INTERNATIONAL INSTITUTE FOR THE STUDY OF EXTREMELY QUESTIONABLE CREATURES

TEACHER'S NOTES

Episode Two: Is The Megalodon Back?



Case File: #0002
Episode length: Approximately 20 minutes
Recommended levels: Years 3–6
Adaptable for: Years 1–2 with teacher support
Main investigation: Megalodon
Sub-investigation: Mystery Bite Marks / Cookiecutter Shark
Key question: Megalodon was real, but is it still alive today?

EPISODE OVERVIEW

There is no question that Megalodon once existed.
This enormous prehistoric shark really did swim through Earth's oceans millions of years ago.
But reports continue to arrive claiming something much more extraordinary:
Megalodon might still be out there.

Senior Field Researcher Tom Bramble and the team investigate reports of enormous sharks, mysterious shapes beneath boats and strange sightings at sea.
The evidence leads to an important scientific question: if a giant predator such as Megalodon were still living in our oceans, **what evidence would we expect to find?**
Then another mystery arrives.
Large marine animals are being discovered with strange, almost perfectly circular wounds.

Could this finally be evidence of a giant prehistoric predator?
The investigation leads the team not to an enormous shark, but to a much smaller, and very real, ocean predator: **the Cookiecutter Shark.**

Episode Two explores fossils, extinction, evidence, animal adaptations and the importance of considering alternative explanations before reaching a conclusion.

LEARNING INTENTIONS

Students will:

- discover what scientists know about Megalodon
- understand how fossil evidence helps scientists investigate extinct animals
- explore the concept of extinction
- distinguish between evidence that an animal once existed and evidence that it exists today
- investigate the feeding adaptations of the Cookiecutter Shark
- consider alternative explanations for unusual evidence
- use evidence to support a conclusion.

SUCCESS CRITERIA

Students can:

- explain how we know Megalodon existed
- identify evidence scientists use to study prehistoric animals
- explain the difference between **"Megalodon was real"** and **"Megalodon is still alive"**
- describe how a Cookiecutter Shark feeds
- identify evidence that helped solve the mystery bite marks
- suggest alternative explanations for an unexplained observation
- support a conclusion using evidence.

BEFORE LISTENING

Begin with one important fact

Tell students:

Megalodon was REAL.

Scientists have fossil evidence showing that these enormous sharks once lived in Earth's oceans.

Then reveal today's actual mystery:

Is Megalodon definitely gone?

Ask students:

- How could we know an animal existed millions of years ago?
- How could we know whether it still exists today?
- What evidence would you expect to find if an enormous shark were still living in the ocean?
- Does the ocean being enormous mean anything could be hiding there?

Students can record an initial prediction:

I think Megalodon is:

☐ Extinct

☐ Still out there

☐ Not yet determined

Students should record **why** they made their choice.

THE CENTRAL MYSTERY

Megalodon is not a mythical creature.
It was a real prehistoric shark.

The investigation therefore involves **two different claims**:

Claim 1

Megalodon existed.

There is strong scientific evidence supporting this.

Claim 2

Megalodon still exists today.

This requires completely different evidence.
This distinction provides an excellent opportunity to introduce students to an important scientific principle:

LISTEN FOR...

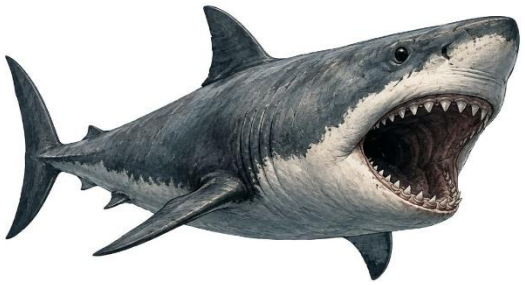
While listening, ask students to identify:

- evidence that Megalodon really existed
- how large Megalodon may have been
- what it ate
- evidence scientists have found from its prehistoric life
- why scientists consider it extinct
- possible explanations for modern “Megalodon sightings”
- what evidence researchers might expect if Megalodon were still alive
- what is unusual about the mysterious bite marks
- which creature eventually explains those bite marks.

CREATURE CASE FILE: MEGALODON

Name

Megalodon



Scientific name

Otodus megalodon

Status

REAL prehistoric animal
Current scientific understanding: EXTINCT

What was Megalodon?

Megalodon was an enormous prehistoric shark that lived millions of years ago.
It was one of the largest predatory sharks known to science.
Scientists do not have a complete Megalodon skeleton because shark skeletons are largely made from cartilage, which does not preserve as readily as bone.
However, researchers have discovered large numbers of fossilised Megalodon teeth and other evidence.

