

# Teeth & Tails: Shark Adaptations and Survival

Investigating how structural features help sharks survive in different marine environments

Stage 3 Science (Years 5-6)

# Learning Intentions

Students will:

- analyse how shark structural features support survival
- compare adaptations across different shark species
- explain relationships between diet, habitat, and physical features
- use evidence to justify scientific conclusions



# Shark Bites: Lesson Plan

## Introduction

SEA LIFE Aquariums across Australia and New Zealand have created this Shark Bites lesson plan with one goal in mind

— **making life easier for teachers!**

This is a great way to introduce the creatures of the sea to your classes. We hope you find the information here useful, and your students enjoy learning about sharks.

Once you've introduced the creatures to your class, why not meet them in real life with a school excursion? You can continue the learning outside of the classroom. After all, the more they see, the more they'll learn!

**To book your school excursion visit your local SEA LIFE Aquarium's website!**



# Shark Bites 1: The Shark Detectives Lesson Plan

## LESSON 1 - Focus Questions

- How do a shark's teeth and body features support its survival?
- How do shark features change depending on diet and environment?
- What evidence can we use to explain the relationship between structure and function?

## Teacher Introduction (10-15 mins):

Using your shark anatomy poster or visual resource, introduce the key features of sharks. Support students to move beyond identifying features by discussing:

- the function of each feature
- how each feature contributes to survival
- how features may differ between shark species

Encourage students to begin linking:

- diet
- habitat
- physical adaptations

Optional:

Use a short quiz or class discussion to assess students' prior understanding of shark adaptations.



# The Shark Detectives -Teachers' notes

- Sharks are apex predators that play an important role in maintaining balance in marine ecosystems
- Sharks have evolved over 400 million years, developing specialised adaptations for survival in different environments
- Sharks have highly developed senses and physical adaptations that support hunting, including electroreception to detect prey
- Successful hunting relies not only on finding prey, but on having the right structural features to catch and eat it
- Different shark species have different feeding strategies depending on their environment and available food sources
- Teeth are a key adaptation — their shape and structure influence what a shark can eat and how it feeds
- Humans also rely on specialised tools and teeth to eat different types of food
- Diet is linked to structure — what an organism eats affects the physical features it needs to survive



# The Shark Detectives -Teachers' notes

Use the whiteboard to capture different foods that humans eat and categorise them by diet type.

Introduce key vocabulary:

- carnivore (meat eater)
- herbivore (plant eater)
- omnivore (eats both plants and animals)

Guide students to identify that humans are omnivores and can eat a wide range of foods. Prompt students to consider:

- how different foods require different methods of eating
- how teeth or tools are used for different types of food

Discuss the difference between specialised diets and generalised diets.

Explore animals with specialised diets (e.g. animals that eat only certain prey), and animals with generalised diets (e.g. humans). Discuss the advantages and disadvantages of each.

Answers:

- specialised diets: highly efficient for specific food sources, limited if food availability changes
- generalised diets: flexible and adaptable, less efficient for specific food types

Link this back to sharks by discussing how their teeth are adapted for particular diets and feeding strategies.

**Hand out Tooth Toolkit worksheet and begin teeth investigation activity**

# The Shark Detectives -Teachers' notes

## ACTIVITY 1

### Tools for the Job (20-30 mins)

Set up tables with pictures or examples of different foods (e.g. nuts, steak, apple, crisps, toffees, chicken drumstick). This has been provided in a worksheet for students as well, if your class does not permit these utensils.

Provide groups of students with a "toolkit" (knife, fork, nutcracker, tea strainer).

**Activity:** Students test or match tools with different foods and record their thinking. Students create a word bank including:

- tool type
- food type
- function of the tool
- description of how the tool works

Students must explain:

- why each tool is suited to a specific food
- how the structure of the tool affects how it is used
- what might happen if the wrong tool is used

### Group Session 10-15 mins /Review: What have we learnt?

Discuss:

- How does the structure of teeth determine what a shark can eat?
- Why do different sharks have different types of teeth?
- What evidence can we use to explain these differences?

### Expand: Meet the sharks - Introduce four sharks (with the kitchen tools):

Students analyse how each shark's teeth relate to feeding strategy and environment.

1. Grey Nurse Shark – "Fork Teeth" - Smooth, pointed teeth used to grasp and hold slippery prey such as fish. Feeding strategy relies on catching and swallowing prey whole.
2. Port Jackson Shark – "Crushing Teeth" - Flat, plate-like teeth adapted for crushing hard-shelled prey such as molluscs. Suited to feeding on organisms found along the ocean floor.
3. Whale Shark – "Filter Feeder" - Does not rely on teeth for feeding; instead, it filters plankton from water. Adapted to environments with abundant microscopic food sources.
4. Great White Shark – "Cutting Teeth" - Serrated teeth used for slicing and tearing prey into pieces. Supports hunting of large prey in open ocean environments.

Students should identify:

- how tooth shape relates to diet
- how feeding method links to habitat
- similarities and differences between species

### End Lesson 5-10 mins (optional)

Students summarise learning in their books:

- What do sharks and humans have in common?
- How are their diets and feeding structures different?



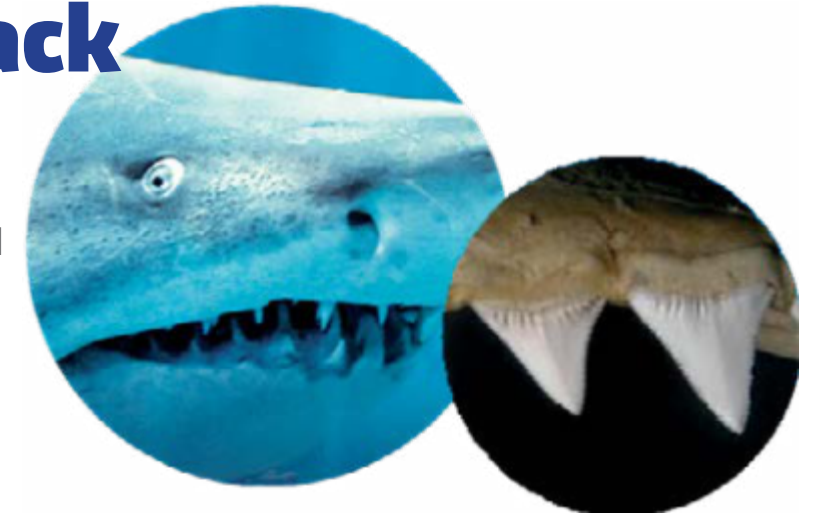
# Shark Bites 1: The Shark Detectives - Activity Pack

## Investigation 1 - Eat your words!

Using your own resource or the shark anatomy poster, introduce how living things eat by exploring the relationship between structure and function.

Explain that the way an organism eats depends on:

- the structure of its teeth or tools
- the type of food it consumes
- the environment it lives in



**Verb Bank (words that describe how we eat)** - Students generate verbs that describe different ways of eating. Encourage students to think about how different actions are suited to different food types. Eg. Chew, tear

**Adjectives Bank (words that describe food)** - Students describe different food types and consider how their properties influence how they are eaten. Eg. Crunchy, tough

# The Shark Detectives - Activity Pack

Pick three different foods from the table. Using your word banks, write a detailed explanation describing how each food is eaten. For each food, explain:

- what the food feels like (e.g. texture and properties)
- which action is needed to eat it (e.g. chew, tear, crush)
- which part of the mouth or tool would be used
- how the structure of the teeth or tool supports eating that food

Try to use a range of descriptive and scientific vocabulary.

