

Teacher Notes

Themes

- Migration
- Resilience and survival
- Conservation

Key learning outcomes

- Recognise that an animal's adaptations, both behavioural and physical, assist the animal to survive.
- Understand that bird migration patterns are an adaptation that has evolved over thousands of years.
- Identify the seasonal triggers for migration, including: light duration, temperature, wind speed and direction, and food availability.
- Comprehend that local and global rigorous scientific observation, documented knowledge and communication are vital to support the successful conservation of a species.

Key curriculum areas

- English: Language, Literature, Literacy
- Science: Biological sciences, Earth and space sciences
- Humanities and Social Sciences: Geography
- The Arts: Making, Responding
- Cross Curriculum Priorities:
 - Sustainability: Systems, world views, futures
 - Aboriginal and Torres Strait Islander Histories and Cultures: Country/place, culture, people

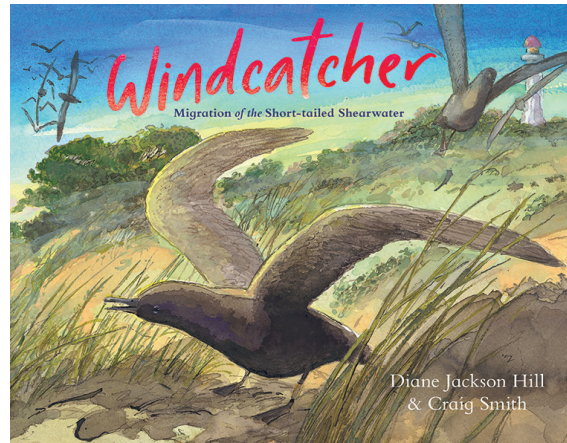
Publication details

Windcatcher: Migration of the Short-tailed Shearwater

ISBN: 9781486309870

These teacher notes are licenced under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 Licence (CC BY-NC-SA). They may be reproduced free of charge but may not be offered for commercial sale.

Teacher notes prepared by Dianne Gordon.



Windcatcher

Migration of the Short-tailed Shearwater

Diane Jackson Hill and Craig Smith

Windcatcher describes the migration, conservation and survival of the Short-tailed Shearwaters that live on Griffiths Island, near Port Fairy, Victoria. Their remarkable story is told through the life of a small bird called Hope, whose adventures begin as soon as she leaves her burrow and starts her marathon journey to the Arctic Circle.

Hope faces danger and fatigue on the long journey, but her resilience and the help of some dedicated humans ensure she returns home to continue the life story of the Short-tailed Shearwater.

Students aged 6–9 years



CSIROPUBLISHING
www.publish.csiro.au

Teacher Notes

About the author and illustrator

Award-winning children’s author Diane Jackson Hill has always been drawn to the ocean and the creatures that call it home. A former primary school teacher, Diane’s books educate children about the marine environment in a bid to help protect and restore it for future generations.

Craig Smith is one of Australia’s most prolific and popular illustrators. He has been illustrating children’s books for over 40 years and has published over 400 titles.

Windcatcher is the second book that Diane and Craig have published together, with their previous book *Chooks in Dinner Suits: A Tale of Big Dogs and Little Penguins* (Museum Victoria, 2017) winning the 2017 Wilderness Society Environmental Award for Children’s Literature – Picture Fiction.

Pre-reading activities

Shearwater sounds

Play the sound recording of the Short-tailed Shearwater: <https://www.xeno-canto.org/species/Ardenna-tenuirostris> (Note: the second recording in the list has the clearest call).

Compare the call of the Short-tailed Shearwater to that of some other migratory birds (e.g. Bar-tailed Godwit, Artic Tern, Adelie Penguin) and discuss the distances that they migrate – see migration cards at the back of these notes.

Mapping migrations

Using a globe of the Earth, or Google Earth on a class screen, find Australia.

If we wanted to visit another country on the other side of the world, 15,000 km away, how would we get there? (A website like <https://www.rome2rio.com/map/Melbourne/Alaska> provides a map, flight path and length.)

How long would it take? Would you sleep? Would you eat and drink?

