INCREDIBLE SHARKS

Teacher Resources - Lesson Plan

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AUSTRALIAN CURRICULUM OBJECTIVES

Australian Curriculum Objectives

Years 5 & 6 (Stage 3) - Science

- AC9S5U01
  Examine how particular structural features and behaviours of living things enable their survival in specific habitats

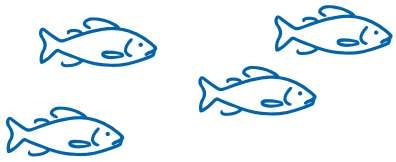
- AC9S6U01
  Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions

- AC9S5H02 / AC9S6H02
  Investigate how scientific knowledge is used by individuals and communities to identify problems, consider responses and make decisions.

In this lesson for learners aged 8+, students learn about shark features, adaptations, and behaviours. Students listen to a podcast, play a quiz, and work in groups to understand unsustainable fishing challenges.

Key terms

- Sharks
- Features
- Behaviours
- Adaptation
- Habitat
- Predator
- Survival
- Ecosystem
- Sustainable seafood



Key questions

- What is a shark?
- How long have sharks lived in the ocean?
- What kinds of bodily adaptations do sharks have to living in the ocean?
- How do shark's adaptations make them so effective and increase their survivorship?
- Why are sharks important to the marine ecosystem?
- How can we help to protect sharks from unsustainable fishing practices?

You will need

- A device and headphones for each students to listen the podcast Squiz Kids podcast episode on Sharks
- Printed copies / screen projection of the Sharks Factsheet (page 5)
- A printed copy of the unsustainable fishing cards
- Printed copies of the Incredible Sharks worksheet (page 6)
- Access to Kahoot Quiz Incredible Sharks!

Class Activities

- Students listen to a Squiz Kids podcast with shark expert Dr. Adrian Gutteridge
- Students use a Sharks Factsheet to help them answer questions
- Students play a Kahoot Quiz to learn about shark features and behaviors
- Students work in groups to research one of five unsustainable fishing challenges
- Students present their findings to the class and discuss how we can use science to prevent this problem and protect sharks in the future
- Students play a card game, or Kahoot quiz, to extend their knowledge

LESSON PLAN

Starter (5 mins)

Explain to students that they will be learning about **sharks** and how their bodies are designed to living in ocean habitats.

Begin the class by asking learners,

- What is a shark?
- What kind of **habitat** do sharks live in? *(marine / ocean / underwater)*
- What kinds of **features** might sharks have which help them to live in the ocean?
- What kinds of **behaviours** might sharks have which help them to live in the ocean?

Activity 1 (20-30 mins)

Give students a copy of the Sharks Factsheet on page 5, or display the factsheet on a screen or Smartboard. Individually or as a class, students listen to a Squiz Kids podcast episode on Sharks with Dr. Adrian Gutteridge (15 mins). As they listen to the podcast, students fill out the worksheet on page 6. The factsheet will help them to find the answers.

Review

Dr Adrian explains

"Sharks have been around longer than the dinosaurs, 200 million years in our oceans and in that time they really haven't changed that much in terms of how they appear. They haven't really evolved beyond that... they are so well evolved to live in the oceans."

Discuss as a class,

- What does Dr. Adrian mean when he says that sharks are 'well evolved' to live in the ocean?
- What are some features of sharks that we learned about in the Squiz podcast?

See answers on page 10.

Extension Activity

What other kinds of features and behaviours do sharks have, which help them to live in the ocean? **Play the Kahoot Quiz** Incredible Sharks! to learn some other ways that sharks have adapted to life underwater, including detecting the smell of blood, ultraviolet vision, and

Activity 2 (60 mins)

Next, students explore how sharks might be affected by **changing physical conditions** in their ocean habitats.

Split students into 5 groups, and assign each group one of the following topics:

- Shark finning & Overfishing
- Endangered Habitats
- Ghost fishing
- Bycatch
- Climate Change

Give each group a set of the unsustainable fishing cards to match their topic.

Each group will have 15-20 minutes to learn about their topic and make notes about how their topic might relate specifically to the changing physical conditions (ocean habitats) of **sharks**.

Advanced: A list of web resources from science and news organisations are listed on page 8.

Students will then present their learnings to the class. After the presentation of each topic, discuss as a class

- How might we use science to understand this problem?
- How might we be able to prevent this problem in the future?
- Can we protect sharks using science?

Extension Activities

1. What is sustainable fishing?
Watch the short film My Dad is a Fisherman (14:45) to learn all about overfishing and how we can fish more sustainably.