Explain your reasoning clearly, linking the type of food to how it is eaten.

**Food 1:**

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**Food 2:**

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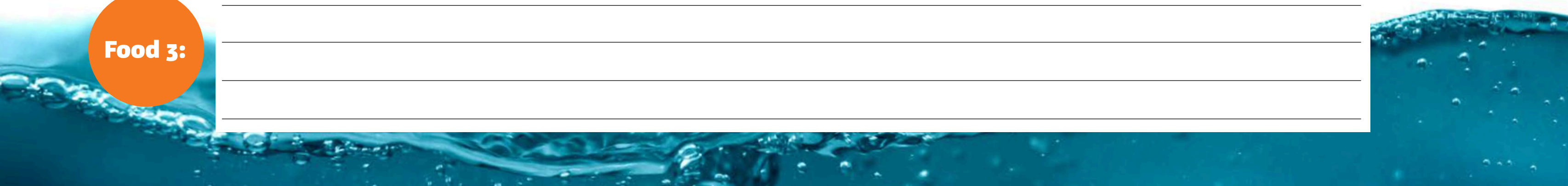
**Food 3:**

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# The Shark Detectives - Activity Pack

## Investigation 2 - Analysing Teeth Structure

When humans eat, different teeth perform different functions. Teeth are specialised for different types of food and eating actions.

Examples include: biting, cutting, tearing, crushing

In this investigation, students identify different types of teeth and analyse how their structure relates to their function.

### Bonus Questions

Which animal is the canine tooth named after, and what does this suggest about its function?

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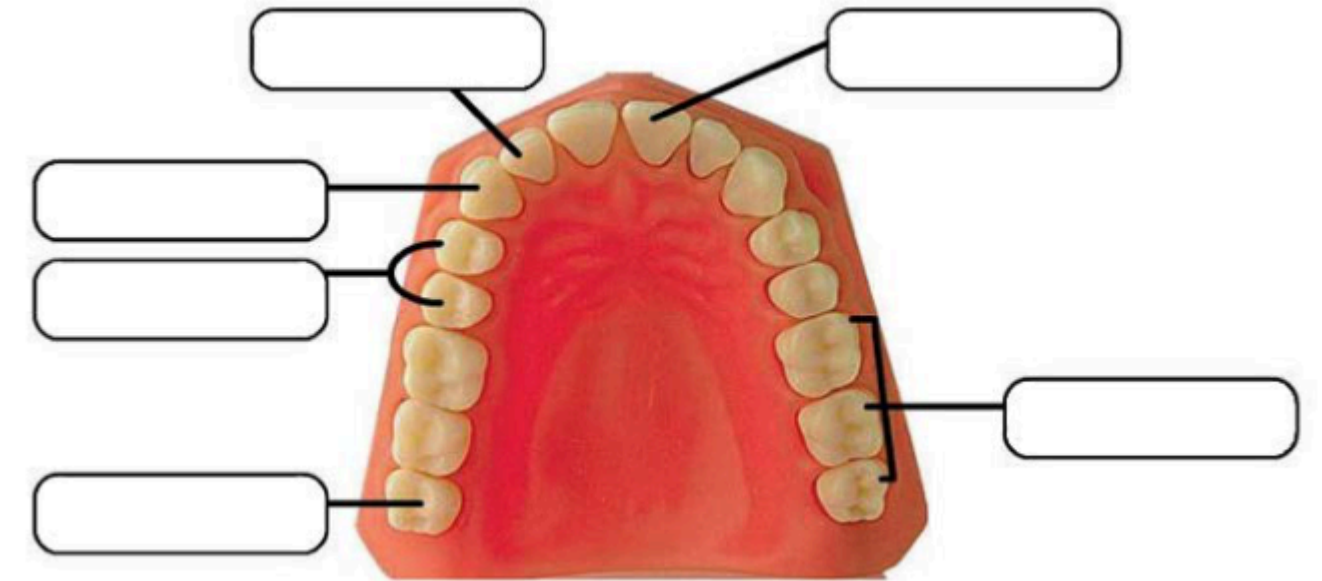
How do human teeth change from childhood to adulthood, and why might this be important?

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How are human teeth adapted to support an omnivorous diet?

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Correctly label the teeth & explain their functions



**Clues –  
The identity  
parade:**

**Incisor –  
“Cutting tool”**  
Flat-edged teeth at the front of the mouth used for slicing and cutting food

**Canine – “Gripping Tooth”**  
Pointed teeth used for holding and tearing food

**Premolar – “Crushing and Grinding Tooth”**  
Teeth used to break down food into smaller pieces

**Molar - “Grinding Tool”**  
Broad, flat teeth used for crushing and grinding food

# The Shark Detectives - Activity Pack

## Investigation 3 - Analysing Feeding Tools & Habitats

Students should explain how the habitat influences:

- the type of food available
- the feeding strategies required

On your table, there are four kitchen tools. Below are different types of food that a shark might find in the ocean. For each food:

- draw the tool that would be most effective to help eat or capture the food
- explain your choice by describing how the shape and structure of the tool makes it suitable
- In the final column, write where in the sea you might expect to find this food (e.g. open sea, seabed, near the coast, surface).

### Tool drawing

### Describe suitability

### Where the food is found

<b>Anchovy</b> (little, slippery fish)			
<b>Tuna</b> (big fish)			
<b>Plankton</b>			
<b>Crab</b>			
<b>Mussel</b>			
<b>Seal</b>			

# Shark Bites

## - The Shark's Toothpaste - Teachers' Notes

### LESSON 2

#### Focus Questions

- How are shark teeth adapted to their diet and feeding behaviour?
- Why do sharks not need to clean their teeth in the same way humans do?
- How do differences in tooth structure affect survival across species?

#### Introduction 15-20 mins

Use the presentation to introduce the concept of tooth structure and maintenance in sharks.

Link to prior learning by revisiting how tooth shape supports feeding.

Extend student thinking by introducing:

- how shark teeth are replaced regularly
- how different feeding strategies affect wear and tear on teeth
- how adaptations reduce the need for cleaning compared to humans

Encourage students to compare:

- shark teeth and human teeth
- feeding methods and diet
- how structure relates to function and survival



# Shark Bites 2. - The Shark's Toothpaste - Teachers' Notes

- Sharks are apex predators that play an important role in maintaining balance in marine ecosystems
- Sharks have evolved over more than 400 million years, developing specialised adaptations for survival in different environments
- Sharks have highly developed senses and physical adaptations that support hunting, capturing, and consuming prey
- Successful feeding depends on both the ability to detect prey and having the appropriate structures to catch and eat it
- Different shark species have different types of teeth depending on their diet and feeding strategy
- Shark skeletons are made of cartilage rather than bone, making them lighter and more flexible for movement in water
- Because shark teeth are not deeply rooted in bone like human teeth, they are more easily replaced
- Sharks continually produce new teeth throughout their lifetime, allowing them to maintain effective feeding structures
- This constant replacement means sharks may use thousands of teeth over their lifetime
- These adaptations reduce the need for maintenance, meaning sharks do not require cleaning in the same way humans do



# Shark Bites 2. - The Shark's Toothpaste - Teachers' Notes

## Activity 1 - Shark Tooth Challenge 15-20 mins

**Challenge:** Read aloud the scenario from an aquarist who needs to estimate how long it will take to collect enough shark teeth.