Many kinds of animals make long journeys across different parts of the Earth. The journeys are called migrations. On the way, animals need to be able to rest, eat and drink. And they’re not always successful.

Teacher Notes

Migratory animals usually travel in search of more abundant food supplies. So migration can be seasonal. Shearwaters, like many animals, increase their chances of survival by migrating in huge numbers.

Background information on migration: <https://www.nature.com/scitable/knowledge/library/animal-migration-13259533>

Migration cards

Animal migration cards (found at the end of these notes) can be used in a couple of ways:

- Cut out the animal and stick its corresponding information onto the back and use it with the students to show where and how far the animal travels across the globe.
- Cut out the animal cards and information cards separately and use them to play a Migration Memory game.

Note: the distances on the cards represent a one-way journey, as some animals travel back by a different route. This means that animals travel about double the distance shown on the card each year!

Dangerous journeys

A flight of 15,000 km one way will have its dangers. Ask students to imagine what they might be. Discuss scenarios including bad weather, not enough food, being caught in fishing nets and ingesting plastics.

Discussion questions

Science

1. The shearwaters' round trip from Australia to the Arctic Circle and back again is around 30,000 km, so they must have adaptations to help them in their marathon flight. Can you suggest some features of their body that help them?

The birds' 90 cm wingspan and narrow, blade-shaped wings reduce wind resistance and help them to fly fast. They also take advantage of wind currents to glide and rest.

2. How would their flying style help conserve their precious energy stores?

The 'flap, flap, glide' style preserves their energy on the glide, so there is not the high energy requirement of continuous flapping.

Teacher Notes

3. What are krill?

Krill are small ocean-swimming crustaceans. Different species are present in all the oceans of the world and can vary in length from 1 cm to 15 cm. In the Southern Ocean alone, scientists estimate there are 500 million tonnes of Antarctic krill. (<http://www.antarctica.gov.au/about-antarctica/wildlife/animals/krill>)

4. Shearwaters are able to convert their diet of krill to a high energy oil in their stomach. How would this help them to fly such a long way?

The high energy oil is nutrient dense and lighter to carry on the long trip.

5. When they are fishing, shearwaters can dive down into the water to 50 m! Shearwaters have a hook on the end of their beak. How do you think that would help them?

Shearwaters eat krill, squid and fish. The hook helps the birds snag their slippery prey.

6. Animal migrations around the world can be short or long, with many bird species having the longest migrations. What pushes animals to migrate?

There are many environmental factors that trigger migration: day length, light intensity and duration, temperature decreases, reduced food levels and reduced resources for different lifecycle stages.

7. Shearwaters prefer to mate each year with their previous mate and return to the same burrow. How many eggs do the shearwaters lay each year?

One per mating pair.

8. If you wanted to see the birds leave their burrows and start their flight to the Arctic Circle, when would be the best time to visit their breeding ground?

The fledglings leave 3 to 4 weeks after the parents in late April. As the departure dates are reliant on the weather, always check with the local rangers before making travel arrangements.

9. Shearwaters face many obstacles during their lengthy journey. What are they?

- *Rough weather can blow the birds off course and cause them to take longer to return to their original flight path. This can exhaust the birds before they reach their destination.*
- *Fishing nets can entangle birds as they dive for their food.*
- *When there are warmer seasons than usual, polar ice caps melt more than expected. This reduces the concentration of algae that the krill feed on, thereby reducing the krill population and providing insufficient krill for the birds' return journey.*
- *The birds ingest plastic, not only because it looks like food to them, but also because it smells like krill. As plastic breaks down, it releases the same gas as krill does. The birds also feed their chicks the plastic when they return from hunting.*

Teacher Notes

10. How do shearwaters find their way (navigate) to the Arctic Circle?

It is likely that the birds use the Earth's magnetic field to guide them north and south. Star patterns and landmark recognition may also play a role in reinforcing direction.

