



LESSON OBJECTIVE

- Understand how sharks and fish have different anatomy that help them survive

GRADE

- 4th

STANDARDS

- Life Science
- ELA

TIME REQUIRED

- 45-60 min

VOCABULARY

- Cartilage
- Swim Bladder
- Ampullae of Lorenzini

MATERIALS

- Pencil
- Crayons or colored pencils (optional)

RECOMMENDED ASSESSMENT

- Completed Venn diagrams and stories

Introduction

Students will compare the anatomy of sharks and fish with a Venn Diagram and write a story about what life is like for a shark in the ocean, using the facts they have learned.

State Standards

4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
4.W.1, 4.W.2.1, 4.W.3.3: Handwriting a narrative

Lesson Plan

Background Knowledge –

- Cartilage*: a connective tissue found in many areas of the body including joints and between bones
- Swim Bladder*: a gas-filled sac present in the body of many bony fishes, used to maintain and control buoyancy
- Ampullae of Lorenzini*: sensory organ of mucus-filled pores in the skin of sharks and rays that detect electrical currents

Activity –

1. Start the lesson by having the Live Shark Cam from the Baltimore Aquarium playing in the background. The Shark Cam can be found here: <https://www.earthcam.com/usa/maryland/baltimore/aquarium/?cam=blacktipreef>

[If the camera is down, here's a video that was recorded from them: <https://www.youtube.com/watch?v=o41HD4liWoA>]

- What do students notice about the animals present?
- What do they notice about the environment?

They may see fish and sharks. Sharks are classified as fish and they have many similarities, but each of them has their own unique characteristics.

- How are sharks and fish different? How are they the same?
- Where do you think they live?
- Do they have to swim all of the time?
- What is their skeleton made of?
- How do they breathe in the ocean?
- How do they maintain their buoyancy?

2. Have students write down the differences and similarities between a blacktip reef shark and a fish in the Venn Diagram. As they are working, share some fun facts about sharks and fish:
 - a. Tropical fish have internal skeletons made of ossified bones (the same stuff our bones are made of), while a shark's skeleton is made of cartilage (the same stuff as our noses).
 - b. Tropical fish come in a wide variety of shapes and the colors reflect how they hide, find food, or mate.
 - c. All fish breathe with gills, where oxygenated water passes over the gills and the oxygen moves into the bloodstream. Most sharks need to be on the move for water to pass over their gills so they can breathe.
 - d. There are tiny sensors called Ampullae of Lorenzini on the shark's snout, which detect electrical currents coming off of every animal (for example, a flounder buried in the sand).

3. Lead a discussion about what life for a shark might be like. The ocean is full of colorful, diverse species swimming around and interacting with each other. What do students think happens in a day in the life of a shark?
 - a. What do sharks look like?
 - b. What do sharks like to do?
 - c. Where do they like to explore?
 - d. What do sharks like to eat?
 - e. What are some issues they face in the oceans?
 - f. How can humans help sharks?

4. Have your students write a creative story about a shark and their life in the ocean. They should describe their shark and what it does throughout the day, using at least 2 of the phrases from the Venn Diagram (have students underline them). Encourage your students to be creative with the animals in the sea their shark might interact with. Once they complete their story, have them share their story with the class and tell the class how they can help the shark they wrote about.

Post Activity –

Shark Myth Busters: Can Students Bust These Myths?

Have students get into small groups. Each group is going to discuss the myth about sharks and vote on whether the myth is based on fact or is busted! Every answer they get right earns them a point.