Students must use the information provided to calculate and justify their answer.

I have five sharks in my tank. They eat fish from a pole, and sometimes they lose teeth, which fall to the bottom of the tank.

The aquarium has asked if we can collect up to 285 shark teeth from the tank.

I need to work out how long it will take to collect this many teeth.

Here is what I know:

- These sharks go through around 20,000 teeth in their lifetime
- Each shark has 60 teeth in the front set (30 on the top jaw and 30 on the bottom jaw)
- There are seven rows of teeth behind the front set
- Each shark lives for an average of 11 years

**Students must determine:**

How long it will take for five sharks to lose a total of 285 teeth.

**Students should:**

- break the problem into steps
- make reasonable assumptions where needed
- show working clearly
- justify how they reached their answer

Hand out Shark's  
Toothpaste  
Toolkit  
worksheet and  
begin activity

## Group Session 5 mins

**Review:** Discuss student strategies for solving the problem.

Prompt students to explain: how they approached the calculation, what assumptions they made, how they checked their answers

## Introduction to Activity 2

Introduce tooth structure using the following resource (or similar).

Link to prior learning by revisiting how tooth structure supports function.

Students should consider: why different teeth have different roles, how structure supports function.

Follow up by asking students to examine their own teeth.

Discuss why humans need to clean their teeth, and how this differs from sharks

## Activity 2 Tooth Structure Investigation – 10-15 mins

Colour in and label the diagrams of tooth structures – 1 for human, 1 for shark.

Based on the paragraph, complete the tooth decay flowchart.

## End Lesson 5-10 mins (optional)

Students reflect on learning by responding to how shark teeth differ from human teeth.

Encourage students to use evidence, scientific vocabulary and examples from the investigation

# Shark Bites - Shark Tooth Challenge - Teachers' Notes & Answers

## Shark Tooth Maths Challenge Calculations

**Challenge:** How long will it take for 5 sharks to lose 285 teeth?

- Sharks can go through approximately 20,000 teeth in their lifetime
- Each shark has 60 teeth in the front row (30 top, 30 bottom)
- There are 8 rows of teeth in total (1 front row + 7 behind)
- Sharks live for an average of 11 years

How many teeth does one shark have at one time?

**60 (set of teeth) x 8 rows = 480 teeth**

How many teeth does a shark use in its lifetime?

**≈ 20,000 teeth**

How many teeth does one shark lose per year?

**20,000 ÷ 11 ≈ 1,818 teeth per year**

How many teeth do 5 sharks lose per year?

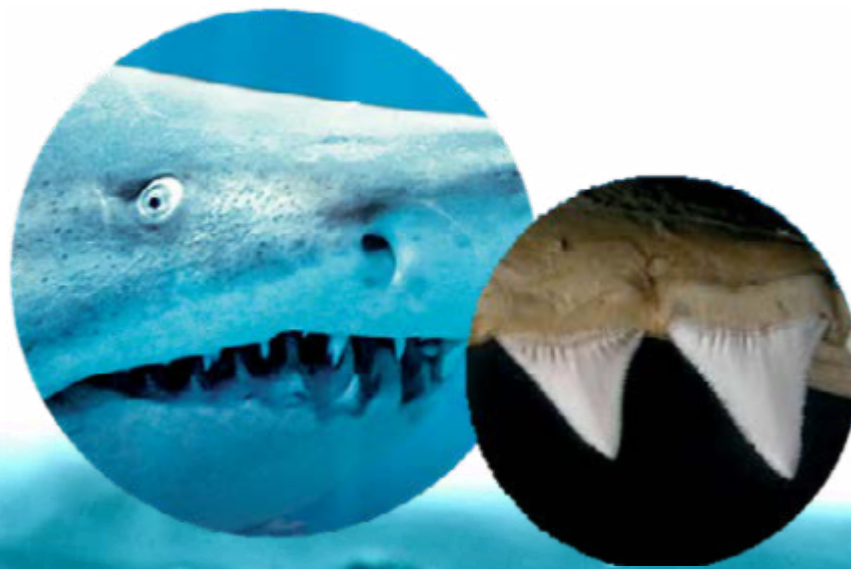
**1,818 × 5 = 9,090 teeth per year**

How many teeth do they lose per month?

**9,090 ÷ 12 ≈ 758 teeth per month**

How long does it take to collect 285 teeth?

**285 ÷ 758 ≈ 0.38 months (11-12 days, accept 2 weeks for decimal rounding and variation).**

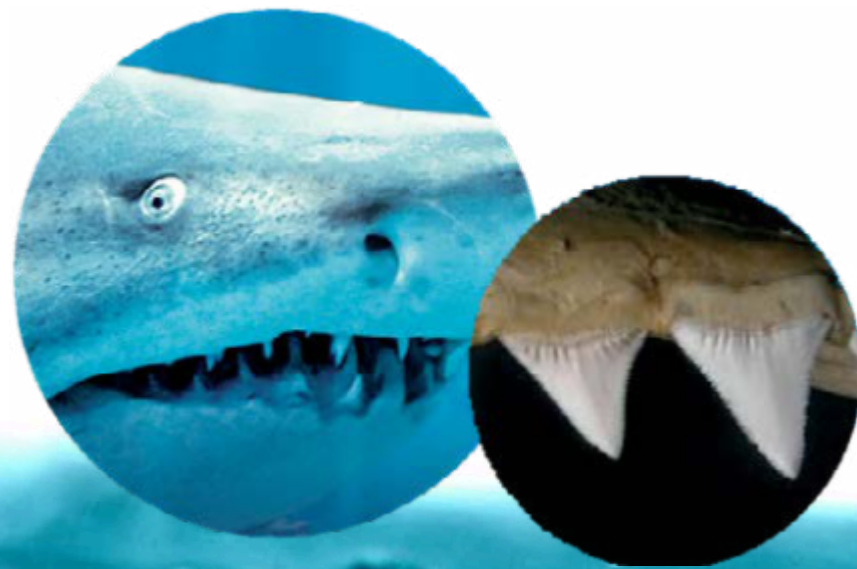


# Shark Bites 2. - Shark Tooth Challenge - Student Worksheet Example

## Shark Tooth Maths Challenge Calculations

**Challenge:** How long will it take for 5 sharks to lose 285 teeth?

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How many teeth does one shark have at one time?

How many teeth does a shark use in its lifetime?

How many teeth does one shark lose per year?

How many teeth do 5 sharks lose per year?

How many teeth do they lose per month?

How long does it take to collect 285 teeth?

# The Shark's Toothpaste - Teachers' Notes

## TOOTH STRUCTURE INVESTIGATION

Read the following paragraph and highlight the names of the different parts of the tooth.

