SHARKS
IN THE MARINE ECOSYSTEM

Teacher Resources - Lesson Plan

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AUSTRALIAN CURRICULUM OBJECTIVES

Australian Curriculum Objectives

Years 3 & 4 (Stage 2) - Science

- AC9S4U01
  Explain the roles and interactions of consumers, producers and decomposers within a habitat and how food chains represent feeding relationships

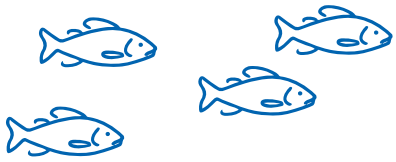
- AC9S3I01 / AC9S4H02
  Consider how people use scientific explanations to meet a need or solve a problem

- AC9S3I01 / AC9S4I01
  Pose questions to explore observed patterns and relationships and make predictions based on observations

In this lesson for learners aged 8+, learners will identify producers, consumers and decomposers in the food chain, and understand the importance of sharks in the marine ecosystem.

Key terms

- Sharks
- Energy
- Food Chain
- Producers
- Consumers
- Decomposers
- Ecosystem
- Sustainable seafood



Key questions

- What are producers, consumers and decomposers?
- What does a marine food chain look like?
- Why are sharks important to the marine ecosystem?
- What would happen to the food chain if there were no sharks?
- What are some fun and interesting facts about sharks?
- How can we help to protect sharks from unsustainable fishing practices?

You will need

- Access to the Kahoot Quiz Producer, Consumer or Decomposer (Game pin: 007679847)
- 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)
- Printed copies of the We Love Sharks worksheet (page 6)
- Printed copies of the Food Chain Links sheet (page 7) scissors and glue / staples / tape

Class Activities

- Students understand the concept of a food chain
- Students play a quiz to identifiy producers, consumers and decomposers
- Students make their own paper food chain using marine species, including sharks
- Students predict what might happen to the food chain if there were no sharks
- Students listen to a Squiz Kids podcast with shark expert Dr. Adrian Gutteridge
- Students use a Sharks Factsheet to help them answer questions

LESSON PLAN

Starter (15 mins)

Begin by asking learners if they enjoy eating seafood and what their favourite type of seafood is. Explain to learners that whenever an animal eats (or consumes) something, energy is transferred from the food source to the consumer. When we eat seafood, for example, it fills our bellies and gives us energy to function!

Next, explain to learners that we can show how energy is transferred through food chains and that they are going to be making observations about food chains today. Write a simple food chain example on the board.

For example: Grass seeds ⇢ Grasshopper ⇢ Mouse ⇢ Owl ⇢ Bacteria

Note the direction of arrows to your learners, explaining that the arrows point in the direction that the energy is transferred. Next, explain to students that there are different kinds of roles in the food chain.

*A **producer** is a living thing that make its own energy or "food" from the sun.*
*A **consumer** is a living thing that cannot make its own energy and needs to eat food to survive.*
*A **decomposer** is a living thing that gets its energy from breaking down dead animals and plants.*

On your food chain example, label the producers, consumers and decomposers and define these roles for your learners. Next, play the Kahoot Quiz: Producer, Consumer or Decomposer (Game pin: 007679847) to practice these concepts as a class.

Activity 1 (20-30 mins)

Divide learners into groups of 3-4 and give each group a set of paper chain links (page 7). Learners circle each species as a producer, consumer, or decomposer. Afterwards, provide them with the correct answers.

Students then cut and assemble the links into a paper food chain, in the correct order.
Algae ⇢ Pipi ⇢ Snapper ⇢ Shark ⇢ Bacteria
Use glue, staples, blue tack or tape to connect the paper links.

When their food chains are complete, ask students to make predictions and observations based upon the question: *"What would happen to the food chain if there were no sharks?"*
Instruct students that for every action there is a reaction and encourage them to use their paper chain links to predict how the removal of sharks would impact the food chain, according to what each species eats.

Activity 2 (20 mins)

Individually, students listen to a Squiz Kids podcast episode on Sharks with Dr. Adrian Gutteridge (15 mins). Give students a copy of the Sharks Factsheet on page 5, or display the factsheet on a screen or Smartboard.

As they listen to the podcast, students fill out the worksheet on page 6. The Sharks Factsheet will help them to find the right answers.

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

3. 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 environment?
- Is this species endangered? What can be done to protect it?

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. They are like the lions of the sea, which means tht they help to keep the populations below them in the food chain in check. 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?

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!
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?

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. Shark finning is one of the biggest threats facing many shark species.

WE LOVE 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. What kind of fish was Adrian supposed to be studying when he got distracted by a shark?

_____

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?

_____

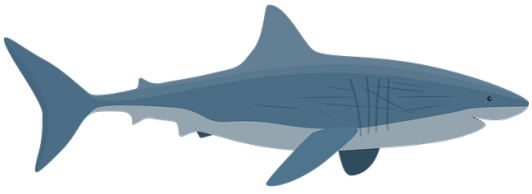
4. What is the name of a kind of fish at the fish and chip shop that is actually shark?

_____

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?



_____

7. What can people do to help protect sharks?

_____

FOOD CHAIN EXERCISE

Print enough copies of this page to give one to each group of learners. To save time, you could pre-cut them prior to class. Students circle each species as either a producer, con-

ALGAE

Producer | Consumer | Decomposer

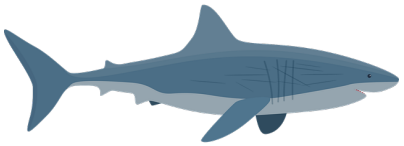
PIPI

Producer | Consumer | Decomposer

SNAPPER

Producer | Consumer | Decomposer

SHARK



Producer | Consumer | Decomposer

BACTERIA

Producer | Consumer | Decomposer

WE LOVE 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. What kind of fish was Adrian supposed to be studying when he got distracted by a shark?

A parrot fish

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?

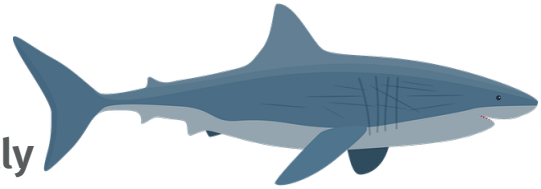
Around 600 species

4. What is the name of a kind of fish at the fish and chip shop that is actually shark?

Flake

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