

SHARK SUMMIT / INSTRUCTOR INFO

Summary

As apex predators, sharks play an important role in the food web and help ensure balance in the ocean's ecosystem. However, as demand for shark products (i.e. fins) has increased, concern has steadily grown regarding the status of many shark populations and the sustainability of global fisheries. How are conservation problems like this addressed in the real world? Students find out by researching the issue and demonstrating a real-life decision-making process in this lesson – Shark Summit.

Goals & Objectives

The students will:

- practice using the library and Internet to research a conservation issue;
- work as a team to develop a stance on an issue using scientific research;
- stage a “Shark Summit” to discuss the issue, propose solutions, and vote on a plan to conserve wild shark populations;
- and discuss how conservation issues are complex problems of society that affect both humans and animals.

// STANDARDS

This lesson aligns with the following Next Generation Science Standards:

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

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™, “Shark Summit” is intended to promote environmental awareness and to prepare students for STEM careers.

Helpful Tips

- 1) The content in this lesson is based on the conservation work of 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 first 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.

Vocabulary

Apex Predator – A predator residing at the top of a food chain on which no other creatures predate.

Collaborate – To work together with others to solve a problem/issue.

Conservation – A careful preservation and protection of something; especially planned management of a natural resource to prevent exploitation, destruction, or neglect.

Ecosystem – A community of organisms and their nonliving environment.

Endangered Species – A species of plant or animal whose numbers are decreasing at an alarming rate and is threatened with extinction by natural or man-made causes.

Food Web – The totality of interacting food chains in an ecological community.

Summit – A type of meeting between leaders and scientists with the purpose of solving an issue.

MS-LS2-4)

SHARK SUMMIT / LESSON PLAN

Part 1. Introduction to Shark Conservation (10 minutes)

As apex predators, sharks play an important role in the food web and help ensure balance in the ocean's ecosystem. However, sharks populations in all oceans are being depleted at an alarming rate. Humans typically view sharks as fearsome monsters, but sharks have so much more to be afraid of: pollution, long lines, shark finning, overfishing, and more.

To add to this problem, sharks mature (grow) very slowly compared to other fishes. After reaching maturity at approximately 15 years old, a female shark may give birth to only a few hundred pups in her lifetime compared to the millions of offspring produced by other fish species. For this reason, depleted shark populations may take years to recover.

How are conservation issues like this addressed in the real world? World leaders, scientists, and organizations collaborate to find the best solutions for both the environment and people. As a class, you will demonstrate this decision-making process then evaluate its outcome.

Part 2. Shark Summit Activity

Instructions

1. Familiarize yourself with the activity by reading all scenario cards on the following pages. Based on the size of your class, select at least three groups (we recommend the first three) to use in the scenario.
2. Divide the class into even-sized groups, one for each fictional group you have chosen. Each group will represent a different faction in an environmental issue. The issue at hand is **the diminishing population of wild sharks**. And the goal of the summit is to form a policy that is accepted by the all groups.
 - a. Group 1 represents an organization of environmental activists.
 - b. Group 2 represents a team of marine biologists who studies sharks.
 - c. Group 3 represents a local, native community.
 - d. Group 4 represents a major shipping company.
 - e. Group 5 represents a brand new ecotourism company.
3. Copy and distribute the scenario cards to the students. Give the students time to familiarize themselves with the situation. Then, depending on how much available time you have (one class period, several days, or a week), allot a certain amount of time for research, planning, and

creating a presentation. The activity can be as simple or as in depth as you have time for. See sample schedules on following page.

Sample Schedule 1: 5+ Days

Day 1 – Break up into groups, review scenario cards, discuss group’s position on the issue, and research the issue.

Day 2 – Continue researching the issue if needed and begin brainstorming a plan to present at the summit. Discuss solutions and decide as a group on one solution to present. Work on presentation (slideshow, poster, speech, model, etc.).

Day 3 – Continue working on presentation.

Day 4 – Finalize presentation. Discuss plan for presenting at the summit – Who will lead? Who will be in charge of presentation materials (clicking through the slide show, holding the poster, handing out paper, etc.)? What are the main points you need to get across? How will you answer questions from the other groups? What questions will you ask the other groups? What parts, if any, of your plan is your group willing to compromise if needed?

Day 5 – Shark Summit. *Can continue for more than one day if needed.

Sample Schedule 2: 3 Days

Day 1 – Break up into groups, review scenario cards, discuss group’s position on the issue, and research the issue. Discuss solutions and decide as a group on one solution to present. Work on presentation (slideshow, poster, speech, model, etc.).