THOSE TEETH!

One of the most spectacular pieces of Megalodon evidence is its teeth.
Megalodon teeth could grow extraordinarily large.
Fossilised teeth allow scientists to investigate:

- the shark's size
- its feeding behaviour
- its relationship to other sharks
- where Megalodon lived
- when it existed.

Classroom question

If scientists have never found a complete Megalodon skeleton, how can they still learn about it?
This introduces students to **scientific inference**. Using available evidence to develop the best-supported explanation.

HOW BIG WAS MEGALODON?

Scientists cannot measure a living Megalodon, so estimates are made using fossil evidence and comparisons with other sharks.
Estimates vary depending on the method used, but Megalodon was enormously larger than most modern sharks.
Rather than focusing only on an exact measurement, encourage students to consider:
How can scientists estimate the size of an animal when they only have part of it?

WHAT DID IT EAT?

Megalodon was a major marine predator.
Evidence indicates that it preyed upon large marine animals, including whales.
Fossilised whale bones bearing large shark bite marks provide scientists with clues about Megalodon's feeding behaviour.
This becomes important to the episode's modern mystery.

If an enormous shark were still hunting large animals today
Would we expect to find evidence?

WHAT HAPPENED TO MEGALODON?

Megalodon disappeared from the fossil record millions of years ago.
Scientists have proposed several interacting factors that may have contributed to its extinction, including:

- changing ocean temperatures
- changing marine ecosystems
- changes in available prey
- competition with other predators eating its food

Scientists therefore regard Megalodon as extinct.

BUT WHAT ABOUT MODERN SIGHTINGS?

People occasionally report seeing enormous sharks or mysterious shapes in the ocean.
This raises a useful scientific question:

What else could they have seen?

Possible explanations can include:

- another large shark
- a whale
- another large marine animal
- unusual viewing angles
- inaccurate size estimates
- an object beneath the water
- incomplete or misleading photographic evidence.

An observation can be genuine while the **interpretation of the observation is mistaken**.
Someone may genuinely have seen a very large animal without that animal being Megalodon.

SUB-INVESTIGATION:

THE MYSTERY BITE MARKS

Reports arrive concerning unusual injuries on large marine animals.

The wounds are distinctive.
They are:

- round
- relatively neat
- shaped as though a plug of tissue has been removed.

For investigators searching for a giant shark, mysterious shark-like bites deserve attention.
But good investigators do not decide what caused the evidence before examining it.

Ask students:

What questions should Tom and the expert ask first?

Possible questions:

- How large is the bite?
- What shape is it?
- Where was it found?
- Are similar bites found on other animals?
- What animals live in that area?
- Does the bite pattern match Megalodon evidence?
- Could a much smaller animal have caused it?

CREATURE CASE FILE:

COOKIECUTTER SHARK



Common name: Cookiecutter Shark

Status: REAL

Despite its almost ridiculous name, the Cookiecutter Shark is a real animal.
And it provides the solution to the mysterious bite marks.

HOW DOES A COOKIECUTTER SHARK FEED?

Cookiecutter Sharks are relatively small sharks.
Instead of swallowing an enormous animal, they can attach themselves to much larger animals.
Their specialised mouth and teeth allow them to remove a round plug of flesh.
The resulting wound can look as though someone has used a cookie cutter.

Hence the name: **COOKIECUTTER SHARK.**

WHAT DOES IT BITE?

Cookiecutter Sharks have been known to bite much larger marine animals, including:

- whales
- dolphins
- large fish
- sharks.

Evidence of Cookiecutter Shark bites has even been found on human made underwater equipment.
Their small size provides a wonderful contrast with Megalodon.

The creature responsible for a frightening looking bite does not necessarily have to be enormous.

GLOWING SHARKS

Cookiecutter Sharks also possess another extraordinary adaptation:
Bioluminescence.
Parts of their bodies can produce light.
Scientists think this glowing underside may help camouflage the shark when viewed from below by matching light coming from the ocean surface, a strategy known as **counterillumination**.
This makes the Cookiecutter Shark an excellent example of how a real animal can sound every bit as strange as an imaginary one.

Ask students:
Which shark sounded more unbelievable before today's investigation?
Their answers may provide an interesting discussion about why size or familiarity can affect what people consider believable.

CLAIM, EVIDENCE AND CONCLUSION

Investigation One

Claim
Megalodon is still alive somewhere in Earth's oceans.

Evidence to consider
- modern sighting reports
- photographs or video
- fossil evidence
- feeding evidence
- the absence or presence of modern remains
- evidence from today's marine ecosystems
- possible alternative explanations for sightings.

