Grade Level: 3-5
Time Estimate: 2-3 days

ENDANGERED SPECIES / INSTRUCTOR INFO

Summary

This lesson includes vocabulary, content, and creative activities to help students learn about endangered species. Students will discover the different treaties, laws, and efforts that have been put into place to help protect and preserve endangered species in the wild. The will learn about two different kinds of sharks that are classified as endangered and how we can help them!

Part 1. Introduction
Part 2. What does Endangered Mean?
Part 3. Endangered Sharks
Part 4. Helping is Caring
Activity 1. Make a Pact
Activity 2. Do the Research

Goals & Objectives

The students will:
• Learn what it means for a species to be classified as an endangered species;
• Learn who decides the "status" of a species;
• Learn about the different species sharks that are endangered;
• Learn how they can help endangered species in the wild.

Helpful Tips

1. The content in this lesson is related to OCEARCH and the Global Shark Tracker. Spend a few minutes getting familiar with the website and the tracker if you have not done so already. The Global Shark Tracker is also available as an app for iPhone and Android.
2. This lesson plan is designed to be adaptable to suit your specific needs. Use the entire lesson plan or just parts of it. This material can be expanded to be an entire unit or condensed for just one day in the classroom.
3. Vocabulary words will be underlined as they appear in the lesson plan. A complete list of vocabulary words is included as well.
4. Answers to questions and prompts for discussions will appear in italics.
5. Optional activities and content (side notes) will appear in a box. Use these to enhance your lesson and adapt it to suit your needs!
6. Have questions for OCEARCH Expedition Leader, Chris Fischer? Email info@OCEARCH.org to schedule a Skype session and let your students/child talk directly to Chris and the OCEARCH crew!
7. Email all questions about this lesson to info@OCEARCH.org

// STANDARDS

This lesson aligns with the following TEKS:
Grade 3 Science: 1B, 2A, 2C, 2F, 3A, 3D, 9A, 9B, 9C
Grade 4 Science: 1B, 2A, 2C, 2F, 3A, 3D, 9A, 9B, 9C
Grade 5 Science: 1B, 2B, 2C, 2D, 2F, 2G, 3A, 3D, 9A, 9B, 9C

This lesson aligns with the following Next Generation Science Standards:

Earth and Human Activity - 5-ESS3-1

Science and Engineering Practice
Obtaining, Evaluating, and Communicating Information
• Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. (5-ESS3-1)

Disciplinary Core Ideas
ESS3.C Human Impacts on Earth Systems
• Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. . (5-ESS3-1)

Crosscutting Concepts
Systems and System Models
• A system can be described in terms of its components and their interactions. (5-ESS3-1)
Connections to Nature of Science
• Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)

STEM
This lesson plan aims to assist teachers in implementing a STEM-based program into their classroom while inspiring the next generation of explorers, scientists, and stewards of the ocean. Based on real science and the Global Shark Tracker™, this lesson is intended to promote environmental awareness and to prepare students for STEM careers.

Grade Level: 3-5

ENDANGERED SPECIES / VOCABULARY

Adaptation - A characteristic that helps an organism survive in its environment.

Apex Predator - A predator residing at the top of a food chain upon which no other creatures prey.

Biodiversity - The variety of life in the world or in a particular habitat or ecosystem.

Convention on the Trade in Endangered Species (CITES) - An international treaty drawn up in 1973 to protect wildlife from extinction.

Ecosystem - A biological community of interacting organisms and their physical environment.

Endangered - Seriously at risk of extinction.

Endangered Species Act (ESA) - Was signed on December 28, 1973 and provides conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend.

Extinct - Having no living members.

Food Chain - Shows how each living thing gets food, and how nutrients and energy are passed from creature to creature.

Habitat - The natural home of an organism.

Juvenile - A young animal.

Organism – A plant, animal, or single celled life form.

Population - All of the organisms living in a specific area.

Species - A group of organisms that are similar and capable of producing offspring.

Treaty –A formal agreement between countries.