Students should also identify the function of each part and explain how it contributes to the health of the tooth.

The tooth is made up of four main layers. The soft pulp in the centre contains nerves and blood vessels and is surrounded by a harder layer called dentine. The outer surface of the tooth is protected by enamel, which is the strongest substance in the human body. The tooth sits in a socket in the jaw and is supported by the gums.

Tooth decay occurs when bacteria (plaque) build up on the surface of the tooth. These bacteria feed on sugars from food and produce acid as a waste product. This acid gradually breaks down the enamel, the protective outer layer of the tooth, forming a cavity.

As the enamel wears away, the softer inner layers of the tooth become exposed and are more easily damaged. If decay continues, it can reach the dentine and eventually the pulp, where nerves are located.

When plaque is not removed, it can harden into tartar. Tartar traps bacteria against the gums, which can lead to irritation, infection, and gum disease. Unhealthy gums are less able to support teeth, increasing the risk of tooth loss.

Tooth decay can be prevented by removing plaque and reducing sugar in the diet. Brushing teeth with fluoride toothpaste helps strengthen enamel and protects against acid damage.

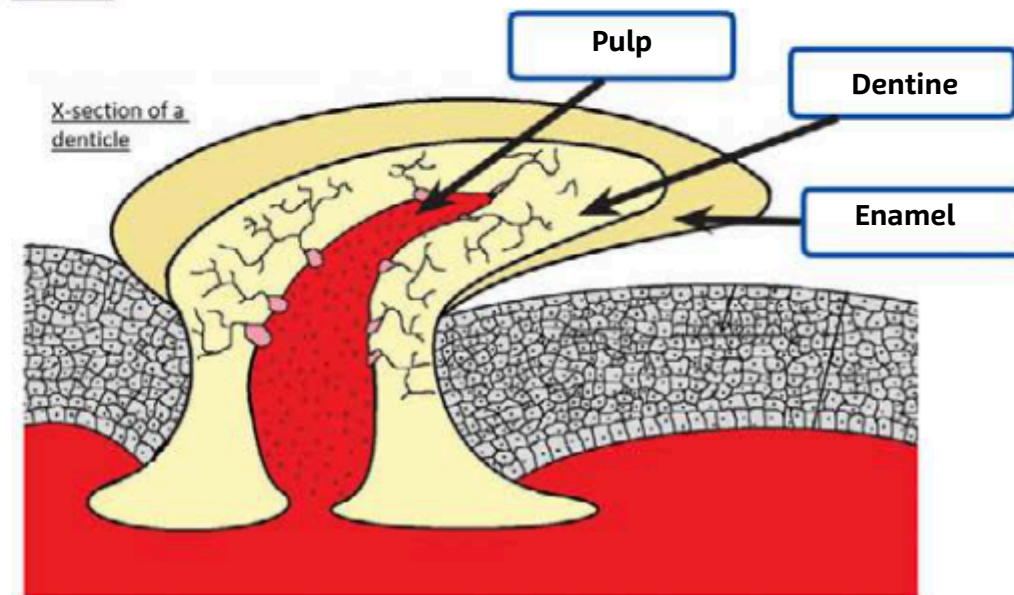
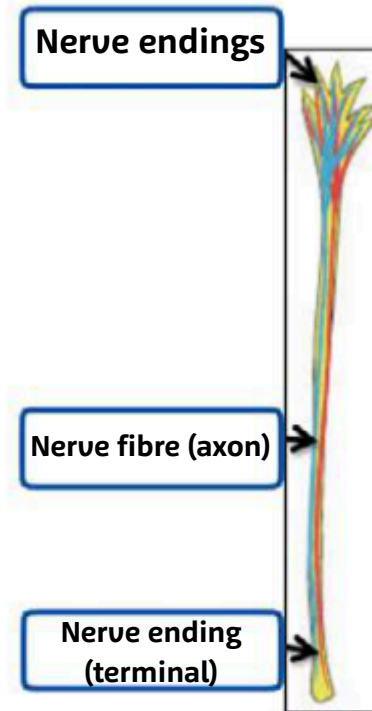
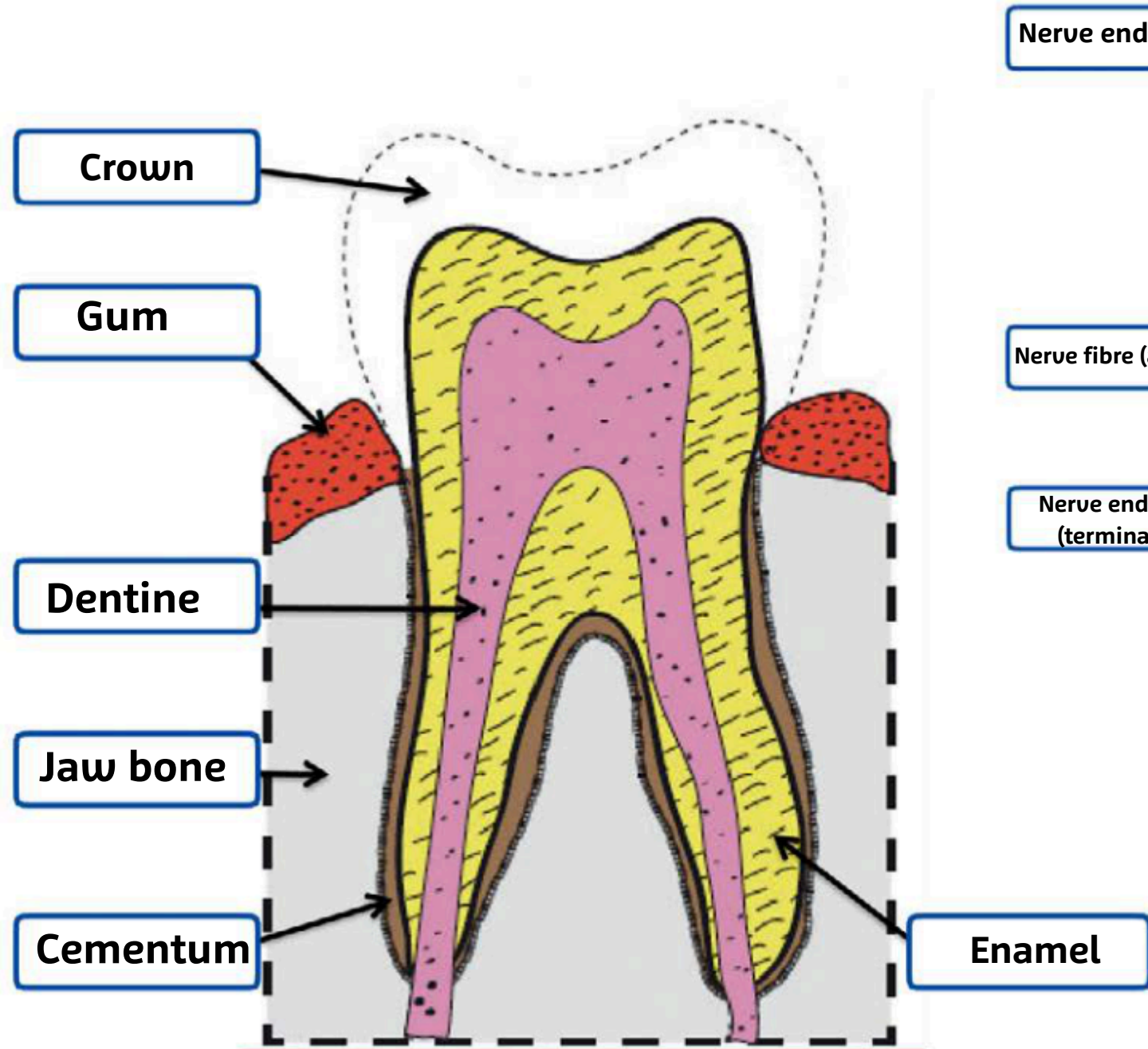
Unlike humans, sharks do not need to clean their teeth in this way because they continually replace them. This means damaged or worn teeth are regularly replaced with new ones.



