Teacher Notes

Themes

- Animal diversity
- Australian marine life

Key learning outcomes

- Discover several kinds of animals that live in or rely on the ocean
- Learn about nocturnal creatures and their behaviour
- Be introduced to the Atlas of Living Australia
- Find out about some scientific methods

Key curriculum areas

- **Science:** Science Understanding (Biological sciences); Science Inquiry; Science as a Human Endeavour
- **English:** Literature
- **HASS:** Geography; Skills
- **The Arts:** Visual Arts
- **Digital Literacy:** Investigating

Publication details

Oceans at Night

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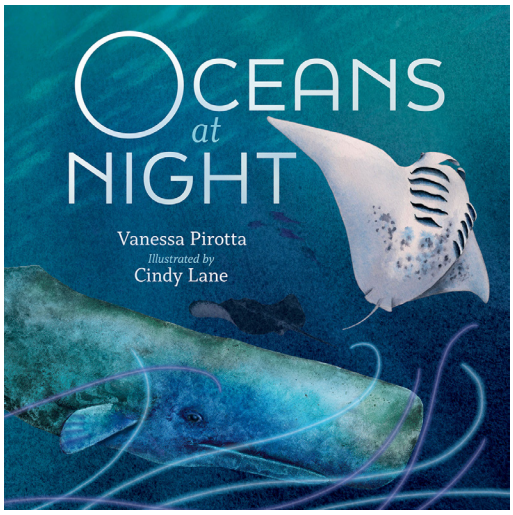

Oceans at Night

Vanessa Pirotta and Cindy Lane

About the book

As night-time nears, a world of creatures comes alive in our oceans.

Settle in and explore the wonderful world under the waves, and see what animals do from sunset to sunrise. From penguins to sharks, giant squid and plankton, discover the fascinating after-dark lives of ocean creatures.

Oceans at Night showcases the beauty and wonder of life below the sea, so dive deep and discover what happens while you sleep!

Recommended for

Readers aged 5 to 9 (Years 1 to 4)

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About the author and illustrator

Dr **Vanessa Pirotta** is a wildlife scientist, science communicator and author. Her work is primarily focused on the use of innovative technologies for wildlife conservation. Vanessa has encountered many wonderful sea creatures through her research on whales around the world. Vanessa is also the proud author of *The Voyage of Whale and Calf*.

Cindy Lane is an award-winning artist and illustrator, with a passion for the ocean and its inhabitants. Nature provides Cindy with inspiration as well as materials to make her own paints, which she's used in this book.

Pre-reading questions or activities

Humans are land animals who can spend short periods of time in a marine environment. Think about all the body systems that would need adjustment if we wanted to spend hours, or even longer, in the ocean without breathing apparatus or other aides. Compare us to some of the underwater animals you're already familiar with. Consider our skin, our respiratory system, our eyes and our modes of movement. What about our food, or how we sleep and play – how different would we need to be?

Discussion questions

Science

1. Marine scientists use various methods to learn about creatures in the sea, including observation and attaching tracking devices to some animals. How might scientists be able to identify an individual whale shark?

   Not only by the unique pattern on her body but also from any damage that may have occurred in her life, leaving scars or healed wounds.

2. In many animals, the male is more colourful, noisier, larger or more decorated than the female. Think about peacocks and lions. However, one creature in *Oceans at Night* displays the opposite features: the angler fish. Go to the Atlas of Living Australia web page about the angler fish (https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/5cda72f0-56e4-4653-b60f-e8530f7cbb34), and in the box called Morphology check the sizes of the female and the male. How much bigger is the female than the male?

   Female angler fish can grow to around 15 centimetres while the full-grown adult males measure only around 2 centimetres, so the females are 8 times larger than the males.

3. Plankton are tiny creatures that can barely travel on their own, and require the currents in the ocean to move them from place to place. Most plankton are either plant-like (phytoplankton) or animal-like (zooplankton). They grow in the upper layers of the ocean where there is more light, and they provide food for a very large number of marine animals. Describe how plankton are important to us, as part of a food chain.