2. Watch the Fin Tastic video series to learn about different shark and ray species with Sharks4Kids

3. Learn all about Dr. Adrian's favourite shark, the Hammerhead Shark by watching the video The Insane Biology of Hammerhead Sharks (18:00)

4. Students choose one species of shark, skate or ray that they would like to learn more about. Students design a poster to present to the class, sharing information such as:

- What does this shark, skate or ray look like?
- Where in the ocean does it live?
- What does it eat? How does it catch its prey?
- What makes this species unique? Does it have any special adaptations to its

Ask Dr. Adrian a Question!

Promote ocean literacy in your classroom by encouraging students to ask their own questions about sharks, or other marine life. Send in your question using the form on the MSC's Ask an Expert web page.

We'll then get back to you with a response. The answer might be written, by video or we may even beam our expert into your classroom.

SHARK FACTS WITH DR. ADRIAN GUTTERIDGE

Dr. Adrian Gutteridge is a surfer and marine scientist who knows all about sharks! Students around Australia have been asking Dr Adrian their shark questions.

What is a shark?

A shark is a fish in the class called elasmobranchs. 'Elasmos' include all sharks, skates and rays. What they all have in common is that, compared to normal fish, they are generally slow-growing, late to mature and have fewer offspring. They all reproduce through internal fertilisation, which differs from normal fish that release their eggs and sperm into the water. Sharks have been around for around 200 million years, relatively unchanged. So they basically arrived into the fossil record and have been dominating the oceans for ages.

How many species of sharks are there?

There are around 600 species of shark in the world's oceans,with some species being as **BIG** as a school bus (like whale sharks) or *smaller* than a 30cm ruler (like a dwarf lantern shark).

What do sharks eat?

Tiger sharks probably have the broadest diet of any shark and pretty much eat anything. As well as eating things like fish and rays, they also eat turtles (they saw them in half!) and diet studies have found things in their stomachs including fruit bats, birds and number plates.

Why are sharks important to the ecosystem?

Sharks are a top marine predator, which means that almost no other animals that eat them. Without sharks, the populations of marine species lower down the food chain (such as seals) can expand, and put pressure on the species even lower in the food chain (such as fish). If some species get depleted, the whole food chain can collapse. Sharks help keep the food chain balanced, and a well stabilised ocean food chain in turn provides food for billions of humans and jobs for hundreds of millions.

What are some surprising facts about shark biology?

1. Most sharks give birth to live young. This can range from 1 or 2 pups to up to 20-30. In some species, like the grey nurse shark, they have intrauterine cannibalism. This means they start with about 5 pups in each uterus, but the biggest ones eat each other until only one is born from each uterus!
2. Hammerhead sharks use their heads like a metal detector. These sharks swim along the bottom of the ocean and sweep their heads from side to side, using the electromagnetic receptors in their heads to find fish or stingrays buried under the sand.
3. Sharks don't have scales they have 'dermal denticles'... sort of like teeth on their skin. Their denticles feel smooth from nose to tail but rough like sandpaper the other way. This makes them extremely hydrodynamic and it inspired swimsuit design for elite swimmers.

What is the weirdest kind of shark?

Cookie-cutter sharks are pretty cool. They are a small-bodied shark that lives in the open ocean. They have the biggest teeth relative to the size of their jaw of any shark. They bite onto whales and bigger fish, spin their body and take a circular chunk of flesh out. They are also bioluminescent. Rad.

How can we be more shark aware?

If you're going to go surfing, swimming or do anything in the ocean, don't stuff pilchards down your pants. Sharks eat pilchards.

How can we protect sharks?

Shark finning is one of the biggest threats facing many shark species. To protect sharks, buy seafood products from well-managed fisheries, including ones certified with the MSC blue fish tick, that do their best to reduce bycatch of sharks and rays. Don't eat shark fin soup, as these shark fins are typically from illegal and unregulated fisheries.

INCREDIBLE SHARKS WORKSHEET

Listen to the Squiz Kids podcast episode all about Sharks with Dr. Adrian Gutteridge, and use the Shark Factsheet to help you fill in the worksheet below.

1. How many years sharks been living in the ocean for?

_____

2. *Circle true or false:* Most sharks species give birth to live young

True False

3. How many shark species are there in the world today?

_____

Bonus! Can you name some examples of shark species?