# Tooth Structure Investigation - Teachers' Answers

**The map of the tooth:** Fill in the boxes to label the different parts of the teeth – human and shark. Explain how each part supports the function and health of the tooth.

Students should: correctly label each part of the tooth, describe the function of each part, explain how each structure helps the tooth survive damage or decay



**Amazing Fact**  
Shark enamel contains fluoride, which helps strengthen teeth. Unlike humans, sharks continually replace their teeth, meaning damaged teeth are quickly replaced

# Tooth Structure Investigation - Teachers' Answers

**The map of the tooth:** Fill in the boxes to label the different parts of the teeth – human and shark. Explain how each part supports the function and health of the tooth.

Students should: correctly label each part of the tooth, describe the function of each part, explain how each structure helps the tooth survive damage or decay

Structure - Human Tooth	Colour in diagram	Function (Stage 3 level)
<b>Crown</b>	Dotted outline (top)	The visible part of the tooth used for biting and chewing
<b>Enamel</b>	Outer yellow layer	Hard outer surface that protects the tooth from damage and acid
<b>Dentine</b>	Yellow layer under enamel	Supports the tooth and helps it handle pressure
<b>Pulp</b>	Pink centre	Contains nerves and blood vessels that keep the tooth alive
<b>Gum</b>	Red area around tooth	Protects the root and helps hold the tooth in place
<b>Cementum</b>	Brown layer on root	Anchors the tooth to the jaw and keeps it stable

Structure - Shark Tooth	Colour in diagram	Function (Stage 3 level)
<b>Enamel (outer layer)</b>	Smooth pale yellow outer edge	Hard outer coating that protects the tooth from damage during feeding
<b>Dentine</b>	Pale yellow inner layer (cracked pattern)	Gives the tooth strength and supports it when biting prey
<b>Pulp</b>	Red centre	Helps the tooth grow and develop

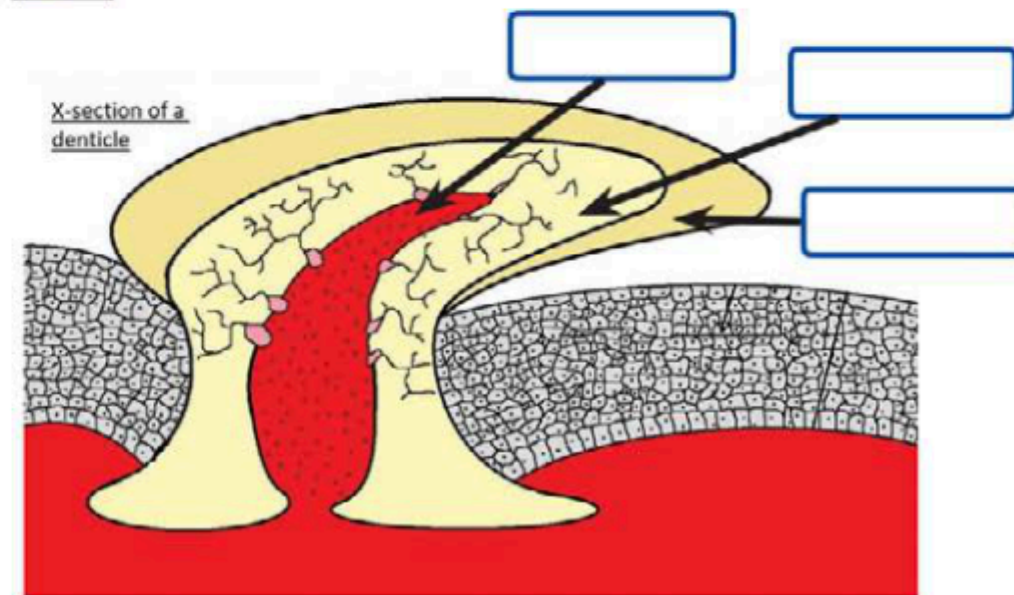
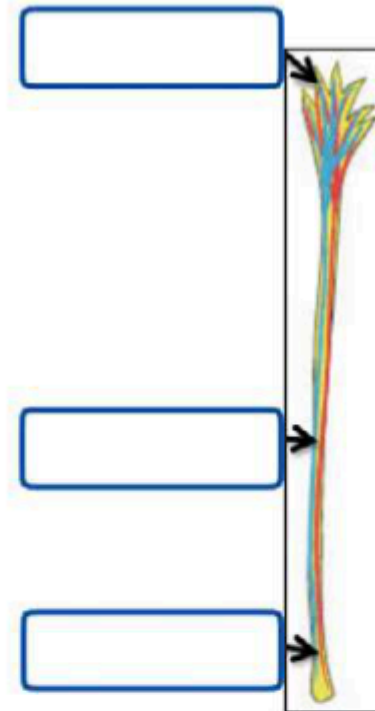
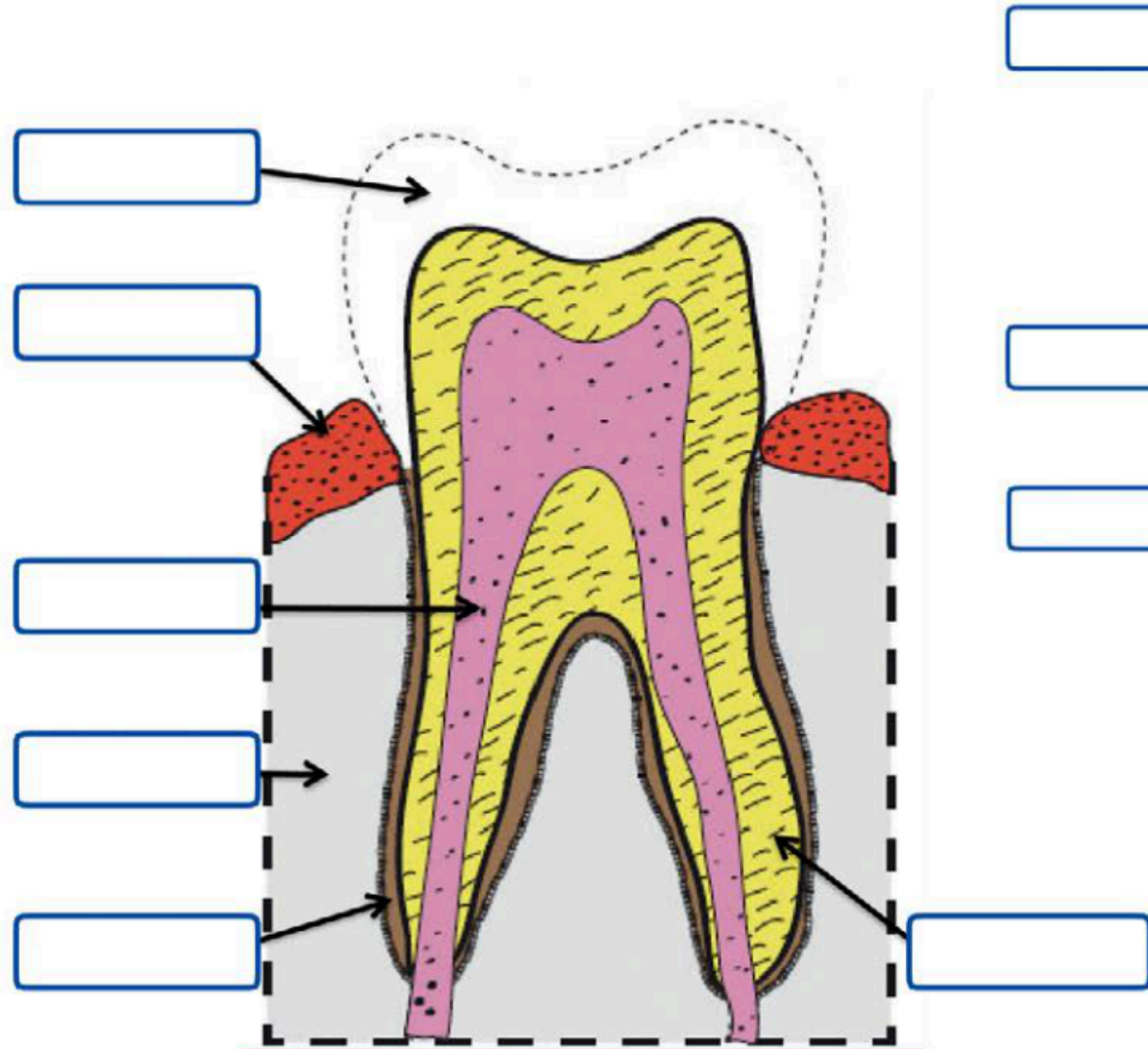
**Amazing Fact**  
 Shark enamel contains fluoride, which helps strengthen teeth.  
 Unlike humans, sharks continually replace their teeth, meaning damaged teeth are quickly replaced