1. **All sharks are dangerous.** *BUSTED! Most sharks eat bony fishes, crustaceans, and mollusks while only some turn their attention to seals and turtles. The largest shark species are filter-feeders, eating only plankton!*
2. **All sharks are large.** *BUSTED! Pygmy sharks and Ghost cat sharks grow to only a few inches in length! Whale sharks, the largest of all sharks, can grow to be up to 60 feet long!*
3. **You are more likely to be struck by lightning than bitten by a shark.** *FACT! Shark bites are rare, and you are more likely to be struck by lightning than bitten by a shark.*

4. **Sharks have no predators.** *BUSTED! Orca whales will attack sharks and humans are sharks' main predators!*
5. **MOST sharks will drown if they stop swimming.** *FACT! There are a couple of shark species that can remain stationary and breathe through a process called buccal pumping, but most species need to swim constantly to force water into their mouths and over their gills for respiration.*
6. **Sharks do not have bones.** *FACT! Their skeleton is made of cartilage rather than bone. Our ears and nose tip are also made of this same substance.*
7. **Sharks can smell a single drop of blood from a mile away.** *BUSTED! Sharks have an extremely acute sense of smell and can detect a single drop of blood in an Olympic-sized swimming pool. However, for them to smell blood in the vast ocean this would mean a whale would need to be bleeding out for a shark to smell it from a mile away. A cut on a surfer's leg would not be enough to attract any attention unless the surfer was already in shark waters.*
8. **Female sharks can reproduce by themselves.** *FACT! Bonnethead, blacktip, and zebra sharks have the power of parthenogenesis, the ability to have young without a male shark through fertilizing their own eggs.*
9. **Sharks can change their body temperature to help suit their environment.** *FACT! Sharks are cold blooded, which means the temperature of their blood usually matches the surrounding environment. However, some species of sharks like the great white, mako, salmon, and porbeagle sharks have evolved to be able to maintain a body temperature a few degrees higher than their surrounding environment. This allows them to hunt in deeper, colder waters!*
10. **Sharks have walnut-sized brains.** *BUSTED! Sharks can communicate with body language, live in groups, and even hunt in packs. They have some of the largest brains among all fish, with brain-to-body ratios similar to birds and mammals.*
11. **All sharks live in the ocean.** *BUSTED! Some sharks can survive in freshwater. Bull sharks often swim upriver channels during birthing season.*
12. **Sharks have an important role in the ecosystem.** *FACT! Sharks prey upon weak or sick animals, which allows for healthier animals to reproduce. Sharks also help disperse carbon throughout the ocean by feeding on dead matter, which protects our planet.*

Discover Further

Extending the Lesson –

Have the students draw a picture of their shark on its daily adventures. Have them draw colorful fish, corals, and other creatures that the shark might encounter.

Learn More –

Sharks play a vital role in ecosystems around the world. They keep reefs healthy by preying on the weak and sick animals to leave healthy ones to breed new generations! Although sharks at the Fort Wayne Children's Zoo always receive what they need to live long, healthy lives, their wild counterparts face new pressures each year. The sharks in the oceans face limitations of space, food, and water supply due to