Grade Level: 3-5

ENDANGERED SPECIES / LESSON PLAN

PART 1. INTRODUCTION **3-5 mins**

There are over 8.7 million species of plants and animals in the world with one million of them living in the ocean. Unfortunately, many of these plants and animals are endangered of becoming extinct, meaning they will no longer exist and will never exist again. Why is this happening? Poaching, the destruction of wild habitats, disease, climate change, and human expansion all play a big role. But it's not too late! There's so much that we, including YOU can do to help!

PART 2. WHAT DOES ENDANGERED MEAN? **10 mins**

When an organism is classified as an endangered species, that animal or plant is in danger of disappearing from the planet completely. Ask the students if they know of any endangered species. Why is that plant or animal endangered? Rhinos are unfortunately a great example as they are on the brink of extinction. Can you imagine a world without rhinos or any of the other amazing plants and animals that the students named?

Scientists state that a species can be classified as endangered when the population is so small that it will become extinct within fifteen years if populations do not increase. In an effort to monitor and evaluate populations in the wild, the International Union for Conservation of Nature (IUCN) was formed. The IUCN was founded in 1948 and is the largest global environmental organization in the world. The main role of the IUCN is to preserve biodiversity. The IUCN created and maintains the IUCN Red List, which is a list of all the different species of organisms in the world and their status. The categories begin with species" Of Least Concern" and end with "Extinct" species. Many species are classified as "Not Evaluated" or "Data Deficient" because not enough information is known about those species populations in the wild. The species may have been recently discovered or lives in a habitat that is difficult to study, such as the deep sea. The IUCN oversees updating this list which helps spread awareness to help protect species all around the world.

Once a species has been classified as endangered, it falls under the protection of a treaty that has been signed by over 150 countries. This treaty is called the Convention on the Trade in Endangered Species (CITES). It is an international treaty that protects endangered species from the commercial trade as well as any international movement. This includes any part of the animal, alive or dead, such as sea turtle shells, tiger teeth, and elephant tusks. This treaty allows governments to prosecute anyone that violates the rules of the treaty. The Endangered Species Act (ESA), which was passed in 1973 by the United States Congress, also protects endangered species.

PART 2. ENDANGERED SHARKS **5-10 mins**

Sharks are apex predators, which means that are at the top of a food chain. The job of an apex predator is to control the populations of the animals they eat. How do you think they do this? They do this by eating a lot of fish and by eating sick and old animals. This keeps populations from getting out of control and makes sure only strong, healthy animals survive to reproduce. This keeps the entire ocean healthy.

If sharks became extinct, then the prey that they feed on would not get eaten and would overpopulate the oceans. What happens to an ecosystem when there is overpopulation? The overpopulated animal consumes all of its prey because they are no longer being preyed upon. Eventually they run out of food or have to switch to another prey item. The end result of this situation would be the collapse of an ecosystem.

Threats to Shark Populations

Unfortunately, this situation is very real. Over 90 million sharks are killed each year by humans. Sharks are killed for a variety of different reasons. One is for their fins. Poachers catch sharks and cut off their fins to sell for (unfortunately for sharks) a lot of money. The fins are the main ingredient in shark fin soup, which is a popular delicacy in the Eastern parts of the world.

Shark populations are also dwindling due to by-catch. By-catch is when fishermen catch animals in their nets or long lines that they were not intending to catch. These animals very rarely survive. Sharks that are caught on long lines usually die by the time the lines are brought up to the surface.

Pollution is also a threat to shark populations. Approximately 80% of trash in the oceans comes from human activities. And an estimated 1.4 billion pounds of trash in dumped into the ocean every year! Wind and ocean currents carry this trash into the center of gyres, which are giant circular oceanic surface currents (Figure1).