Structure	Visual cue in diagram	Function (Stage 3 level)
<b>Nerve endings (branches)</b>	Coloured branching lines at the top	Detect changes such as pressure, temperature, and damage
<b>Nerve fibre</b>	Long, thin central strand	Carries signals between the tooth and the brain
<b>Nerve ending (terminal)</b>	Rounded tip at the bottom	Sends signals when the tooth is affected or damaged

# Tooth Structure Investigation - Student Sheet

**The map of the tooth:** Fill in the boxes to label the different parts of the teeth – human and shark. Explain how each part supports the function and health of the tooth.

Students should: correctly label each part of the tooth, describe the function of each part, explain how each structure helps the tooth survive damage or decay



**Amazing Fact**  
Shark enamel contains fluoride, which helps strengthen teeth.  
Unlike humans, sharks continually replace their teeth, meaning damaged teeth are quickly replaced



# The Shark's Toothpaste - Activity Pack

Students should explain how each action increases tooth decay.

## Cavity Wars – The Battle for Healthy Teeth

Plaque bacteria constantly form on the surface of your teeth. These bacteria feed on sugars from food and produce acid as a waste product. This acid can damage tooth enamel, leading to tooth decay over time.

Your teeth need to protect themselves from this process so they can stay strong and healthy. If plaque bacteria could “give instructions”, what actions would increase tooth decay? Write five instructions the plaque “commander” might give to damage teeth.

1.

2.

3.

4.

5.

## Bonus Questions

Why do sharks not need toothpaste? \_\_\_\_\_

Which chemical in toothpaste helps strengthen enamel? \_\_\_\_\_

Name a food that contains calcium. \_\_\_\_\_

Where in the sea might acid damage calcium-based structures?  
(Clue: Nemo's home) \_\_\_\_\_



# Shark Bites 3: The Shark Feed - Teachers' Notes

## LESSON 3 – Focus Questions

- How are organisms in a marine ecosystem connected?
- How does energy move through a food web in the ocean?
- How do changes in one part of a food web affect other organisms?

## Introduction 10-30 mins

Teacher Introduction:

Create an interactive Kahoot quiz using the facts provided on the next page.

Use this activity to assess student understanding of:

- marine food chains and food webs
- predator-prey relationships
- how different organisms depend on each other for survival

Encourage students to explain their answers, rather than just select them.

As students respond, prompt them to:

- describe how energy flows through the food web
- identify producers, consumers and apex predators
- explain how changes to one species may affect the entire ecosystem



**Teacher Notes**  
This lesson includes opportunities for extension through deeper analysis of food webs and ecosystem changes. Activities can be extended across multiple lessons

# The Shark Feed - Teacher's Notes

- Sharks are apex predators that play an important role in maintaining balance in marine ecosystems
- All organisms, including sharks, need energy from food to survive, grow and reproduce
- Producers (such as plankton) use energy from the sun to make food and form the base of the food web.
- What do sharks eat, and how does this vary between different species?
- How does a shark's diet relate to its teeth and role in the food web? Different sharks are adapted to eat different types of prey

Use the whiteboard to identify animals found in the sea.

Support students to describe what each organism eats and its role in a food chain. Guide students to construct a simple marine food chain using:

- plankton
- shrimp
- mackerel
- mako shark

Introduce key terms:

- producer
- consumer
- predator
- prey
- apex predator

Encourage students to explain:

- how energy moves through the food chain
- how each organism depends on others for survival

## Extension:

For deeper investigation, examine a fish such as a mackerel. Explore how its features (e.g. gills, fins, body shape) support survival in its environment.

Discuss:

- how its structure relates to movement and feeding
- what it eats and where it fits in the food web

Where appropriate, relate observations to human biology and classify the organism within its group.

Encourage students to explain how removing one organism from the food chain could affect the ecosystem.

Hand out Lesson 3: Shark Feed pack and introduce lesson activity

# The Shark Feed 3 - Teachers' Notes

## Activities

### Link the Link & Catch of the Day 20-40 mins

Link the Link: Students complete the food chain activity in their activity pack. Students should: identify producers, consumers and predators, describe how energy moves through the food chain, explain relationships between organisms

### Catch of the Day:

Set up: Provide the following equipment: washing bowl (rectangular), plastic beads (~50), stirrer, stopwatch, fishing nets, plastic tweezers

### Activity:

Students participate in a simulation of feeding in a marine environment.