Day 2 – Finalize presentation. Discuss plan for presenting at the summit.

Day 3 – Shark Summit.

Sample Schedule 3: 1 Day

10 Minutes – Break up into groups, review scenario cards, and discuss group’s position on the issue.

20 Minutes – Research the issues and decide on one solution to present.

30 Minutes – Work on presentation (slideshow, poster, speech, model, etc.). Discuss plan for presenting at the summit.

30 Minutes – Shark Summit.

4. Stage a “Shark Summit” with all groups to discuss the issue. Mediate between the groups as they take turns presenting their point of views and their solutions. The goal of the summit is to develop and agree on one plan to solve the issue. The final plan can include pieces of the groups’ individual plans or the class can vote on one unmodified plan.
5. At the end of the meeting, vote on a plan that will be acceptable to all factions.

Shark Summit Scenario Cards

All names and locations used in scenarios are fictional.

Group 1: Wildlife Heroes

Your organization is a group of individuals fiercely dedicated to protecting wildlife and the environment. After identifying a conservation issue, you make it your mission to educate the public, persuade others to join your cause, and fight for change until politicians pass laws to protect the wildlife you are lobbying for.

Wildlife Heroes is currently concerned about wild shark populations in a particular coastal region where native villagers hunt sharks, even juveniles who have not yet reached maturity. Your number one goal is to stop this community from hunting sharks and to stop any human disturbances or interaction with the sharks in any form. You have decided that the only way shark populations will recover is if humans simply do not interfere.

Group 2: Marine Biologists

You and your teams of scientists have been studying a particular species of shark in a small coastal region. According to your data, within a few years the number of sharks will be so low that there will be no chance for their population to recover, making them vulnerable to extinction. As apex predators, sharks play an important role in the food web and help ensure balance in the ocean's ecosystem. Without sharks, the whole ecosystem could collapse.

Taking control of the situation is of utmost importance to you and the rest of your team. Therefore, you have come up with a proposal to increase shark populations in these waters. Your plan is to create ocean pens in the shark nursery to safely raise juvenile sharks until they are mature enough to release into the open ocean. In the pens, they will be safe from hunters, tourists, and predators. This will also give your research team the chance to study sharks up close!

Group 3: Local Native Community

You are a member of a tribe that lives in a small village next to the sea. For as long as anyone can remember, the people of your village have hunted sharks. You do not hunt sharks for sport, you hunt sharks to survive. They provide food for your family and you sell the extra meat and the inedible parts of the sharks to traders in order to buy other food, materials, and supplies.

The small amount of coastline that your village occupies is actually a nursery for juvenile sharks, which are the easiest for your fishermen to catch. Unfortunately, sharks of any age are becoming harder and harder to find close to home. This is unfortunate because hunting sharks is the only way of life you know.

Shark Summit Scenario Cards

All names and locations used in scenarios are fictional.

Group 4: Major Shipping Company, Inc.

Major Shipping Company, Inc. main business is shipping medical surgical supplies, including stainless steel tools, diagnostic scopes, caps, gowns, gloves, gauze, anesthesia equipment, and even operating room furnishings, such as tables, storage carts, and lights. These supplies are produced in a factory located in a large city and then transported by Major Shipping Company, Inc. to distribution centers on other continents, who then deliver the supplies to hospitals all over the world.

You have recently learned that the shipping route used by your ships may cross over the migratory path of a particular species of shark that is vulnerable to extinction. Scientists believe these sharks are pregnant females, swimming to a coastal nursery to give birth. You anticipate a law being passed that will ban your ships from using this route, however you are concerned about hospitals not receiving their supplies in time since a new route would take longer. At this time, the company cannot afford to build more ships, which would help get supplies out faster if they end up having to

