

# Teacher Notes

## Themes

- Marine ecosystems
- Biodiversity
- Conservation

## Key learning outcomes

- Similar to the range of environments on land, there are many different marine environments which feature their own living and non-living characteristics.
- Even animals within the same group can have significant differences in bodies and behaviours that help them survive in their environment.
- Changes in any one characteristic of a particular environment can impact on the health of and numbers of the living things within it.

## Key curriculum areas

- **Science:** Science Understanding (Biological sciences)
- **English:** Language; Literature
- **Arts:** Media arts
- **Cross curriculum priority:** Sustainability

## Publication details

*Swim, Shark, Swim!*

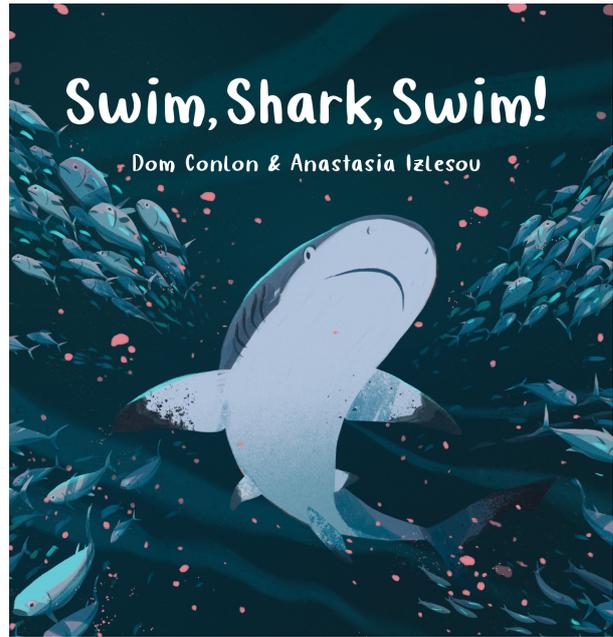
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Teacher notes prepared by Mike McRae.

CSIRO Publishing  
Private Bag 10  
Clayton South, VIC 3169, Australia

Website: [www.publish.csiro.au](http://www.publish.csiro.au)  
Tel: 1300 788 000 (local call in Australia)  
Email: [publishing.sales@csiro.au](mailto:publishing.sales@csiro.au)



# Swim, Shark, Swim!

Dom Conlon and Anastasia Izlesou

## About the book

Swim around the world with Shark as he explores ocean forests and coastal reefs, meeting hammerheads and great whites, stingrays and dolphins in a search for the place he calls home.

With rich language and enchanting art, *Swim, Shark, Swim!* is written by Dom Conlon and illustrated by Anastasia Izlesou and features fascinating facts to inspire a love of science and the natural world.

## Recommended for

Readers aged 5 to 8; notes for Years 2 to 5



PUBLISHING

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## About the author and illustrator

**Dom Conlon** is a double Carnegie-nominated poet and author whose work is guided by nature and the stars. He's written poetry and picture books, fact and fiction – sometimes all in the same book. Dom hopes to inspire everyone to read and write poetry.

**Anastasia Izlesou** is a multidisciplinary illustrator and designer from the UK. Using a mix of digital and traditional media, she creates vibrant works full of bold natural elements. Her inspirations range from natural sciences, literature and folklore to everyday items and objects of kitsch.

## Pre-reading questions or activities

Our planet's surface covers a lot of area. A little over 500 million square kilometres, in fact. About 360 million square kilometres is ocean (about 70 per cent of the surface), meaning most of our planet is water.

These are big numbers for any of us to comprehend. Use a tape measure and masking tape to measure out a square metre. Tell students a square kilometre is a huge square with sides that are 1000 of those square metres long.

Ask them to share stories of long journeys to far-off places, inviting them to try to imagine just how big 500 million square kilometres looks. Use a globe, or better still, display Google Earth on a large screen to illustrate your conversation.

Lead the students into a discussion on the different kinds of environments they might pass through on land. Ask them if they've considered how different ocean environments might be? Discuss different living and non-living features of marine habitats, such as temperatures, depth, types of fish and corals, types of plants, whether there is ice, and even how salty it might be. Show different parts of the globe to visualise how marine environments might differ.