Encourage students to design a fair test by controlling variables such as:

- method of "feeding" (tool used), position of the net, depth of the water, time allowed

Students should:

- conduct multiple trials, record results accurately, calculate averages where appropriate, present data using graphs or tables

Students must explain:

- how their test was fair, what their results show, how this model represents feeding in a real ecosystem
- **Show the slides on the smartboard / projector or print out for students to work on in groups!**

## Group Session - 10-15 mins

Review: What have we learnt?

### Key points:

- Energy flows through a food chain from producers to consumers and apex predators
- Marine food chains are part of larger food webs with interconnected relationships
- Changes to one organism can affect the entire food web
- Fair testing ensures results are reliable and valid
- Data can be analysed and presented using graphs and tables

### Extension:

Use results from the investigation to discuss the impact of environmental changes on food webs. For example, introduce the concept of microplastics:

- small plastic particles can enter the ocean
- these are eaten by small organisms
- they move up the food chain as organisms are eaten

Discuss:

- how this can affect animals at different levels of the food web
- why organisms at the top may be more affected
- how human actions can impact marine ecosystems

Encourage students to explain cause-and-effect relationships.

## End Lesson 5-10 mins

How are sharks connected to other organisms in the marine ecosystem?

What would happen if sharks were removed from the food web?

Students should explain their ideas using examples from the lesson.

# Shark Bites 3. The Shark Feed - Teachers' Answers

## Activity 1: Link the Link Food chains

A food chain shows how energy moves from the sun through plants and animals in an ecosystem. Organisms in a food chain have different roles based on how they obtain energy.

Fill in the missing words below and be prepared to explain your answers.

Energy in the sea comes from the sun. Plants that turn the sun's energy into food are called producers. Animals that get their energy by eating plants or other animals are called consumers. primary consumers eat plants, while secondary consumers eat other animals. Animals that hunt and eat other animals are called predators, with the one at the top of the food chain called the apex predator. Sharks are usually, but not always, apex predators.

Predator

Producer

Consumer

Secondary

Primary

Apex

The Sun

We can also represent a food chain using pictures. Use the terms from above to label each organism. Then explain how energy moves through this food chain.



Sun

The sun



Plankton

Producer



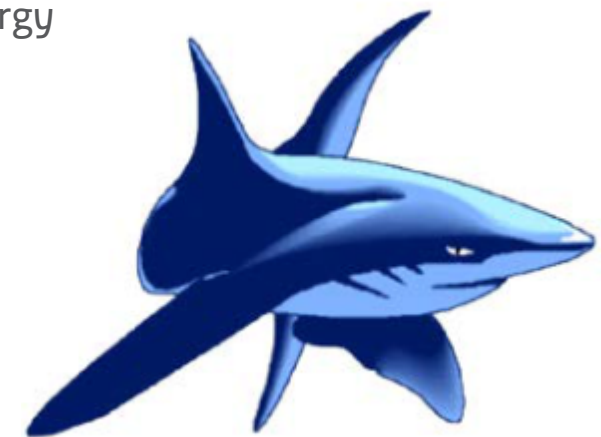
Shrimp

Primary consumer



Mackerel

Secondary consumer



Mako

Apex predator

# Shark Bites 3. The Shark Feed - Activity Sheet

## Activity 1: Link the Link Food chains

A food chain shows how energy moves from the sun through plants and animals in an ecosystem. Organisms in a food chain have different roles based on how they obtain energy.

Fill in the missing words below and be prepared to explain your answers.

Energy in the sea comes from \_\_\_\_\_. Plants that turn the sun's energy into food are called \_\_\_\_\_. Animals that get their energy by eating plants or other animals are called \_\_\_\_\_. \_\_\_\_\_ consumers eat plants, while \_\_\_\_\_ consumers eat other animals. Animals that hunt and eat other animals are called \_\_\_\_\_, with the one at the top of the food chain called the \_\_\_\_\_ predator. Sharks are usually, but not always, apex predators.

Predator

Producer

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Secondary

Primary

Apex

The Sun

We can also represent a food chain using pictures. Use the terms from above to label each organism. Then explain how energy moves through this food chain.



Sun



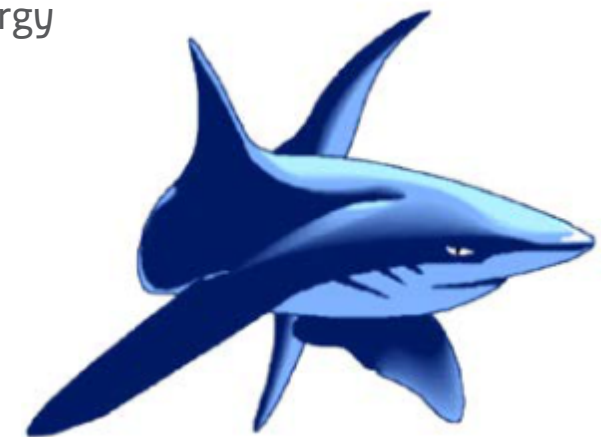
Plankton



Shrimp



Mackerel



Mako

# The Shark Feed - Activity Pack

## Activity 2 Catch of the Day

On your table you have the equipment for the “Catch of the Day” experiment.

Check and tick that you have everything:

- Washing up bowl
- Plastic beads
- Stirrer
- Stopwatch
- Fishing net
- Tweezers

## The Question is...

Which feeding method is more effective for collecting small pieces of food – straining or picking?

## Your Challenge:

Design a fair test to measure how much food (plastic beads) a straining feeder (the net) can collect. Then design a fair test to compare how much food a picking feeder (the tweezers) can collect.

Students must:

- identify the independent variable (tool used)
- identify the dependent variable (amount of food collected)
- keep controlled variables the same (e.g. time, water depth, starting position)

Students should:

- conduct multiple trials
- record results clearly
- calculate an average
- present results in a table or graph

Students must explain:

- how their test is fair
- which method is more effective
- how this represents real feeding strategies in marine animals



# The Shark Feed - Activity Pack

## How do we perform a fair test?

### What do we need to do to make it fair?

Think about what could affect how much “food” is collected. Identify:

- what you will change (independent variable)
- what you will measure (dependent variable)
- what you will keep the same (controlled variables)

For example: where the beads are in the water, how many beads you start with, how long each feed lasts

**Write a clear method that someone else could follow.**

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Do 3 “feeds” for each feeding style and record the amount collected each time. Calculate the average (mean) amount of “energy” collected.

	Feed 1	Feed 2	Feed 3	Average (mean)
Straining				
Picking				

Do 3 “feeds” for each feeding style – work out average “energy” per feed.

Based on your results, which feeding method is more effective for collecting small pieces of food?  
Explain your answer using your data.



# The Shark Feed - Activity Pack

When a primary consumer feeds, it obtains energy that producers have converted from the Sun's energy. This energy is used for life processes such as movement, growth and reproduction, and some energy is stored.

**What do you use energy for? Think of three examples.**

**1.**

---

**2.**

---

**3.**

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**How do living things store energy?**

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Stored energy is passed to secondary consumers when they eat primary consumers. This is how energy moves through a food chain and into a food web. Not all energy is transferred — some is used by each organism. Larger animals require more energy to survive and grow, so they need to consume more food.

In this activity:

- the straining feeder represents the primary consumer
- the picking feeder represents the secondary consumer

Use the results from your experiment to complete the table.

