



## **Cabrillo Marine Aquarium Lesson Plan**

**Grade Level:** Fifth and Sixth Grades

**Title:** *Swimming with Sharks: A Lesson on Shark Migration*

**Objective:** Students will learn about the blue shark's migratory nature and how scientists study shark movements with electronic tags.

**California Science Standards:** 5<sup>th</sup>: 6a-i 6<sup>th</sup>: 5a-e, 7a-f

**Time to Complete:** 30 to 45 minutes

**Materials Provided by CMA:** *Reading Handout: All about the Blue Shark, Worksheet: Tracking a Shark, Worksheet: Shark Word Search*

**Materials Provided by Teacher:** Photocopies, pencils, rulers (optional)

**Vocabulary:** Endangered, threatened, vulnerable, extinction, conservationist, ecosystem, migration, coordinate, vertical, horizontal, seamount, species, buoyancy, gill rakers, viviparous, pelagic

### **Background Information:**

Presently, it is estimated that 55-100 million sharks and rays are killed worldwide each year. Some shark populations have declined by as much as 80% due to human activities such as fishing. At this time, many species of sharks and rays are considered **endangered**, **threatened** or **vulnerable**. For instance, currently, Great White sharks are vulnerable to extinction and sharks once as common as the Blue, Mako and Hammerhead are now threatened. In order to protect shark populations, information about where sharks go and what routes they take is needed. Identifying the movement patterns of sharks can help scientists and **conservationists** safeguard sharks by advocating for the protection of those areas most favored by sharks.

### **Lesson Outline:**

- **Activity 1: Brainstorming with Students** - Discussion
- **Activity 2: Shark Tracking** - Class Activity
- **Activity 3: All About Blues** - Reading Handout
- **Activity 4: Shark Word Search** - Student Activity

### **Activity 1: Brainstorming with Students**

- Many animals migrate. Birds migrate many thousands of miles to avoid extreme temperatures and to find food. Large African mammals such as gazelles and

elephants migrate to find water. Large marine mammals, like the gray whale, migrate to birth their young in the warm, protective waters of the Gulf of California

➤ **Why do sharks migrate?**

- Students will brainstorm all the reasons they know for why sharks migrate.

➤ **Why do animals migrate?**

- Write student responses, for animal migration, on the board & discuss as a class.

**Possible answers may include:** to seek better living conditions, travel to feeding, nesting and nursing grounds, migrate to breed, to find food & shelter, migrate due to changing environments—including factors such as temperature & climate, population growth & decline, habitat destruction & natural disasters, etc.

## Activity 2: Shark Tracking

### Procedures

- The following activity is an exercise that involves mapping the coordinates of a tagged shark onto a map to identify its movements.
- Each student will be given the handout with a map of Baja California and instructions on how to construct the tracking map of the Blue shark, Jeff.
- Learners should follow the instructions, placing a mark on the map and connecting the marks to follow the migration of the shark.
- In the Gulf of California, many species of shark migrate to the open ocean in search of food including small fish like sardines and herring; but they also like to eat squid and octopus. In search of food, blue sharks can migrate over 3000 miles!
- Print the map (see *Worksheet: Tracking a Shark*) and the directions for the shark tracking activity.
- Each student should receive a copy of the directions and the map.
- Map Directions: The map has **horizontal** lines indicated by numbers (1-21) and **vertical** lines indicated by a letter of the alphabet (a-u).
- Each **coordinate** is made up of a letter and number. Use the coordinate to mark the position of the shark on the map.
- Connect the coordinates by drawing a line from one coordinate position to the next to track the movements of Jeff the Shark.

### Discussion with Students

- Following the tracking exercise, discuss with the students Jeff's movements. Have the students think about his movements and why he may have preferred certain areas. Also, have the students discuss his shark senses and how he might have navigated to all of the areas.
- Some discussion prompts:
  - What was the farthest location (coordinate) Jeff moved from the point he was tagged? (Have the students use a ruler to measure from his starting place to find the farthest location he moved to.)
  - Jeff had returned to the Gulf of California when the tag came off at the end of his journey. Discuss some reasons why Jeff may have returned to this inland

sea. (Some possibilities would be to find food or to find a mate). Jeff was often found to visit **seamounts** in the ocean. What is a seamount?

- Discuss some reasons why Jeff may visit seamounts? (Some possibilities would be to find food, find a mate, or for preferred ocean temperatures.)

### Activity 3: All about the Blue Shark - see reading handout

- Read & discuss as a class

### Activity 4: Shark Word Search

- Make copies for students

### Lesson Extensions: Shark Tagging Video Gallery!

- National Aquarium's Shark Tagging Trip  
<http://www.aqua.org/care/conservation-initiatives/shark-tagging>
- Discovery Channel: Shark Up! Shark Up! - off the coast of California, researchers tag a massive great white shark. The tag will help reveal where this apex predator is going and why - 02:27 minutes  
<http://dsc.discovery.com/tv-shows/shark-week/videos/great-white-shark-videos.htm>
- Discovery Channel: Tagging a Ruthless Shark - a research team tags an enormous great white shark just off the coast of Cape Cod - 02:13 minutes  
<http://dsc.discovery.com/tv-shows/shark-week/videos/great-white-shark-videos.htm>

### Further Student Exploration:

- Book recommendations
  - **Shark (DK EYEWITNESS BOOKS)** by Miranda MacQuitty
  - **Uncover a Shark** by David George Gordon
  - **What Do Sharks Eat For Dinner?** by Melvin Berger, Gilda Berger
  - **The Best Book of Sharks** by Claire Llewellyn
  - **Sharks : 3-D Book** by Discovery Kids
  - **Shark!: A Sticker Safari** by Discovery

### References:

- Iemanya Oceanica  
<http://www.adoptashark.com/>
- The-Shark-Side-Of-Life  
<http://www.the-shark-side-of-life.com/>
- Discovery Channel  
<http://dsc.discovery.com>
- The Shark Side of Life  
<http://www.the-shark-side-of-life.com>
- Shark World  
<http://www.sharks-world.com>