# Teacher Notes

## Discussion questions

### Science

1. 'Scary' Hollywood movies such as *Jaws* and *The Meg* often depict sharks as lone, fearsome monsters. Discuss with students what their impression of sharks is. Write individual descriptive words they use, displaying them on the board or bits of card. Ask students to group similar words, placing them into categories of emotions, concerns or benefits.
2. Explain to students how sharks are cartilaginous fishes. This means all species of shark, from giant whale sharks to tiny wobbegongs, have skeletons made of cartilage. Discuss with students where they can find cartilage in their own bodies, such as nose and ears, and how it differs to bone. Discuss how a light, flexible skeleton might help sharks survive.
3. Sharks are typically predators. But this doesn't mean all sharks will eat all fish. *Swim, Shark, Swim!* depicts the whitetip shark looking for food 'with pilot fish and remora by her side'. Discuss with the students why the shark might not eat these fish, and why they might accompany the shark. How would they benefit from each other's company? Ask the students if they can think of other examples where animals co-exist with each other in ways that help one another out.
4. When we talk about nurseries, we often refer to places where a baby sleeps. Biologists use the word 'nursery' to describe where baby animals not only sleep, but spend much of their childhood. *Swim, Shark, Swim!* refers to mangroves as nurseries for young lemon sharks. Discuss with students why the warm, shallow waters of a mangrove forest might be good for baby sharks. Explain how some people consider mangroves to be stinky, muddy zones and pull them down. How might mangrove destruction impact on different species far out into the ocean?
5. Sharks aren't the only predators described in *Swim, Shark, Swim!* Cape fur seals and penguins also chase down a meal in the waters off Africa's coast. List similar features of all three animals and ask students to suggest different characteristics of each. Discuss the similarities and differences, helping students understand what class of animal each belongs to.

### English

1. On page 9 of *Swim, Shark, Swim!* author Dom Conlon describes a net as 'the lines on a globe'. What do the students think he means by this? Ask them why Dom used these words, and didn't just describe a net? Invite them to come up with their own descriptive terms for a net used to catch fish.

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2. The word 'Shark' is used throughout as a name for the shark swimming around the ocean. Ask the students why it's capitalised, while other references to sharks aren't. What other terms are capitalised? Ask them to come up with other names for the shark.

## Arts

1. The artist uses a range of colours to depict the ocean's waters. Share the different locations with the class, asking them to describe the nature of the location. Is it deep or shallow? Night or day? How might the reader know?

## Sustainability

1. Explain to students how there have been shark-like animals swimming in our oceans for roughly 450 million years, with many different body shapes and sizes. Ask the class what they would miss about sharks if they weren't around. How might the oceans be better, or worse? Role play scenarios where students try to describe their favourite shark to somebody who has never seen one.

# Activities

## Science

### *Sharks in a bottle*

**Note:** This is a variation on the 'Cartesian diver' activity. It's a great way to communicate the physics of pressure, but can also be used as a fun toy to discuss sea creatures.

**Sustainability:** Plastic bottles and fish-shaped containers for soy sauce can be a potential source of plastic waste. Reuse and recycle existing containers for this activity. Share the limited materials you have, even if it means doing this activity as a single class demonstration.

### You will need

- 1 × small (375 ml) plastic bottle
- 1 × plastic 'sushi fish' container (the kind that holds soy sauce)
- Bucket filled with water
- Plasticine
- Water
- Blue food dye (optional)

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## What to do

1. Empty the sushi fish and clean it out with water. Let it dry with the cap off before giving to any students.
2. Put the cap back onto the sushi fish. Instruct students to place the sushi fish into the bucket of water and watch how it floats.
3. Show the students how to place small amounts of plasticine around the cap-end of the fish, making it nose-heavy. They can use the bucket again to test how it floats – the goal is for the fish to float near the surface, with its nose pointing down.
4. Once their sushi fish floats appropriately in the bucket, give each student an empty plastic bottle. Instruct them to fill it to the very top, to the point of overflowing.
5. Tell them to put the sushi fish into the bottle, nose-down. They can top-up the bottle with more water if need, before putting on the bottle's cap.
6. To make the fish sink, all they need to do is give the bottle a good squeeze!
7. Optional: Add a few drops of blue dye to the bottle's water for an ocean-blue feel.

## What's happening

Imagine a drop of water the shape and size of the fish. This volume of water would have a certain mass.

Now imagine the sushi fish. Its plastic covering along with the added plasticine and the air inside it also gives it a certain mass. When the fish floats at the top of the bottle, this mass is less than the volume of water it occupies. That blob of water is pushed aside by the fish, and pushes back. This is called buoyancy.

When the bottle is squeezed, everything inside is pushed together: the water, the sushi fish and the air inside the fish. Only air can be squeezed into a smaller volume, though, making the fish's volume slightly smaller.

Now the volume of sushi fish is heavier than the same volume of water. The surrounding water doesn't push it up any more. It pushes it down.

