

Hammerhead Heroes: The Science of the "Cephalofoil"

Lesson Overview

In this lesson, Keatyn will explore the fascinating world of Hammerhead sharks. We will dive into why these sharks have such uniquely shaped heads, how they use their specialized senses to hunt, and the different species that roam our oceans.

Materials Needed

- Printed or digital photos of different Hammerhead species (Great Hammerhead, Bonnethead, Scalloped Hammerhead)
- A ruler or measuring tape
- A small magnet and a handful of paperclips
- A bowl of sand or rice
- Drawing paper and colored pencils/markers
- A wide book or a small rectangular tray (to represent the "hammer" head)

Learning Objectives

By the end of this lesson, Keatyn will be able to:

- Explain the scientific name for the hammerhead's shape: the **Cephalofoil**.
- Identify three specific advantages of having a hammer-shaped head.
- Describe how Hammerheads use "electro-reception" to find food.
- Compare and contrast at least two different species of Hammerhead sharks.

1. Introduction: The Wide-Head Mystery (The Hook)

The Scenario: "Keatyn, imagine you are a superhero, but instead of a cape, you have a head shaped like a giant surfboard. Your eyes are way out on the ends, and your nose is stretched wide. People might think it looks silly, but it actually gives you 'super-senses' that no other shark has!"

Discussion Question: Why do you think a shark would want a head shaped like a hammer? Do you think it helps them swim faster, see better, or something else?

2. Content & Modeling: Why the Wide Head? (I Do)

Explain that the scientific name for that hammer shape is the **Cephalofoil** (pronounced: *sef-uh-lo-foyl*).

The Three Super-Powers of the Cephalofoil:

1. **Panoramic Vision:** Because their eyes are on the far ends of the "hammer," they can see 360 degrees. They can see what is above them and below them at the same time!
2. **The "Metal Detector" Sense:** Sharks have tiny pores on their snout called *Ampullae of Lorenzini*. These feel the tiny electric pulses given off by the muscles of other fish. Since the Hammerhead has a wider head, it has more "sensors" than any other shark—just like a wider metal detector finds more treasure!
3. **Better Steering:** The flat head acts like a wing on an airplane. It helps them make sharp, banking turns very quickly to catch fast prey.

Demonstration: Hold a ruler or a wide book horizontally against your forehead. Pivot your head. Notice how the ends of the ruler move much further than your nose? This shows how the shark covers more "scanning" area with every head wag.

3. Guided Practice: The Hidden Stingray Hunt (We Do)

Hammerheads love to eat stingrays, which hide under the sand. Let's test out that "Metal Detector" sense!

1. **Setup:** Hide several paperclips (the "stingrays") at the bottom of a bowl filled with sand or rice.
2. **The Tool:** Give Keatyn a magnet. This represents the shark's *Ampullae of Lorenzini*.
3. **The Hunt:** Have Keatyn move the magnet over the surface of the sand without touching the sand. When the magnet "clicks" or pulls, she has found a stingray!
4. **Analysis:** Ask: "Did you have to see the paperclip to find it? How does having a wider magnet (a wider head) make this easier than using a tiny pinpoint magnet?"

4. Independent Application: Species Spotlight (You Do)

Keatyn will now become a Marine Biologist. There are 9-10 different types of Hammerheads!

The Task: Choose two species from the list below and create a "Trading Card" for each.

- **Great Hammerhead:** The largest (up to 20 feet!), very tall dorsal fin.
- **Bonnethead:** The smallest, head is shaped like a shovel, actually eats some seagrass (the only "omnivore" shark!).
- **Scalloped Hammerhead:** Has an "indented" front edge of the hammer, likes to swim in big groups.

On the cards, Keatyn should include:

- A drawing of the shark's head shape.
- How long it grows (use the measuring tape to mark this out on the floor for scale!).
- One "Fun Fact" about that specific shark.

5. Conclusion & Recap

Summary: Today we learned that the Hammerhead isn't just a "weird-looking" fish—it is a perfectly designed hunting machine. The **Cephalofoil** gives them 360-degree vision, a giant "metal detector" for sensing electricity, and an extra "wing" for fast swimming.

Final Check:

- Can you tell me the "C" word that describes the shape of their head? (Cephalofoil)
- Which Hammerhead is the "veg-head" that eats seagrass? (Bonnethead)
- If you were a Hammerhead, what would be your favorite "super-sense"?

Success Criteria

- **Great:** Keatyn can name the Cephalofoil and explain one reason for its shape.
- **Expert:** Keatyn can explain all three advantages (vision, sensing, steering) and identify two different species.

Differentiation & Extensions

- **For More Challenge:** Research "Ocean Stratification." Where in the water column do Hammerheads live? Does the temperature affect where they hunt?
- **For a Kinesthetic Learner:** Use painter's tape on the floor to draw a life-sized Great Hammerhead (20 feet) and a Bonnethead (3 feet) to compare their sizes.
- **For Digital Learners:** Use a tablet to watch a video of a Hammerhead "pinning" a stingray to the ocean floor using its wide head.