   Plankton are eaten by crustaceans, shellfish and small fish, which are then consumed by larger fish, which humans catch and eat. Without the plankton at the bottom of the food chain, larger mammals and fish would have nothing to sustain them and the food chain would be disrupted.

The Arts

In a book like this it is difficult to show all the animals in their correct proportions to each other. For instance, do you think that the little penguins are a similar size to the Port Jackson shark, as they appear in the book? Is the sunfish bigger or smaller than the leatherback turtle? It's hard to be sure. Why has the artist drawn them this way? Which pages might display animals in their correct scales to each other?

The artist is using the space provided to her. She takes up the whole of each page so the reader can see as many details as possible. Pages where we can be pretty certain that creatures are in the proper proportion to each other are: the dumbo octopus with the whale skeleton; the sperm whale and giant squid.

Activities

Science

Sea sparkle

The microscopic plankton that create blue waves when the dolphins swim through them aren't the only sea creatures that can glow in the dark. Have a look at the land and sea animals here and think about possible purposes for this ability: https://www.australiangeographic.com.au/topics/science-environment/2018/08/bioluminescent-beauties-meet-australias-sparkling-species/. Write a paragraph that describes what bioluminescence is and suggest a reason why some life forms have developed this power.

Scientists suggest that bioluminescence may act as a warning to predators, be an enticement for food, a way to illuminate prey, a defence mechanism, an attractor for partners or perhaps a communication method.

Who belongs where?

You are introduced to 13 amazing organisms in this book. They are so different from each other and belong to a wide variety of families or groups. Using the worksheet on pages 7–8, your task is to match up 12 of the animals (not the plankton) with their correct group.

Answers:

Bird: Little penguin

Bony fish: Angler fish, sunfish

Cartilaginous fish: Port Jackson shark, giant manta ray, whale shark

Cephalopod: Dumbo octopus, giant squid

Mammal: Cuvier's beaked whale, sperm whale

Mollusc: Chambered nautilus

Reptile: Leatherback turtle

Whale sharks

Before students watch the clip below, teachers should set the scene a little. Show where Ningaloo is on a map of Australia, and explain that Tim Winton is a Western Australian author and environmental activist, although not a scientist. Some words and phrases may need explanations, too:

- **parasites** are creatures (or plants) that live off other organisms and can cause the host harm
- **ultrasound** is a non-invasive method of using sound waves to create a picture to examine inside a body
- an **indicator species** is one that tells us what's going on in its local habitat, which helps scientists monitor and assess the health of the nearby environment and the creatures that live in it
- **ram filter feeders** move through the water with their mouths open, taking in everything along the way.

Now, the class can watch this video and notice all the different ways that marine scientists study and learn about whale sharks: https://youtu.be/cic3psuRVdw?si=zqGjDbYIJ-hND9Tt. What methods are mentioned? What sorts of things are the scientists measuring, monitoring and reporting on? What questions might this data help answer?

The following scientific processes are mentioned in the clip:

- *physical scratching (to find parasites)*
- *mapping the whale shark spots (to identify individual animals)*
- *looking at gut contents (to learn what they ingest, not just food)*
- *satellite tagging (to see where the creatures travel)*
- *DNA samples (to learn about family trees)*
- *ultrasound (to discover how healthy the animal is)*

Geography

Where are we?

You will use an online map that shows where various organisms have been sighted, and learn a little more about one of the creatures. Choose one of the animals in the book (not plankton, though) and record its scientific name, or the two Latin words that scientists use to identify each species. This can be found in the section of the book called 'Meet the sea creatures'. This is the label you will use to find out more. (Note: If you choose the dumbo octopus, you only need to record the first Latin word, which is the genus name.)

