know of their **local marine region**. Makes up lists of the following animals.

What sort of fish are seen around your local coastal area?	Sharks, rays, morwongs, wrasses, leatherjackets, flatheads etc.
What about marine mammals?	Whales, dolphins, seals, sea lions
Which animals are found around your local intertidal area?	Sea urchins, sea slugs, anemones, sea stars, octopuses, juvenile fishes
Name some dangerous sea creatures found locally.	Sharks, jellyfish, blue bottles, blue-ringed octopus, spiky sea urchins

FOOD CHAINS & FOOD WEBS

Food Chains describe the hierarchy of feeding relationships that exist in a particular ecosystem. Species can be separated into distinct trophic levels based on what they feed on and what in turn feeds on them. In a temperate tidal rockpool the top trophic level species might be a large octopus, which has few predators. The octopus may feed on crabs. The crabs may scavenge of smaller invertebrate animals such as sea urchins. The urchins may feed on the algae that grows on the rocks. The algae gets its energy from the sun.

The structures of these feeding relationships are extremely complex and varied with certain animals feeding on a large variety of prey depending on many different conditions. These complex feeding linkages are called **food webs**.

Ask students to draw a diagram showing the possible feeding links between animals in particular marine ecosystems such as the open ocean and an intertidal rockpool.

SURVIVING IN THE SEA

The presentation features footage of marine animals using camouflage and disguise. Discuss with the students some of the ways that marine creatures protect themselves and survive in the wild.

For example:

Animal	Protection
Sea urchins	They have sharp spines
Turtles	Have a hard shell covering their body
Hermit Crab	Use a seashell to protect their soft body
Stingrays	Have a venomous barb on their tail
Octopus	They are experts at hiding in tiny holes and under rocks.

ACTIVITIES - BEFORE OR AFTER THE PRESENTATION

- Ask the students to research or discuss human activities that could harm sea creatures, such as types of pollution (including oil spills and stormwater runoff), overfishing or disturbing creatures on rock platforms.

SOME QUESTIONS - AFTER THE PRESENTATION

Camouflage	
What are some of the ways that crabs camouflage themselves?	Some crabs cover themselves with seaweed while others put toxic sponges on their back to deter octopuses.
How does the little dumpling squid hide from predators?	It buries itself in the sand.
What shape are flounder? And why are they so hard to see when lying on the sand?	Flounder have thin flat bodies. Their body pattern matches the patterns on the sand, making them very hard to see.
Where do stargazers like to spend most of their time?	Buried under the sand with just their eyes poking out.
Feeding	
How do Goat fish search for food in the sand?	The stir up the sand using the little spines that protrude from just below their mouths.
What technique does the anglerfish use to catch food?	It sits very still waiting for a little fish to come close, then gulps it down in one mighty mouthful!
Behaviour	
Why do schooling fish school?	For protection from predators.
What is so special about seahorse reproduction?	The male seahorse incubates the babies and gives birth rather than the female.
Do newborn seahorses get looked after by their parents.	No. From the moment they are born they must survive on their own.
How does the puffer fish protect itself?	It sucks in water and blows up like a balloon making itself look bigger.
The spiny gurnard has modified pectoral fins that allow it to?	Walk about the seafloor.
How long does a baby Port Jackson Shark spend inside its shell before hatching?	12-18 months
Protecting the marine environment	
What does it mean when a marine animal is protected?	This means state or federal laws are in place to protect a particular animal. Fishing for, collecting or keeping the animal as a pet may be prohibited.
What are Marine National Parks? And why do we have them?	MNPs are specific marine areas declared by the Government. They are set up to help protect marine plants, animals and habitats in their natural state for the benefit of the environment and to provide a buffer against potential environmental impacts.
What sort of pollution runs into the sea after heavy rain?	Cigarette butts, milk cartons, paper, oil from the car, dog poo.
Does pollution harm marine life?	Poor quality water is bad for marine life. Rubbish like plastic bags can be accidentally eaten by marine creatures.

POLLUTION

How long does it take the following items to breakdown in the ocean?

Apple core	6 weeks
Styrofoam cup	50 years
Aluminium can	200 years
Plastic 6 pack holder	400 years
Disposable Nappy	450 years
Plastic bottles	450 years

REDUCING POLLUTION

Some of the things we can do to reduce the amount of pollution going into the ocean?

- Don't litter.
- Don't put oil down the drain.
- Wash the car on grass rather than on the street.

Start a campaign in your local area to stop marine pollution.

DANGEROUS MARINE ANIMALS

What are some dangerous animals that are found in the sea?

- Sharks, stingrays, bluebottles, blue-ringed octopus

Why are they dangerous and what should you do if you see one of them?

When visiting a rock platform, always wear protective footwear, a hat and sunscreen. Also be careful when handling any creatures especially (see table below):

Sea urchins	The have sharp spines and you might get spiked
Crabs	Even little crabs have strong nippers and can pinch hard!
Anemones	These are very delicate animals that should be looked at but not touched.
Barnacles	Cover the rocks in rockpools and are very sharp! It is easy to get a cut and scratched from them.
Octopuses	All octopuses have a beak that can bite you. The Blue ringed octopus is highly venomous, so it should be left completely alone if your find one.

STUDENT WORKSHEET

FIND THE HIDDEN WORDS

K E L P F I N S E A L D
P E A R L O S H A R K O
U L R F I S H E S R O L
R O C K P O O L E S C P
S C R A P S E L P S E H
E T A N E M O N E T A I
A O B E R U R C H I N N
H P S U N M A R I N E W
O U C S E A S L U G S A
R S A L T W A T E R I V
S Q U I D E T W H A L E
E G G P S T O R M Y T S

Can you find all these words hidden above?

