



## **WAVE on Wheels Outreach**

### **Shark Cart Presentation**

#### **Grades K-2**

#### **Time requirement**

1 Hour

#### **Group size and grade**

Up to 50 students maximum

#### **Materials**

2 Epaulette Sharks – in large transport cooler

1 or 2 – water coolers (depending on the length of trip and need for a water change)

Mobile Shark Cart

Blue basket (including Pump, Shark Net, Electrical Cord, Paper towels)

Thermometer

Shark Artifacts Bin

Shark Emergency Water

WAVE Tablecloth

#### **Goal**

Through a live shark encounter, students will be excited, engaged, and educated about the wonders of aquatic life and the importance of conservation.

#### **Objectives**

1. Students will be able to identify what type of animal a shark is.
2. Students will be able to list 2 adaptations a shark has for aquatic life.

3. Students will be able to identify what sharks eat.
4. Students will be able to list at least 5 species of shark and identify a unique characteristic to that species.
5. Students will be able to discuss how they can help save sharks and other aquatic animals.

### **Theme**

Sharks are often misunderstood animals that play an important role in their environment.

### **Kentucky Core Academic Standards – Science**

#### **Kindergarten** - *Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment*

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

LS1.C: Organization for Matter and Energy Flow in Organisms.

K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

ESS3.A: Natural Resources

ESS3.C: Humans Impacts on Earth Systems

#### **First Grade** – *Structure, Function, and Information Processing*

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

LS3.B: Variation of Traits

#### **Second Grade** – *Interdependent Relationships in Ecosystems*

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.

LS4.D: Biodiversity and Humans

### **Background**

#### *Sharks are Fish*

Sharks are a type of fish. They live underwater, breathe water through gills, have a protective layer of scales covering their body, and are cold-blooded. Worldwide there are more than 22,000 species of fish. Sharks fall into a special group of fish known as cartilaginous fish including sharks, rays, skates, and guitarfish. This group has a skeleton made of cartilage rather

than bone like most fish known as bony fish. There are several other distinct differences between sharks and bony fish. The chart below can be found at:  
[http://www.sharkproject.org/haiothek/index\\_e.php?site=evolution](http://www.sharkproject.org/haiothek/index_e.php?site=evolution)

	Cartilaginous fish (Chondrichthyes)	Bony fish (Osteichthyes)
Skeleton	Cartilage	Wholly or partially ossified
Gill slit cover	Open gill slits	Gill cover
Swim bladder	Not present	Present
Skin surface	Covered in dermal teeth	Covered in scales

### *Shark Adaptations*

Sharks have several unique adaptations that help them survive in their environment. In general, sharks are darker on top and lighter below. This is a type of camouflage known as countershading. Countershading aids many aquatic animals, including sharks, as they are more difficult to see because their light undersides blend in with the sunlight. The darker upper body blends in with the ocean depths which are black as sunlight completely dissipates. Dermal denticles protect the shark and have a series of raised ridges giving sharks their sandpaper feeling. These ridges reduce drag and noise generated by a shark swimming enabling them to move efficiently in ghost-like silence. Sharks also have specialized sensory organs that detect electrical fields. These organs, called ampullae of Lorenzini, aid sharks in locating their prey by detecting tiny electrical signals from the prey's muscles. Finally, sharks have a lateral line running along each side of their body. This vibration detection area allows a shark to feel disturbances in the water column.

### *Shark Diet*

Animal diets are closely related to the dentition, or teeth, of those animals. Sharks are no exceptions. A stereotypic shark jaw has sharp pointed teeth on top and bottom which function similar to a fork and knife tearing off pieces. Shark species with these teeth include the Great White, Bull, Hammerhead, Sand Tiger, Black Tip, and many others. Some species have small round teeth similar to human molars designed for crushing and grinding prey with hard bodies and exoskeletons. These species typically have a mouth on the underside of their body rather than on the front of their head and include the Guitarfish (Shark Rays), Epaulette, Nurse, and Zebra Sharks. Finally, some sharks do not have teeth including Basking and Whale sharks. They obtain food by swallowing large amounts of water and filtering out organisms.