Shark Stories

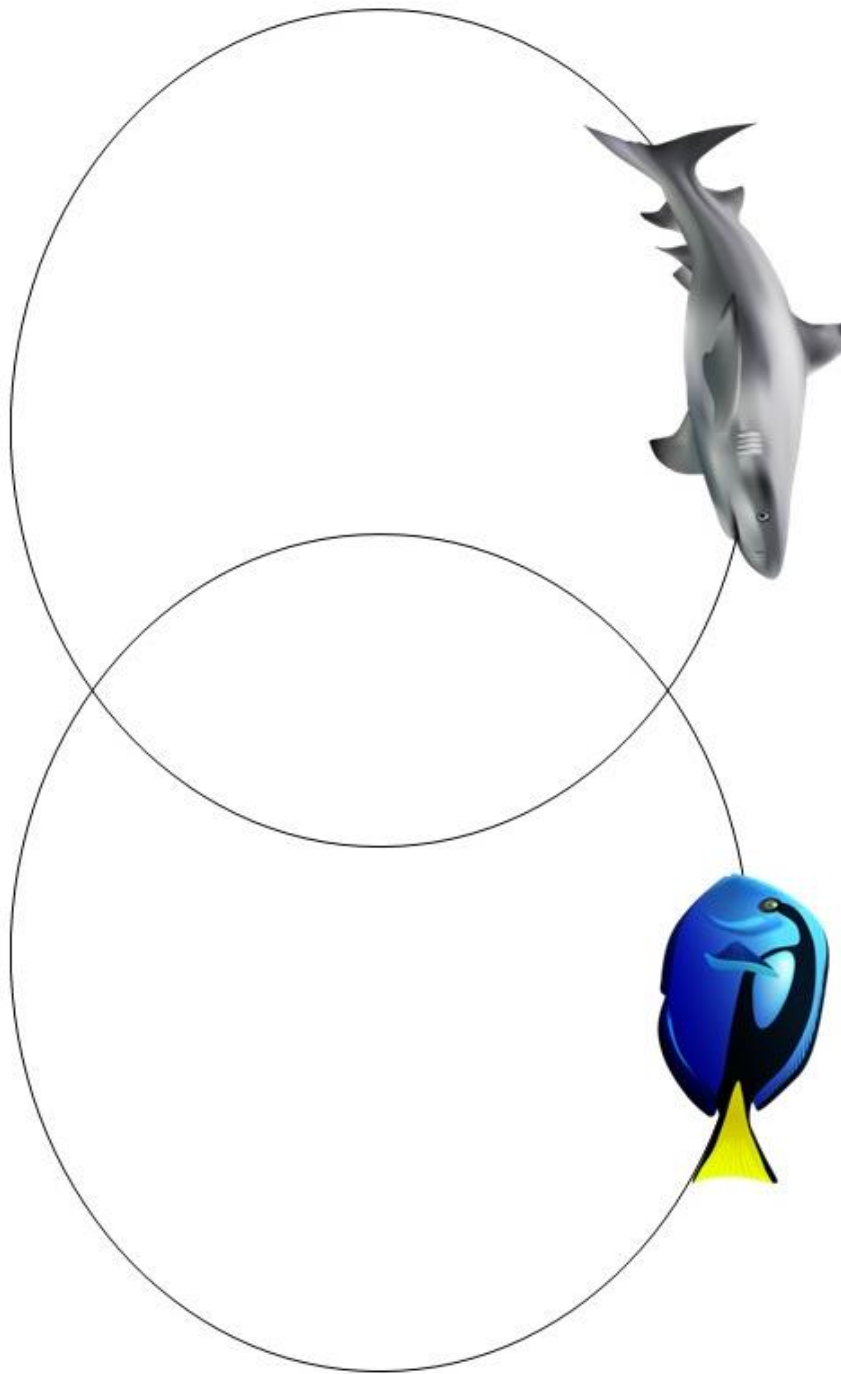


climate change and overfishing. You can do your part by going to the zoo to visit them, spreading awareness, recycling, disposing of trash properly, and celebrating Shark Awareness Day on July 14th. Be on the lookout for the sharks at the zoo and check out our Zookeeper Dive Chats every Tuesday and Thursday afternoon. Share your stories with us by tagging the zoo using #fwkidszoo.



Name: _____

Use the word bank below to fill in the Venn Diagram comparing sharks and tropical fish.
Use your knowledge of life in the oceans and add as many characteristics as you can.
Can you add different ideas of your own?



- LIVES IN OCEANS
- BREATHE WITH GILLS
- EAT PLANTS
- TEETH
- SWIM BLADDER
- CAN STOP SWIMMING AND REST
- MUST SWIM CONSTANTLY
- NEAR CORAL REEFS
- SENSES ELECTRICAL FIELDS OF ORGANISMS
- COLORS PROVIDE CAMOUFLAGE
- SKELETON MADE OF BONE
- SKELETON MADE OF CARTILAGE
- EATEN BY PEOPLE
- EATS FISH
- EATS PLANKTON