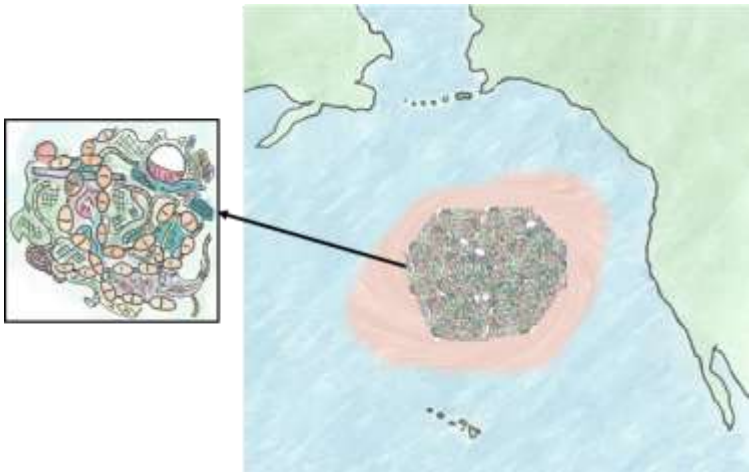

Figure 1. Massive amounts of trash collect in the center of the north Pacific gyre, located of the west coast of the United States.

Illustration Credit: Sarah Rich – Landry's Downtown Aquarium

The circular motion of the gyres keeps the trash towards the center, where energy is low and the area is very calm and stable. Therefore, the trash builds up and gets bigger and bigger over time. As the trash begins to break down it creates a "soup-like" mixture that circulates within the gyre. The north Pacific garbage patch in the Pacific Ocean is so large, it is often referred to as the Great Pacific Garbage Patch.

Endangered Shark Species

The great hammerhead shark (Figure 2) is an impressive shark growing up to 6 meters (19.5 ft.) in length and weighing up to 454 kilograms (1,000 lbs)! It can be found in temperate and tropical waters worldwide and is often seen during massive summer migrations. One of their special adaptations is their oddly shaped heads that give them an advantage when hunting for food. Because their head is so long and their eyes are on the sides of their head, they have a wider field of view. If a hammerhead shark can see more around them, then he can catch more food!

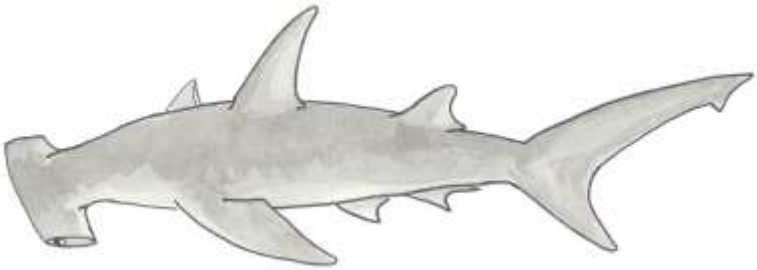

Figure 1. Hammerhead Shark, *Sphyrna mokarran*
Illustration Credit: Sarah Rich - Landry's Downtown Aquarium

According to NOAA, in March 2013, members of the CITES Conference in Bangkok voted in support of listing three species of hammerhead sharks (scalloped, smooth, and great) in CITES Appendix II. This means increased protection, but still allows legal and sustainable trade. This is good news for the great hammerhead shark, but further conservation and protection will help bring this species back.

The zebra shark (Figure 3) grows up to 4 meters in length (13 ft.), most of which is their impressive tail. As juveniles, zebra sharks have stripes (hence the name) and as they mature, their strips turn into spots. Zebra sharks can be found near and around the coral reefs of the western Pacific Ocean, the Indian Ocean, and the Red Sea.