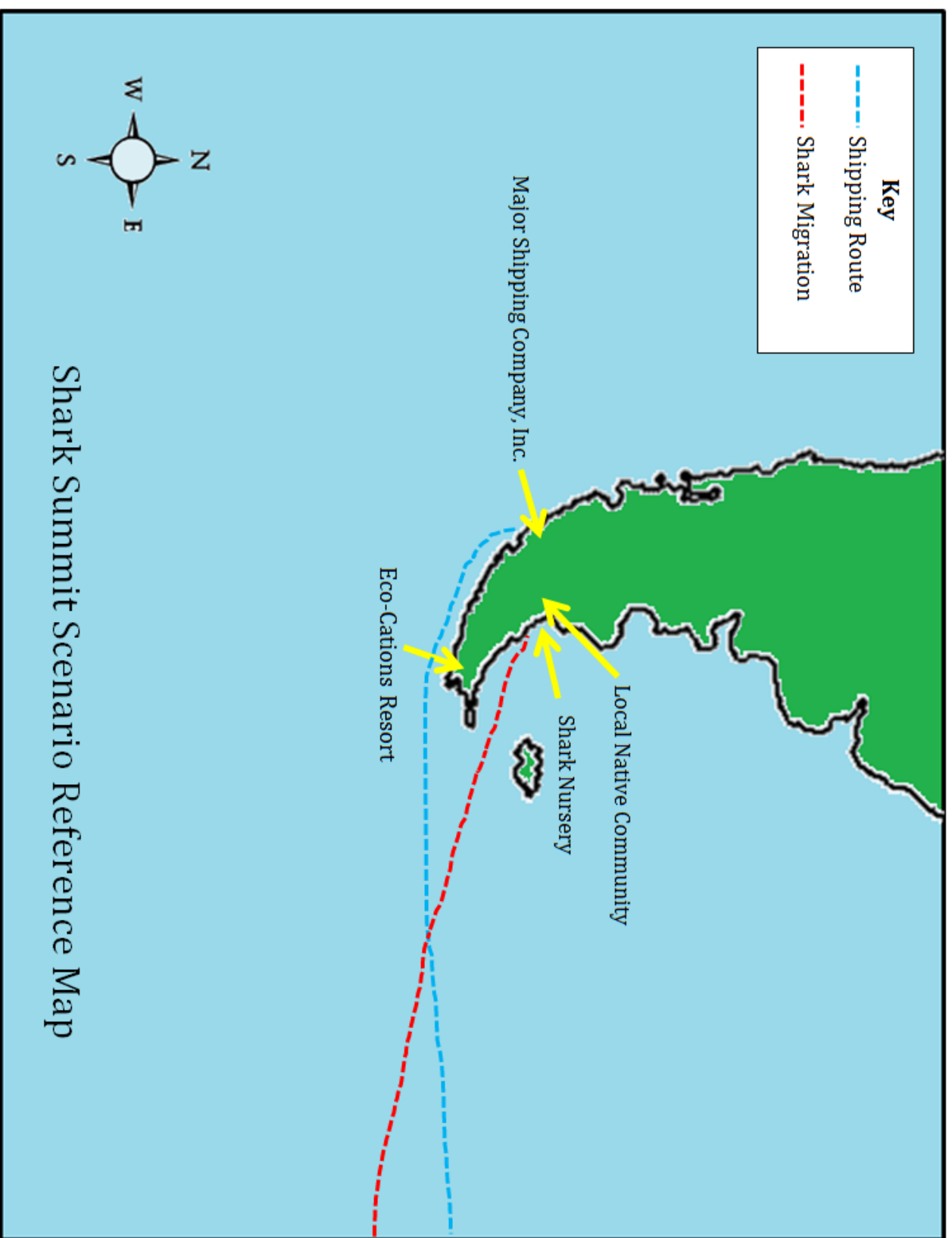
Group 5: Eco-Cations Resort

You and your friends have decided to open an ecotourism destination in a small town next to the sea. Ecotourism is defined as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education". This is right up your alley since you want to share your passion for nature while building environmental and cultural awareness and respect.

Eco-Cations Resort has been open for a couple of months now. The company offers eco-friendly accommodations, organic meals, and a variety of activities such as hiking, snorkeling, SCUBA diving, camping, and more! Unfortunately, attendance is low and you worry that if it doesn't pick up, you will have to shut down.

To make matters worse, you've recently heard that shark populations in nearby waters are decreasing. Shark diving happens to be one of the main activities provided by the resort, since people are fascinated by the animal and it's on many people's "bucket list". You and your partners have an idea! There's a local native community that is very knowledgeable about sharks, so much that sharks are a part of their culture. Maybe Eco-Cations Resort can incorporate the village into their ecotourism plan, thus providing a better experience for your guests as well as direct financial

A reference map is provided on the following page. Use of the map is optional, but may help the students visualize the scenario and brainstorm more ideas for a solution.



Part 3. Shark Summit Conclusion

Discuss how conservation issues are actually complex problems of society that affect both humans and animals. Ask the following questions to prompt students to discuss the outcome of the Shark Summit.

1. Were all three groups satisfied with the outcome of the Shark Summit?
2. Is it always easy, or even possible, to come up with a solution acceptable to everyone involved?
3. Did your stance on the conservation issue change after listening to others present their point of views?
4. Would it ever be beneficial to compromise your point of view? When and why?
5. What role does science play in policy-making?
6. What role does public education play in awareness and action?