We will assume that:

- each primary consumer eaten by a secondary consumer equals 50 units of stored energy
- each secondary consumer eaten by a predator equals 500 units of stored energy



# The Shark Feed - Teachers' Answers

Use your results to fill in the table below:

We will assume that energy increases at each level of the food chain:

- Primary consumer = 1 bead of energy
- Secondary consumer = 50 beads of energy
- Predator = 500 beads of energy



	Primary Consumer (Filter)	Secondary Consumer (Picker)	Predator
<b>A:</b> Energy in each Food Item (bead)	1	50	500
<b>B:</b> Number of food items collected per feed (from your experiment)			4
<b>C:</b> Energy per feed (A x B)			2000
<b>D:</b> Energy for Activity (90%) C x 90%			1800
<b>E:</b> Energy Stored (10%) C x 10%			200

Answers are based on student experiment

Energy is transferred through the food chain, but some energy is lost at each level. This means predators must eat many organisms to gain enough energy.

## Bonus Questions

Our table shows that a predator needs to eat 4 secondary consumers to gain 2000 energy units. How many primary consumers would need to be eaten to provide the same amount of energy? **200 (each primary consumer = 1 unit of energy)**

Would this be easier or harder? Explain your reasoning. **Harder, because many more primary consumers are needed to provide the same energy.**

A basking shark is a filter feeder. How does it obtain enough energy to survive? **A basking shark is a filter feeder and eats large amounts of small organisms (like plankton), so it can collect enough energy by feeding continuously.**

Where in the ocean does acid affect calcium structures? (Clue: Nemo's home) **Coral reefs**

# The Shark Feed - Activity Sheet

Use your results to fill in the table below:

We will assume that energy increases at each level of the food chain:

- Primary consumer = 1 bead of energy
- Secondary consumer = 50 beads of energy
- Predator = 500 beads of energy



	Primary Consumer (Filter)	Secondary Consumer (Picker)	Predator
<b>A:</b> Energy in each Food Item (bead)	1	50	500
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Energy is transferred through the food chain, but some energy is lost at each level. This means predators must eat many organisms to gain enough energy.

## Bonus Questions

Our table shows that a predator needs to eat 4 secondary consumers to gain 2000 energy units. How many primary consumers would need to be eaten to provide the same amount of energy? \_\_\_\_\_

Would this be easier or harder? Explain your reasoning. \_\_\_\_\_

A basking shark is a filter feeder. How does it obtain enough energy to survive? \_\_\_\_\_

Where in the ocean does acid affect calcium structures? (Clue: Nemo's home) \_\_\_\_\_

# Shark Bites 4. The Shark Champion

## LESSON 4 Focus Questions

- Why are sharks important in marine ecosystems?
- What threats are impacting shark populations?
- How can human actions affect marine food webs?
- What actions can we take to help protect sharks?

## Introduction

### Teacher Introduction:

Set up a class quiz session to review learning from previous lessons. The quiz can be run in teams or individually using the questions provided.

Encourage students to explain their answers and justify their thinking using evidence from the unit.

## End Lesson – 5-10 mins (optional)

Introduce some of the key threats to sharks and discuss what can be done to protect them.

Sharks are threatened by:

- overfishing
- habitat destruction
- disruption of food webs

Many shark species grow slowly and reproduce later in life. This means populations take a long time to recover if numbers decrease.

Discuss:

- how human activity impacts marine ecosystems
- why losing sharks can affect the entire food web
- what could happen if apex predators are removed

## What can you do:

Discover more about sharks and share your learning with others

Support shark conservation projects through organisations such as SEA LIFE Trust

Raise awareness or funds to help protect sharks and marine environments

Hand out Shark Champion Quiz sheet or print off the next page!

# Shark Champion Quiz - Student Sheet

1. How long have sharks existed, and what does this suggest about how well they are adapted to their environment?

A. 400 years   B. 4 million years   C. 400 million years

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2. What is an animal that only eats plants, and what is its role in a food chain?

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3. What is a person who only eats plants, and how is this similar to a primary consumer?

---

4. Name the three main types of teeth and what each is used for.

---

5. What is a shark's skeleton made from, and how does this help it survive?

---

6. What is an animal that eats a varied diet called, and why is this useful?

---

7. What type of shark is this and what would it eat? Briefly explain why.

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8. How many teeth does a blacktip reef shark go through, and why is this helpful?

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9. How many teeth are in an adult human mouth, and why must they be cared for?

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10. What chemical is found in shark teeth and toothpaste, and what does it do?

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11. How does this chemical protect teeth?

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12. What is hardened plaque called, and why is it a problem?

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13. What causes enamel to break down and form cavities?

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14. Give three ways to keep teeth healthy and explain why.

---

15. What converts sunlight into energy, and why is this important in food chains?

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16. Energy flows from the \_\_\_\_\_ to the \_\_\_\_\_.  
Briefly explain why some energy is lost.

**ANSWERS**  
on next page

# Shark Champion Quiz - ANSWER SHEET

1. How long have sharks existed, and what does this suggest about how well they are adapted to their environment?

A. 400 years   B. 4 million years   **C. 400 million years** → Shows sharks are highly adapted and have survived environmental changes

2. What is an animal that only eats plants, and what is its role in a food chain?

Herbivore → Eats plants and acts as a primary consumer in a food chain

3. What is a person who only eats plants, and how is this similar to a primary consumer?

Vegetarian (or herbivore if accepted) → Similar to a primary consumer because it eats plants

4. Name the three main types of teeth and what each is used for.

Incisors, canines, molars → Cutting, tearing, grinding

5. What is a shark's skeleton made from, and how does this help it survive?

Cartilage → Makes sharks lighter and more flexible for swimming

6. What is an animal that eats a varied diet called, and why is this useful?

Omnivore → Can eat different foods, increasing chances of survival

7. What type of shark is this and what would it eat? Briefly explain why.

(Depends on image shown - show a mako or a reef shark). Example answers: Sharp teeth → eats fish/meat, Flat teeth → eats shellfish → Teeth match diet

8. How many teeth does a blacktip reef shark go through, and why is this helpful?

Around 20,000 teeth → Helps survival because damaged teeth are replaced

9. How many teeth are in an adult human mouth, and why must they be cared for?

32 teeth → Need care because they are not replaced like shark teeth

10. What chemical is found in shark teeth and toothpaste, and what does it do?

Fluoride → Strengthens enamel and protects teeth

11. How does this chemical protect teeth?

Strengthens enamel and resists acid damage

12. What is hardened plaque called, and why is it a problem?

Tartar (or calculus) → Can damage gums and lead to tooth decay

13. What causes enamel to break down and form cavities?

Plaque (acid from bacteria) → Breaks down enamel

14. Give three ways to keep teeth healthy and explain why.

Example answers: Brush teeth → removes plaque, Reduce sugar → limits acid, Use fluoride → strengthens enamel

15. What converts sunlight into energy, and why is this important in food chains?

Producer (e.g. plants/plankton) → Converts sunlight into usable energy

16. Energy flows from the \_\_\_\_\_ to the \_\_\_\_\_.  
Briefly explain why some energy is lost.

Sun → producers (then consumers)  
→ Energy is lost as heat at each level