11. How can humans help migratory animals, like Short-tailed Shearwaters, to survive?

- *Keep track of as many shearwaters as possible. Park rangers, researchers and volunteers band birds and log their information. Bird banding involves clipping the right size band around a bird's leg (not too tight and not too loose!). It ensures that the individual can always be identified: <https://www.environment.gov.au/science/bird-and-bat-banding/about-banding/band-design>. The accumulated knowledge is invaluable in understanding the pressures on the birds and how we can help them.*
- *Park rangers use predator control measures to protect shearwaters from feral cats, dogs and foxes. People should keep pets inside at night.*
- *Protect habitat by staying on walking tracks and making sure not to litter.*
- *Look out for fledglings as they begin their migration. On Phillip Island where over a million Short-tailed Shearwaters nest, the Shearwater Rescue Patrol helps drivers to look for birds that may land on local roads by accident.*
- *Lights on the San Remo bridge aimed at the mainland may be switched off at night in April so they do not attract the confused fledglings. Fledglings that are attracted by lights sometimes lose track of where they need to go.*
- *There is an international treaty between Japan and Australia to protect seabirds that share our coast and oceans: the Japan and Australia Migratory Bird Agreement (JAMBA).*

Background information on Phillip Island Short-tailed Shearwaters: <https://www.penguins.org.au/assets/Conservation/Education/PDF/2017-NN-Short-tailed-Shearwaters.pdf>

Link to Griffiths Island Short-tailed Shearwater information, including a map and photos: <https://www.portfairyaustralia.com.au/attractions/mutton-birds-on-griffiths-island/>

Teacher Notes

HASS: Geography

1. When the young shearwaters leave Australia, it is autumn. Six weeks later in June, it is winter and cold. By June the birds have arrived in Alaska. What season is it there?

In June it is summer in Alaska. Typically, there is daylight for 24 hours every day in June and July, reducing to 19 hours every day in August!

2. Why is that better for the birds?

There is plenty of feeding time as the sun does not really set.

3. What would the weather be like?

During summer in the Arctic Circle, it is a sunny 4°C.

Activities

Flight path

Track the flight of the shearwaters on the worksheet 'Short-tailed Shearwater Journey', which is found on the next page. Using an atlas or Google Maps, have students label the places the shearwaters fly by.

Short-tailed Shearwater country

Short-tailed Shearwaters mostly nest along the south-east of Australia: http://www.environment.gov.au/cqi-bin/sprat/public/publicspecies.pl?taxon_id=1029

Using the following map of Aboriginal countries throughout Australia, find Gunditjmara country, where this story is set: <https://aiatsis.gov.au/explore/articles/aiatsis-map-indigenous-australia>

What can you learn about the Gunditjmara people and their culture?

Some useful links are below:

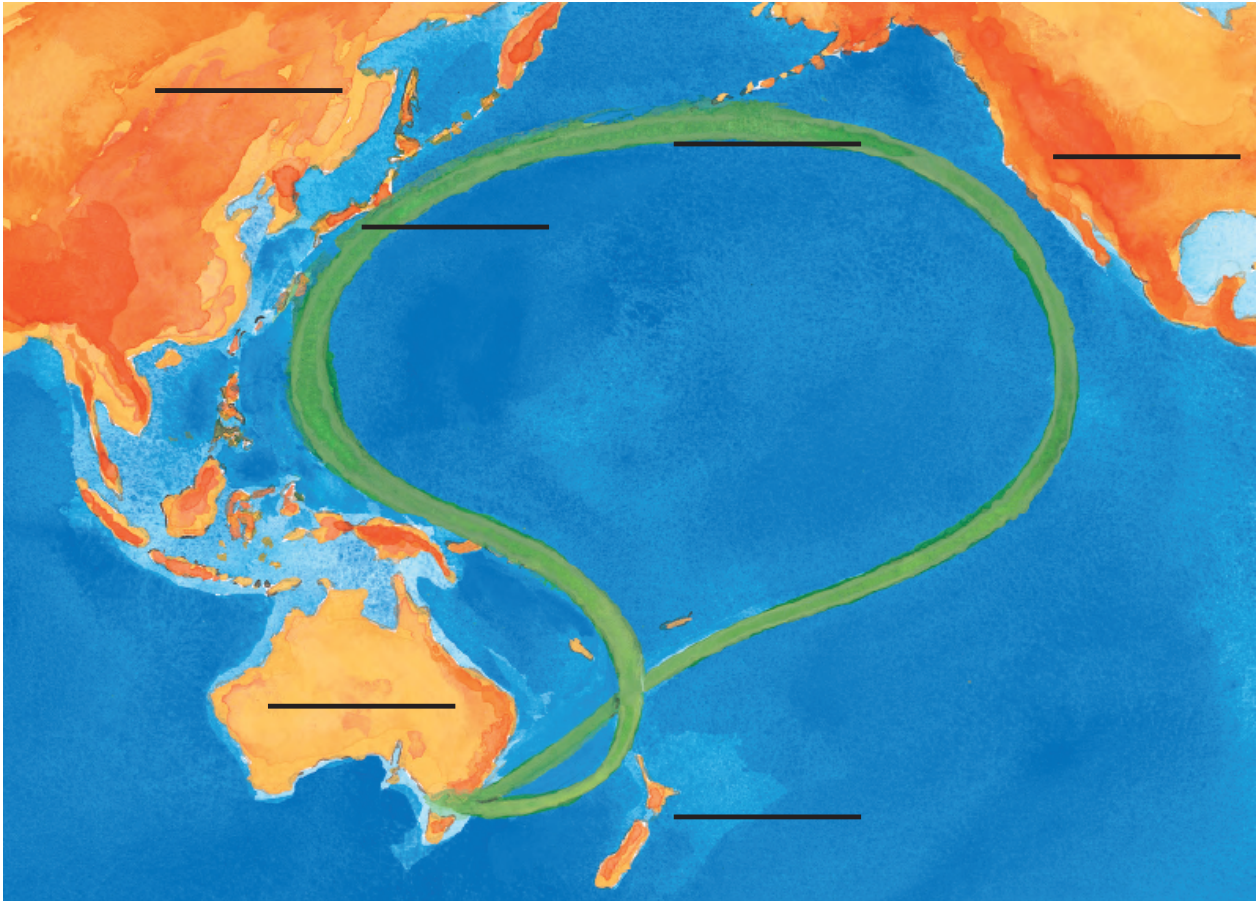
- https://www.nma.gov.au/learn/encounters_education/community/warrnambool
- <https://www.vaclang.org.au/projects/gunditjmara.html>.

Build a burrow display

Make a mini Short-tailed Shearwater habitat in a large, shallow cardboard box. Bunch up different grasses, and 'plant' them around the display. Make large cardboard tubes for burrows: paint them with PVA glue and spread some sand across the tops and around the sides. Make a papier mâché egg to hide inside the burrow. Use the sound recording to surprise any visitors!

Short-tailed Shearwater Journey

The map below shows the migration path of the Short-tailed Shearwater. Fill in the blanks with the name of each place.



Place names

United States of America

Russia

Japan

Australia

New Zealand

Aleutian Islands

Teacher Notes

Ranger story

Write a short story from the perspective of Ranger Phil. Explain how you take care of Short-tailed Shearwaters and their habitat and how you feel about them.

Preventing plastic pollution

In 2016 CSIRO cited balloons as being one of the top three most dangerous items for marine animals. Zoos Victoria has launched a campaign to reduce balloon-related waste. Watch this video to find out why plastic pollution is such a big problem: <https://www.zoo.org.au/get-involved/act-for-wildlife/balloons/about>

The video has footage of balloons being removed from an adult shearwater, and pieces of plastic being removed from the stomach of a marine bird, so may be more suitable for older groups of students.

In a group, make a poster outlining the problem and include some actions that people can take to reduce balloon and plastic waste in our oceans. Present the poster to the class.