KELP
STORM
STINGRAY
CRABS
SILT
ROCKPOOL
SEASLUG
WET
SQUID
EGG
RAY
NET

SHARK
EEL
OCTOPUS
SEAL
MARINE
SALTWATER
FISHES
DOLPHIN
SLIP
FIN
SUN

WHALE
PEARL
SHELL
URCHIN
WAVES
ANEMONE
OCEAN
FLIPPER
SEAHORSE
SCRAPS
SHOE

When you have found all the words, use the left-over letters to finish the phrase.

“The oceans deserve _____”

SOME KEY TERMS

BIODIVERSITY: The density of different plants and animals seen in a particular region or habitat.

ECOSYSTEM – the way groups and animals and plants are found together within their physical environment.

ENDEMIC MARINE CREATURES: Animal species that are only found in a specific region. For example, weedy seadragons and giant cuttlefishes are seen in southern Australian coastal waters but nowhere else in the world. The spotted Handfish is only found around Port Arthur in Tasmania.

EXTINCTION: When an entire species disappears. Many fish species are facing this unfortunate fate.

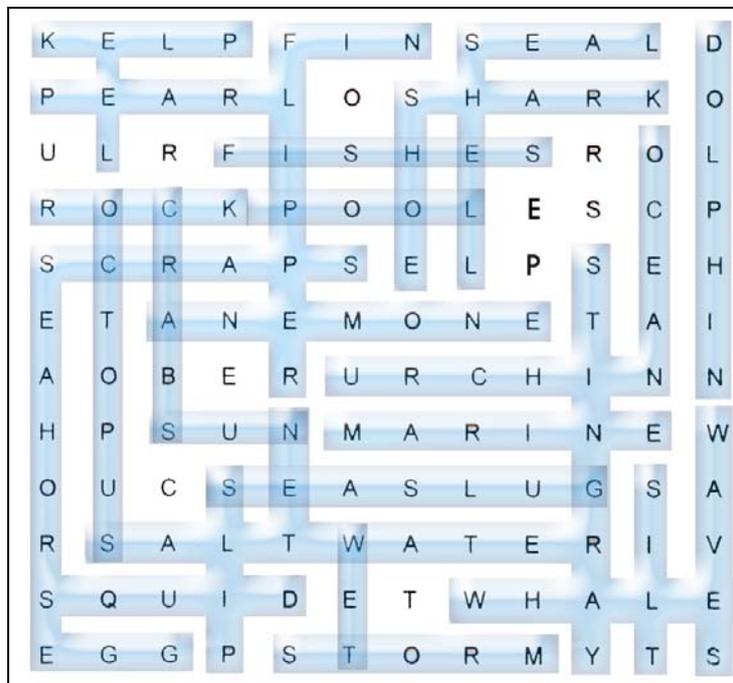
FOOD WEBS – All Ecosystems have a hierarchy of feeding relationships between the plants and animals. The food chain describes the order of these energy flows.

MARINE ECOLOGY: How a particular marine environment works.

PLANKTON: Small plants and animals that drift about on the ocean currents.

INTRODUCED MARINE PESTS: Marine animals that are not native to an area. For example, the North Pacific Seastar is believed to have been introduced by visiting ships' ballast water. Marine pests can dominate an area and wipe out other native species and damage habitats, much the same as rabbits, foxes and cane toads have done on land in certain areas of Australia.

Find the hidden words answers:



Hidden words:

"The Oceans deserve OUR RESPECT"

REFERENCES

Books

Australian Marine Life by Graham Edgar
Published in 2000 by Reed New Holland

Coastal Fishes of South-Eastern Australia by Rudie Kuitert
Published in 2000 by Gary Allen P/L

Australia's Southern Shores by Harry Bredahl
Published in 1997 by Lothian P/L

An Octopus's Garden, An Early Childhood Marine Education Resource Guide for Teaching Young Children 3-8 years,
Published by Victorian Institute of Marine Sciences, 1996.

Sharks and Rays of Australia by P.R. Last and J.D. Stevens
Published in 1994 CSIRO, Australia.

DVDs

Beneath Southern Seas. www.beneathsouthernseas.com.au

THE INTERNET

GENERAL MARINE INFORMATION

Marine Education Society of Australia	www.mesa.edu.au
Introduced Marine Pests	www.marine.csiro.au/crimp
Reef Education Network	www.reef.edu.au
Australian Marine Conservation Society	www.amcs.org.au
National Parks Association – Marine	www.marine.org.au
FISHES	
Australian Museum's Fish website	www.amonline.net.au/fishes/
Seahorses	www.projectseahorse.org
Grey Nurse Sharks	www.fisheries.nsw.gov.au/conservation/species/grey-nurse/home-grey-nurse.htm
Australian Shark Attack File	www.zoo.nsw.gov.au/content/view.asp?id=126
MARINE INVERTEBRATES	
Seaslugs	www.seaslugforum.net/
Squid, octopus and cuttlefish	http://www.cephbase.utmb.edu/
Bioluminescence	www.lifesci.ucsb.edu/~biolum/
Molluscs	http://www.amonline.net.au/invertebrates/mal/
Crustaceans	http://www.amonline.net.au/invertebrates/cru/index.htm
Marine Mammals	
Whales	http://dkd.net/whales/ http://www.whaleresearch.org/
Dolphins	http://www.southwest.com.au/~kirbyhs/dolphins.html
Seals	http://www.zoo.org.au/animal_page.cfm?area_id=48&zoo_id=1&animal_id=89

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