Scientific conclusion
Megalodon definitely existed.
Current scientific evidence indicates that it became extinct millions of years ago.
Modern sightings have not provided reliable scientific evidence that Megalodon survives today.

Investigation Two

Claim
A large mysterious predator is leaving circular wounds on marine animals.

Observations
The wounds are unusually round and distinctive.

Investigation
Researchers compare the shape and characteristics of the wounds with known marine predators.

Conclusion
The evidence is consistent with bites made by the:

COOKIECUTTER SHARK.
Classification: REAL

KEY VOCABULARY

Adaptation
A feature or behaviour that helps an organism survive.

Bioluminescence
Light produced by a living organism.

Cartilage
A flexible body tissue. Shark skeletons are made largely from cartilage rather than bone.

Counterillumination
A form of camouflage in which an animal produces light on its underside, helping it blend with light coming from above.

Evidence
Information or observations used to support or challenge an explanation.

Extinct
When no living members of a species remain.

Fossil
Preserved remains, impressions or traces of organisms from the past.

Hypothesis
A possible explanation that can be investigated.

Inference
A conclusion developed using observations and evidence.

Misidentification
Incorrectly identifying something that has been observed.

Predator
An animal that hunts other animals for food.

Prey
An animal hunted by another animal.

Sighting
A report that someone has seen something.

COMPREHENSION QUESTIONS

Remembering

1. Was Megalodon a real animal?
2. What type of animal was Megalodon?
3. What is one important type of Megalodon fossil?
4. What kinds of animals did Megalodon prey upon?
5. What is the current scientific understanding of Megalodon's status?
6. What was unusual about the mystery bite marks?
7. Which animal caused the circular bites?
8. Is the Cookiecutter Shark real?
9. Is a Cookiecutter Shark larger or smaller than Megalodon?
10. What unusual ability does the Cookiecutter Shark have?

Understanding

11. Why are Megalodon teeth important to scientists?
12. Why don't scientists have complete Megalodon skeletons like some dinosaur skeletons?
13. Why doesn't a modern report of a very large shark automatically prove Megalodon survived?
14. How does a Cookiecutter Shark produce its distinctive bite?
15. How might bioluminescence help a Cookiecutter Shark?
16. Why were the mysterious bite marks initially interesting to the Megalodon investigation?

Thinking Like an Institute Researcher

17. If Megalodon still existed, what evidence might scientists expect to find?
18. Someone reports seeing an enormous dark shape beneath their boat. Give three possible explanations.
19. Why is it important to investigate alternative explanations?
20. Which evidence would be stronger: one eyewitness report or repeated evidence collected by independent scientists? Why?
21. Does failing to explain something immediately mean the most extraordinary explanation must be correct?
22. What new evidence would make scientists reconsider the conclusion that Megalodon is extinct?

CLASSROOM ACTIVITIES

CLASSROOM ACTIVITY 1: BUILD A MEGALODON

Time: 30–45 minutes
Using an outdoor area, oval, hallway or long piece of paper, students investigate estimates of Megalodon's length.

Measure and mark:

- a student
- a Great White Shark
- a school bus or familiar object
- a possible Megalodon length.

Students can then investigate:

- **How many students long is it?** Line students up to the required length.
- How many classroom tables?
- How many metres?
- How does it compare with a modern shark?

This provides opportunities for **Mathematics, measurement and scale**.

CLASSROOM ACTIVITY 2: WHO MADE THAT BITE?

Give students the mystery before revealing the Cookiecutter Shark.

Evidence

A whale has been discovered with a strange wound.
The wound is:

- circular
- relatively small
- deep
- cleanly shaped.

Ask groups to develop a hypothesis.
They must answer:

1. What could have caused it?
2. What evidence supports your idea?
3. What additional information do you need?
4. What would prove your hypothesis wrong?

Then reveal the Cookiecutter Shark.

Discuss whether students need to change their hypothesis.
Changing your explanation because of new evidence is good science.

CLASSROOM ACTIVITY 3: CREATURE OR EXPLANATION?

Present an unexplained report:
Something enormous moved beneath a fishing boat.
Students generate at least **five possible explanations** before choosing one.
The aim is not to guess correctly.
The aim is to practise **not jumping immediately to the most exciting explanation**.
Students then identify what evidence would help distinguish between their hypotheses.

CLASSROOM ACTIVITY 4: FOSSIL DETECTIVES

Provide photographs or drawings of imaginary fossil evidence.
Students become palaeontologists and record:
Observation: What can I actually see?
Inference: What might it tell me?
For example:
Observation: This tooth is very large.
Inference: It may have belonged to a large predator.
Discuss why these statements are different.