Fish in the ocean also have to find ways to navigate the different pressures of the water column. Deep water has a lot of pressure, meaning some fish need special features in their bodies, depending on how deep they dive.

## Follow-up

Ask the students to research the deepest diving sharks. How do they survive the crushing depths?

# Teacher Notes

## *Nothing but the tooth*

The first thing that might come to young minds when thinking about sharks is ‘sharp teeth!’ Just as sharks come in all shapes and sizes, shark teeth also take a variety of forms, all suited to different diets.

**Safety:** This activity uses cutlery as a visual tool. Students won’t need to use them, but will need to hold them responsibly to avoid accidental pokes and prods.

### **You will need**

- Plastic or wooden cutlery (spoons, forks, knives)
- A variety of fruit, such as tiny sultanas, slippery pieces of grape or banana, or large items like apple halves and watermelon slices. Include an egg as an example of an item students need to crush to get inside.
- Images of different shapes of shark tooth, including needle-like ones (grey nurse shark), serrated triangular teeth (great white shark) and crushing teeth (Port Jackson shark)

### **What to do**

1. Hand out a single cutlery item randomly to students, so every student has a fork, a knife or a spoon.
2. Present examples of food. Ask a single representative of each cutlery item to share how easy it would be for them to use their cutlery item to break up each food and deliver it to their mouth.
3. After a number of food items have been discussed, show images of shark teeth to the students. Ask them to share their thoughts on the kinds of food they might eat. If they say ‘fish’, ask them what size, speed and habitat the fish might live in.

### **What’s happening**

Different shark species eat a wide variety of food items: small to large fish, large mammals, molluscs and even tiny crustaceans. While most are carnivorous, there have been some rare examples of sharks that include small amounts of vegetation in their diet.

To be efficient at grabbing a mouthful of their favourite food, sharks rely on teeth that are the perfect size and shape.

Thin, needle-like teeth – like the prongs of a fork – are just the thing for pinning down smaller fish. Big, knife-like teeth can tear up larger prey into smaller pieces for swallowing. Flat ridges of teeth – like the back of a spoon – or wide bony surfaces can crush or scoop up tiny prey or break apart the shell of a mollusc.

Invite students to do their own research on the diets of different sharks, and how their teeth help them catch and hold small and slippery food, cut and slice big food, or crush and grind hard food.

# Teacher Notes

## English

### *Shark travel blog*

The main character in *Swim, Shark, Swim!* is a blacktip reef shark, simply referred to as Shark.

Much of the story covers a journey around the globe, one that a real blacktip reef shark would probably never make. Giving Shark a name, emotions and a fictitious journey are forms of 'poetic licence', which allow writers to essentially make things up to tell a more important message.

Ask students to give Shark a back story. Why is he travelling? What are his hopes or fears?

As an extension, invite students to select some of their favourite places that Shark visits, and write a travel blog entry for that place. What else might Shark see? What does he feel? What is his reaction to other animals, including other sharks?

## Arts

### *Impress me*

In the late 19th century, a new kind of art was becoming famous. Called impressionism, it was more about representing the light and sense of atmosphere of a scene, rather than the details.

### You will need

- A diverse choice of colour media (watercolours, acrylics or even pastels are good)
- Surface for colouring (paper, card or canvas)
- Broad brushes
- A selection of environments written on cards or as a list (desert, arctic, rainforest, beach etc.)

### What to do

1. Set up art supplies for students so they each have one or more broad brushes and a surface to paint or colour.
2. Instruct students to cover the surface with two or more colours of their choice. They can mix them on the surface, paint in large strips, blotches ... but are not to include details.
3. Give each student an environment. Ask them to close their eyes and imagine the colours of that environment, and how they're arranged. Are they as shapes? Layers? Columns?
4. Instruct students to use the media to create an impression of that environment by choosing colours that remind them of it. Encourage them to experiment with colours, shapes, blending and layering.

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## What's happening

Reflect with the students over the artwork depicting the range of shark environments in *Swim, Shark, Swim!*, focusing on the colours and lines. Discuss how each colour makes them feel, and how the different shades and hues communicate features of the environment.

Invite them to share impressionist paintings that appeal to them, discussing how each painting communicates something about the scene.

## Sustainability

### *Big changes*

There are a variety of animals from many different marine environments depicted in *Swim, Shark, Swim!* Ask students to choose their favourite and draw a picture of it.

Instruct them to look the animal up on an internet or library resource, and find some interesting facts about it to share.

Discuss ways human activities might affect the oceans. This might include rising temperatures, acidification, rising waters, or by adding freshwater from melting ice caps. It could also include other forms of pollution, or over-fishing.