Go to the Atlas of Living Australia (https://www.ala.org.au/) and type in the scientific name. Click on the first listed hit and you'll see images, a map and boxes of information. Write down a few facts about your creature: perhaps its conservation status, threats it faces or something interesting about its diet, behaviour or reproduction. Record in which states or territories it has been spotted. Once you've gathered some astonishing details, share your findings with a partner. Consider how your two animals might (or might not) encounter each other in the wild, and why they have been sighted in some places around Australia, but not others.

English

Splish splash

Part of what makes this book so delightful to read is that the words conjure up extra information about the illustrations. On the page with the giant squid we read, 'Dashing and darting, twisting and turning.' Not only does this phrase provide us with a rhythmic description of movement, but also it uses a literary device called alliteration. This is when the writer uses words that start with the same sound. Your task is to choose one of the creatures in the book and write a short poem that adds to what you already know. It may be the feel of the leatherback turtle's shell or the sound the penguin chicks make. In your poem, make sure you use an example or two of alliteration.

Worksheet: Who belongs where?

Cut out the seven labels and the 12 animal names. Use the labels as headings and then place each animal under the correct heading. Discuss why some creatures may belong in the same group and why some others don't. Your dictionary may help with this exercise. Answers are on page 4 of the teacher notes.

Labels

BIRD
BONY FISH
CARTILAGINOUS FISH
CEPHALOPOD
MAMMAL
MOLLUSC
REPTILE

Animals

Angler fish	Chambered nautilus
Cuvier's beaked whale	Dumbo octopus
Giant manta ray	Giant squid
Leatherback sea turtle	Little penguin
Port Jackson shark	Sperm whale
Sunfish	Whale shark

Australian curriculum links (Version 9.0)

Year level	Learning area: Science	Other learning areas
Years 1/2	**Science Inquiry: Communicating** • Write and create texts to communicate observations, findings and ideas, using everyday and scientific vocabulary (AC9S1I06 and AC9S2I06) **Science Inquiry: Processing, modelling and analysing** • Sort and order data and information and represent patterns, including with provided tables and visual or physical models (AC9S1I04 and AC9S2I04)	**English: Literature** • Listen to and discuss poems, chants, rhymes and songs, and imitate and invent sound patterns including alliteration and rhyme (AC9E1LE04) • Identify, reproduce and experiment with rhythmic sound and word patterns in poems, chants, rhymes or songs (AC9E2LE04) **Visual Arts: Developing practices and skills** • Experiment and play with visual conventions, visual arts processes and materials (AC9AVA2D01) **HASS: Geography** • How places can be spatially represented in geographical divisions from local to regional to state/territory, and how people and places are interconnected across those scales (AC9HS2K03)
Years 3/4	**Science as a Human Endeavour: Nature and development of science** • Examine how people use data to develop scientific explanations (AC9S3H01 and AC9S4H01) **Science Understanding: Biological sciences** • Explain the roles and interactions of consumers, producers and decomposers within a habitat and how food chains represent feeding relationships (AC9S4U01)	**HASS: Skills** • Locate, collect and record information and data from a range of sources, including annotated timelines and maps (AC9HS3S02 and AC9HS4S02)
All	**Digital Literacy: Investigating** • Locate information through search engines and in documents by applying specific search terms, and selecting and retrieving relevant information from multiple sources (Level 2 and Level 3)	

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Related books from CSIRO Publishing

For younger readers:

- *Swim, Shark, Swim!* (https://www.publish.csiro.au/book/8069)
- *The Great Southern Reef* (https://www.publish.csiro.au/book/8042)
- *The Voyage of Whale and Calf* (https://www.publish.csiro.au/book/8029)

For older readers:

- *Animal Migrations: Flying, Walking, Swimming* (https://www.publish.csiro.au/book/8044)
- *Ocean Animals: The Weirdest, Smartest and Sneakiest Sea Creatures* (https://www.publish.csiro.au/book/7881)
- *Sensational Australian Animals* (https://www.publish.csiro.au/book/8094)

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