WRITING ACTIVITIES

BREAKING NEWS!

Write a news story with the headline:

MEGALODON SPOTTED OFF LOCAL COASTLINE?

Students should include:

- the alleged sighting
- an eyewitness account
- an expert response
- evidence for and against the claim
- alternative explanations.

Challenge students to write the report **without claiming something has been proven when the evidence is uncertain**.

CREATIVE WRITING

A Day in the Life of a Cookiecutter Shark

Write from the shark's perspective.
Include genuine scientific information about:

- where it lives
- how it finds food
- its teeth
- its unusual feeding method
- its bioluminescence.

Students can be funny while keeping the underlying science accurate.

MEDIA LITERACY:

MEGALODON FOUND!

Show students an invented headline:

SCIENTISTS STUNNED. GIANT PREHISTORIC SHARK FOUND ALIVE!

Before believing or sharing the story, students ask:

- Who published it?
- Who made the original claim?
- Is a scientist identified?
- Is there clear evidence?
- Can the evidence be independently checked?
- Are there other explanations?
- Does the headline say more than the evidence proves?

Students can rewrite the headline to accurately reflect the available evidence.

JUNIOR RESEARCHER FIELD ASSIGNMENT

Evidence of Animals

Students do **not** need to see an animal.
Instead, safely search a garden, schoolyard, park or local environment for **evidence that an animal has been there**.

Look for things such as:

- footprints
- feathers
- nests
- webs
- holes
- burrows
- chewed leaves
- scratch marks
- droppings: observe only; do not touch.

Record:
What evidence did you find?
What animal might have left it?
What other explanations are possible?
What additional evidence would help identify the animal?
This mirrors the Megalodon investigation:

Scientists can learn about animals without seeing the animal itself.

FIELD SAFETY

Junior Researchers should:

- observe rather than handle wildlife
- never put hands into holes or burrows
- avoid touching droppings, remains or unknown substances
- keep a safe distance from animals
- work with adult supervision where appropriate
- leave habitats undisturbed.

CROSS-CURRICULUM OPPORTUNITIES

Science

Explore:

- fossils
- extinction
- adaptations
- predators and prey
- marine ecosystems
- animal structures

- scientific evidence
- observations and inferences
- hypotheses and conclusions.

English

Students can:

- identify key information while listening
- distinguish fact from speculation
- develop questions
- write explanations and reports
- create persuasive arguments
- participate in discussions
- conduct mock interviews.

Mathematics

Use Megalodon to investigate:

- length
- scale
- estimation
- comparison
- measurement
- ratios in drawings and models.

Media Literacy

Explore:

- sensational headlines
- eyewitness accounts
- photographic evidence
- source reliability
- misinformation
- the difference between “unexplained” and “proof”

Visual Arts

Students can:

- reconstruct Megalodon from fossil evidence
- draw a Cookiecutter Shark feeding diagram
- design an Institute evidence board
- create their own marine Creature Case File.

ASSESSMENT OPPORTUNITIES

Teachers may assess:

- Real or Not? responses
- evidence charts
- scientific diagrams
- oral discussion
- investigation reports
- fossil observations
- media-literacy activities
- Junior Researcher Field Assignments.

EXIT TICKET

Complete:

One thing I learned about Megalodon:

One thing I learned about the Cookiecutter Shark:

One piece of evidence I found convincing:

One alternative explanation I considered:

One question I still have:

TEACHER SUMMARY

Episode Two provides a particularly useful opportunity to explore the difference between:

POSSIBLE
And
SUPPORTED BY EVIDENCE.

Megalodon really existed.
That fact does not automatically provide evidence that it exists today.
Likewise, an unexplained sighting or mysterious bite mark does not automatically support the most extraordinary explanation.
The mystery bite marks demonstrate another important scientific idea: investigators should remain open to different explanations.
In this case, the eventual explanation is almost as extraordinary as the original theory.
A small, glowing shark really does take cookie-shaped bites from animals vastly larger than itself.
Sometimes nature does not need our help to become extremely questionable.

INSTITUTE CLOSING MESSAGE

Excellent work, Junior Researchers.
You have examined fossil evidence, investigated modern sightings, considered alternative explanations and solved the mystery of the strange circular bite marks.

Megalodon: REAL prehistoric creature.
Current scientific understanding: EXTINCT.
Cookiecutter Shark: REAL.

Another case can be returned to the Creature Archives. But as always **Keep asking questions.**

Observe. Question. Imagine. Investigate.