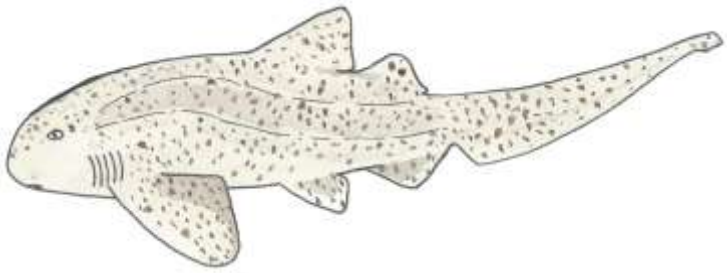

Figure 1. Zebra Shark, *Stegostoma fasciatum*
Illustration Credit: Sarah Rich - Landry's Downtown Aquarium

Zebra sharks are sought after for their meat, which is eaten fresh, or dried and salted like jerky. Its fins are used for shark fin soup or in traditional Chinese medicines. With enough scientific research on populations, scientists can present their findings to governments in order to pass laws to protect species *or* their habitats. For example, in Australia, zebra sharks can be found within several protected areas including the Great Barrier Reef Marine Park and Moreton Bay Marine Park in Queensland.

This is exactly the type of research OCEARCH conducts in hopes of providing valuable data for the protection of sharks and other ocean predators.

PART 3. HELPING IS CARING **10-15 mins**

So what can you do to help?
If you want to help protect sharks and coral reefs, all you have to do is learn about them and pass the knowledge along to your friends and family. Encourage others to learn about coral reefs and how important they are to us and the entire world! Teach your friends and family about sharks and how important they are to coral reef ecosystems.

Practice making "green" choices that help protect the planet. Use less electricity, conserve water, use reusable water bottles and bags instead of plastic, ride your bike instead of driving, and more! What are you doing right now to help the ocean?

When you get older, you can become an activist, a researcher, a marine biologist, a policy maker, a teacher, or you could work in an aquarium and teach the public about the ocean and its inhabitants. So there is a lot you can do!

Grade Level: 3-5

ENDANGERED SPECIES
ACTIVITY 1. MAKE A PACT

INTRODUCTION

During this activity, students will make a pact with fellow classmates, family, and friends to do everything they can to reduce, reuse, and recycle. With this pact, students will promise to educate everyone they know on conservation issues and show them how they too can help!

MATERIALS

- "Make a Pact" handout
- Writing utensils

INSTRUCTIONS

Have a short class discussion about conservation. What are their main concerns? What is at risk? What are they already doing to help?

Ask students to fill out and sign the "Make a Pact" handout. They should take this promise to do everything they can to help reduce, recycle, and reuse very seriously. The youth of today is the leading force behind this movement and with their help we can make an impact on society and the world.

TIPS

To expand on this activity, have students get their parents, siblings, or other family members to sign a pact as well.

Grade Level: 3-5

Name: _____

ENDANGERED SPECIES

I _____ (name) promise to _____ (reduce, reuse, recycle) as much

_____ (cans, glass, paper, plastic) as I can. I will educate my _____

(friends, family) on why it is important to _____ (reduce, reuse, recycle) as much as we can. I will tell

them that the _____ (an endangered animal) population might go extinct in the next fifteen years and tell

them that we can help save them by _____

_____ (a way that you can help the animals in the wild).

Below draw your favorite animal and you helping to save them:

_____

Signature

Grade Level: 3-5

ENDANGERED SPECIES
ACTIVITY 2. DO THE RESEARCH

INTRODUCTION

During this activity, students will research an endangered species of their choice. They will use their research to create an informational poster that can be put on display throughout the class or even the school! The goal is to spread the word about their species and why everyone should help save them!

MATERIALS

- Poster board/butcher paper
- Pencils, crayons, markers, color pencils
- Computer
- Printer
- Internet access
- Glue
- Scissors

INSTRUCTIONS

1. Have students pick a species of animal that is on the endangered list.
2. Research that animal on the computer or in the library. Information should include their species name, common name, where they are found naturally, what they eat, what they are known for, interesting facts, what they look like, and if they are migratory.
3. They should also research why this species is endangered, what is being done to help, and how they can help.
3. Students should either draw pictures of the animal or they can print pictures to glue them to their poster.

TIPS

This can be done as a group project or a take home project. If you choose to have them do it during class time, you could split it up amongst several days. This would be a good opportunity to take them to the library. They can even use books from the library to research as well.