### *Types, or species, of Shark*

The Newport Aquarium currently displays Black Tip Reef Sharks, Nurse Sharks, Zebra Sharks, Sand Tiger Sharks, Sandbar Sharks, Scalloped Hammerhead Sharks, Epaulette Sharks, Leopard Sharks, Hound Sharks, Pajama Sharks, Cat Sharks, Horn Sharks, and a few others. The Aquarium will never display a Whale Shark, Great White Shark, or Bull Shark largely due to size restrictions as well as the behavior of those species. The Whale Shark is the largest fish in the ocean reaching lengths of more than 40 feet and weighing more than 20 tons. The smallest shark is currently thought to be the Dwarf Lanternshark or the Ninja Shark reach lengths of 6-8 inches maximum. The species implicated in the most shark attacks include the Great White Shark, Tiger Shark, and Bull Shark. The species displayed for the outreach program is an Epaulette Shark. These unique sharks are bottom dwellers with crushing dentition. They exhibit several adaptations for life in a tide pool habitat.

### *Shark Conservation*

As with most apex predators, sharks play a critical role in their ecosystem as a top down control mechanism for the environment's food web. As the demand for shark products increase, so does the concern for shark populations and the sustainability of global fisheries. Sharks are characterized by slow growth rates, late maturity, and fewer offspring. These factors leave many species of animals, including sharks, vulnerable to overfishing. Sharks may be caught as bycatch in other fisheries or directly targeted for markets such as the shark fin soup industry.

### **Vocabulary**

Adaptation – the process by which an animal or plant species becomes fitted to its environment through body parts and behaviors

Camouflage - concealing coloration, background matching in animals, the use of biological coloration to mask location, identity, and movement, providing concealment from prey and protection from predators

Conservation – the study of the loss of Earth's biological diversity and ways this loss can be prevented

Diversity - the variety of life found in a place on Earth or the total variety of life on Earth.

Environment - The external conditions, resources, stimuli etc. with which an organism interacts

Habitat – the place where an organism or a community of organisms lives, including all living and nonliving factors or conditions of the surrounding environment

Observation – the act of attentive watching, perceiving, or noticing

Predator – an animal whose diet consists of other animals

Prey – an animal who is eaten by other animals, or predators

Survive – the continuation of life or existence

## Extension Activities

Project WILD Activities. Please contact your state Project WILD coordinator for more information. See <http://projectwild.org/KentuckyCoordinator.htm> (for Kentucky) or <http://www.projectwild.org/ProjectWILDCoordinators.htm> (for other states).

- Beautiful Basics – Students will identify five basic survival needs shared by people and all other animals, including pets, and wildlife.
- And the Wolf wore shoes – Students will distinguish between real and imaginary animals, and give example of real and imaginary animals and their characteristics.
- Learning to Look, Looking to See – Students will describe differences seen in the environment as the result of casual and detailed observation, and give reason for the importance of looking closely at any environment.
- Animal Charades – Students will define wildlife, and distinguish between domesticated and wild animals.
- Ethi-Thinking – Students will generate a list of activities that are harmful to wildlife and the environment, discuss reasons these activities are inappropriate, and recommend alternate activities that are not harmful.
- What’s That, Habitat – Students will identify their own basic needs for food, water, shelter, and space in a suitable arrangement; and generalize that wildlife and other animals have similar basic needs.

Make Your Own Sharkometre! -

[https://www.sharktrust.org/shared/downloads/educational\\_resources/sharkometer.pdf](https://www.sharktrust.org/shared/downloads/educational_resources/sharkometer.pdf)

How a Shark Jaw Works! -

<http://sharkopedia.discovery.com/shark-topics/feeding-hunting-diet/#how-a-sharks-jaws-work>

## Resources

WAVE Foundation - <http://www.wavefoundation.org>

Project Wild - <http://www.projectwild.org>

Project Wet - <http://www.projectwet.org>

Project Learning Tree - <http://www.plt.org>

Endangered Species Information -

<http://education.nationalgeographic.org/media/endangered/>

Shark Information - <http://www.discovery.com/tv-shows/shark-week/>

Shark Information - <http://sharkopedia.discovery.com/>

Shark Information - <https://www.flmnh.ufl.edu/fish/discover/species-profiles/hemiscyllium-ocellatum/>