What might such impacts mean for their chosen animal? Will there be more or fewer of them in the future? Invite students to write a list of threats under their animal as well.

As an extension, ask the students to come up with ways of telling other people what they can do to help their animal survive and flourish in the future.

# Teacher Notes

## Australian curriculum links

Year level	Learning area: Science	Other learning areas
Year 2	<b>Science Understanding: Biological sciences</b> <ul style="list-style-type: none"><li>Living things grow, change and have offspring similar to themselves (<a href="#">ACSSU030</a>)</li></ul>	<b>English: Language</b> <ul style="list-style-type: none"><li>Understand that spoken, visual and written forms of language are different modes of communication with different features and their use varies according to the audience, purpose, context and cultural background (<a href="#">ACELA1460</a>)</li><li>Understand that nouns represent people, places, concrete objects and abstract concepts; that there are three types of nouns: common, proper and pronouns; and that noun groups/phrases can be expanded using articles and adjectives (<a href="#">ACELA1468</a>)</li></ul> <b>Media arts</b> <ul style="list-style-type: none"><li>Explore ideas, characters and settings in the community through stories in images, sounds and text (<a href="#">ACAMAM054</a>)</li></ul>
Year 3	<b>Science Understanding: Biological sciences</b> <ul style="list-style-type: none"><li>Living things can be grouped on the basis of observable features and can be distinguished from non-living things (<a href="#">ACSSU044</a>)</li></ul>	<b>English: Language</b> <ul style="list-style-type: none"><li>Understand that languages have different written and visual communication systems, different oral traditions and different ways of constructing meaning (<a href="#">ACELA1475</a>)</li><li>Identify the effect on audiences of techniques, for example shot size, vertical camera angle and layout in picture books, advertisements and film segments (<a href="#">ACELA1483</a>)</li></ul>
Year 4	<b>Science Understanding: Biological sciences</b> <ul style="list-style-type: none"><li>Living things have life cycles (<a href="#">ACSSU072</a>)</li><li>Living things depend on each other and the environment to survive (<a href="#">ACSSU073</a>)</li></ul>	<b>English: Language</b> <ul style="list-style-type: none"><li>Understand differences between the language of opinion and feeling and the language of factual reporting or recording (<a href="#">ACELA1489</a>)</li><li>Understand that the meaning of sentences can be enriched through the use of noun groups/phrases and verb groups/phrases and prepositional phrases (<a href="#">ACELA1493</a>)</li><li>Explore the effect of choices when framing an image, placement of elements in the image, and salience on composition of still and moving images in a range of types of texts (<a href="#">ACELA1496</a>)</li></ul>
Year 5	<b>Science Understanding: Biological sciences</b> <ul style="list-style-type: none"><li>Living things have structural features and adaptations that help them to survive in their environment (<a href="#">ACSSU043</a>)</li></ul>	<b>English: Language</b> <ul style="list-style-type: none"><li>Understand how texts vary in purpose, structure and topic as well as the degree of formality (<a href="#">ACELA1504</a>)</li><li>Explain sequences of images in print texts and compare these to the ways hyperlinked digital texts are organised, explaining their effect on viewers' interpretations (<a href="#">ACELA1511</a>)</li></ul> <b>Media arts</b> <ul style="list-style-type: none"><li>Explore representations, characterisations and points of view of people in their community, including themselves, using settings, ideas, story principles and genre conventions in images, sounds and text (<a href="#">ACAMAM062</a>)</li></ul>
All		<b>Cross Curriculum Priority: Sustainability</b> <ul style="list-style-type: none"><li>01.1 The biosphere is a dynamic system providing conditions that sustain life on Earth</li></ul>

## Related books from CSIRO Publishing

*Hold On! Saving the Spotted Handfish* (<https://www.publish.csiro.au/book/7903/>)

*Ocean Animals: The Weirdest, Smartest and Sneakiest Sea Creatures*  
(<https://www.publish.csiro.au/book/7881>)

*The Great Southern Reef* (<https://www.publish.csiro.au/book/8042/>)

*The Voyage of Whale and Calf* (<https://www.publish.csiro.au/book/8029/>)

*The Way of the Weedy Seadragon* (<https://www.publish.csiro.au/book/7982/>)

# Teacher Notes

## Other CSIRO resources

CSIRO has developed and delivered a broad range of high-quality STEM education programs and initiatives for nearly 40 years. Our programs aim to inspire the pursuit of further STEM education among students and the community, to equip the emerging workforce with tomorrow's skill sets, and to strengthen collaboration between industry and classrooms across Australia. For more information visit: <https://www.csiro.au/en/Education>