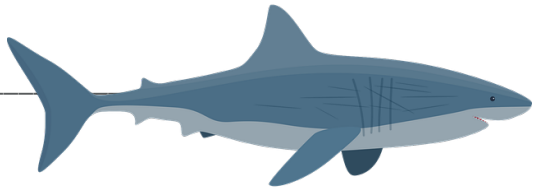
_____

4. Hammerhead sharks use the electromagnetic receptors in their heads, just like what kind of device?

_____

5. If you run your hand from the nose to tail of a shark it feels...

_____



6. What are some of the risks to sharks?

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7. What can people do to help protect sharks?

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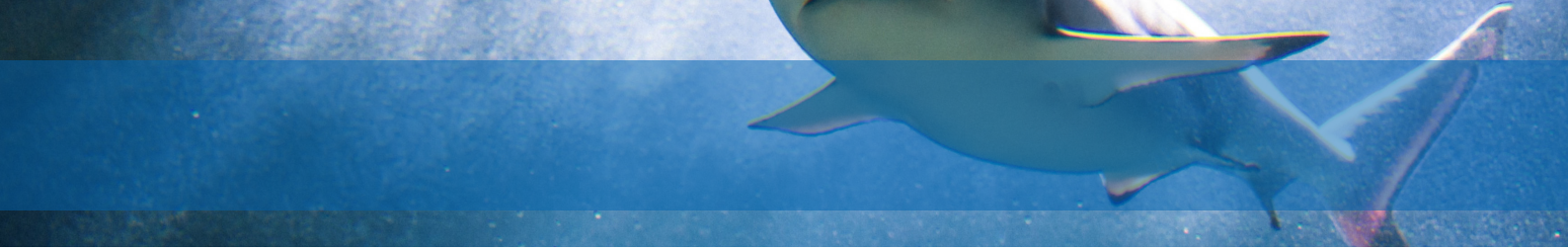


Resources for students - Threats facing sharks and their ocean habitats

All topics

- Unsustainable fishing cards
- Shark Threats - Sharks4Kids

Pollution / Ghost fishing

- 67% of sharks contaminated with plastic - Greenpeace
- Ghost fishing is a bigger threat to sharks - Gizmodo
- Impacts of ocean pollution on sharks & rays - Marine Megafauna Foundation

Shark Finning

- Sharks (see Conservation) - Monterey Bay Aquarium
- Shark finning & fin facts - Shark Stewards

Endangered Habitats

- 'Extinction crisis' of sharks and rays - The Guardian
- Habitat Loss - Save our Seas
- Bull sharks - Save our Seas

Bycatch

- Sharks (see Conservation) - Monterey Bay Aquarium
- New Gadget could reduce shark bycatch - The Guardian

Climate Change

- Shark conservation is essential to tackle climate change - Discovery
- Climate change is pushing great white sharks into new waters - The Guardian

INCREDIBLE SHARKS WORKSHEET- ANSWERS

Listen to the Squiz Kids podcast episode all about Sharks with Dr. Adrian Gutteridge, and use the Shark Factsheet to help you fill in the worksheet below.

1. How many years sharks been living in the ocean for?

Over 200 million years

2. *Circle true or false:* Most sharks species give birth to live young

True (circled) False

3. How many shark species are there in the world today?

Around 600 species

Bonus! Can you name some examples of shark species?

Examples: Great white shark, bull shark, tiger shark, hammerhead shark

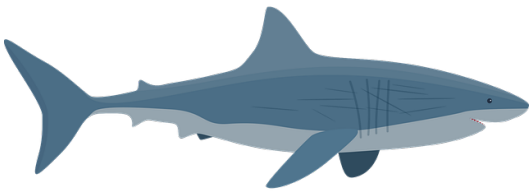
4. Hammerhead sharks use the electromagnetic receptors in their heads, just like what kind of device?

A metal detector

5. If you run your hand from the nose to tail of a shark it feels...

Smooth

6. What are some of the risks to sharks?



Unsustainable fishing, being caught accidentally as bycatch, shark finning

7. What can people do to help protect sharks?

Buy sustainable seafood products (with the blue MSC label), don't eat shark fin soup

ACTIVITY 1 - ANSWERS

What are some features of sharks that we learned about in the Squiz podcast?

Answers may include

- *Sharks give birth to live young. By putting a lot of energy into their young, sharks increase their chances of survival*
- *Sharks have skin instead of scales. Their 'dermal dentacles' help them to be streamlined and powerful swimmers*
- *Sharks have electromagnetic receptors which help them to detect pulses in the water (like heartbeats) of other fish or prey which might be hidden*

What are some behaviours of sharks that we learned about in the Squiz podcast?

Answers may include

- *Hammerhead sharks use their heads like metal detectors. They swim along the bottom of the ocean and sweep their heads from side to side, using their electromagentic reception to detect fish and rays hidden beneath the sand.*