Teacher Notes

Australian Curriculum Links

Year level	Learning area: science	Other learning areas
Foundation/Year 1	<p>Science Understanding: Biological Sciences</p> <ul style="list-style-type: none"> Living things have basic needs, including food and water (ACSSU002) Living things have a variety of external features (ACSSU017) <p>Science Understanding: Earth and Space Sciences</p> <ul style="list-style-type: none"> Daily and seasonal changes in our environment affect everyday life (ACSSU004) Living things live in different places where their needs are met (ACSSU211) Observable changes occur in the sky and landscape (ACSSU019) <p>Science as Human Endeavour</p> <ul style="list-style-type: none"> Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE013, ACSHE021) People use science in their daily lives, including when caring for their environment and living things (ACSHE022) 	<p>HASS: Geography</p> <ul style="list-style-type: none"> The representation of the location of places and their features on simple maps and models (ACHASSK014) The natural, managed and constructed features of places, their location, how they change and how they can be cared for (ACHASSK031) <p>The Arts: Visual Arts</p> <ul style="list-style-type: none"> Use and experiment with different materials, techniques, technologies and processes to make artworks (ACAVAM107)
Year 2/3	<p>Science Understanding: Biological Sciences</p> <ul style="list-style-type: none"> Living things grow, change and have offspring similar to themselves (ACSSU030) Living things can be grouped on the basis of observable features and can be distinguished from non-living things (ACSSU044) <p>Science as Human Endeavour</p> <ul style="list-style-type: none"> Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE034) Science involves making predictions and describing patterns and relationships (ACSHE050) People use science in their daily lives, including when caring for their environment and living things (ACSHE035) Science knowledge helps people to understand the effect of their actions (ACSHE051) 	<p>HASS: Geography</p> <ul style="list-style-type: none"> The ways in which Aboriginal and Torres Strait Islander Peoples maintain special connections to particular Country/Place (ACHASSK049) The way the world is represented in geographic divisions and the location of Australia in relation to these divisions (ACHASSK047) The location of Australia's neighbouring countries and the diverse characteristics of their places (ACHASSK067) The main climate types of the world and the similarities and differences between the climates of different places (ACHASSK068) <p>The Arts: Visual Arts</p> <ul style="list-style-type: none"> Use and experiment with different materials, techniques, technologies and processes to make artworks (ACAVAM107) <p>English: Literacy</p> <ul style="list-style-type: none"> Rehearse and deliver short presentations on familiar and new topics (ACELY1667) Listen to and contribute to conversations and discussions to share information and ideas and negotiate in collaborative situations (ACELY1676) Create short imaginative, informative and persuasive texts using growing knowledge of text structures and language features for familiar and some less familiar audiences, selecting print and multimodal elements appropriate to the audience and purpose (ACELY1671) Plan, draft and publish imaginative, informative and persuasive texts demonstrating increasing control over text structures and language features and selecting print, and multimodal elements appropriate to the audience and purpose (ACELY1682)

Related books from CSIRO Publishing

The Australian Bird Guide, Revised Edition (2019)



Arctic Tern

Flies from Greenland to
Antarctica.
About 35 000 km.



Humpback Whale

Swims from tropical to
Arctic or Antarctic regions.
5000 to 10 000 km.



Monarch Butterfly

Flies from Canada to
Mexico.
Nearly 5000 km.



Christmas Island Red Crab

Scuttles from forest to
ocean to breed.
Nearly 5 km.



Zebra

Walks from Tanzania
to Kenya.
About 800 km.



Photo: Alastair Rae/Flickr, CC BY-SA 2.0

Leatherback Turtle

Swims from Indonesia
to the USA.
About 20 000 km.



Photo: David Wood/Flickr, CC BY-NC 2.0

Short-tailed Shearwater

Flies from Australia to
Alaska.
About 15 000 km.



Wildebeest

Walks from Tanzania
to Kenya.
About 800 km.



Photo: Christopher Michel/Wikipedia, CC BY 2.0

Adelie Penguin

Swims to warmer ice platforms in the Antarctic.
About 600 km.



Bar-tailed Godwit

Flies from New Zealand to Alaska.
About 17 500 km.



Chinook Salmon

Migrates from oceans to rivers.
1000 to 3000 km.



Photo: Jee & Rani Nature Photography

Globe Skimmer Dragonfly

Different migration patterns around the world.
Up to 7000 km.