Living Coast Discovery Center
Field Trip Resource Packet

A Shark's Tale

In this packet you will find lessons and resources related to your Living Coast field trip. The first two activities are intended to bookend your trip, followed by additional resources.

Career Focus: Ichthyologist
I study different aspects of various fish species, including their history, behavior, growth patterns, and their place in ecosystems. To do this, I may collect various samples or observe fish behavior, before returning to a lab or office to analyze the information that I collected.

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Shark Teeth

Lesson Objectives:

- Students will be able to compare a shark's tooth to a human tool
- Students will be able to describe how a shark's teeth can show what kind of food it eats

Standards:

- 3.LS4.2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
- 3.LS4.3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Materials:

- Linked videos
- Shark tooth worksheets

Outline:

Ask students to brainstorm a list of stereotypes about people's perceptions of sharks. Write them on the board. Show students the photos of different types of sharks. Then discuss the different kinds of foods that sharks eat, such as turtles, fish, and microscopic organisms. Ask students to brainstorm how sharks' anatomy fits the prey they hunt – if they eat microscopic organisms, do they need huge teeth?

Watch the Crittercam video segments (at http://education.nationalgeographic.com/education/activity/shark-teeth/?ar_a=1) on the white shark and tiger shark. Ask students to notice the different kinds of foods the two sharks eat.

Give each student a copy of the worksheet Sharks: Which Tooth Belongs to Which Shark? Have students look carefully at the drawings of four kinds of shark teeth and four drawings of sharks accompanied by the foods they eat. Ask students to examine the teeth for features that help capture and eat a particular kind of food, and then match each tooth to a shark and its food.

Discuss the answers. (Tiger Shark, B; Lemon Shark, C; Great White Shark, A; Whale Shark, D) Ask: What tools can you compare each tooth to? For example, tooth A resembles a saw. Tooth C resembles a spear. Have students brainstorm other tools the teeth remind them of.

Worksheets:

Shark Design Challenge

Lesson Objectives:

- Students will be able to describe a shark's adaptive features and provide examples of how those features help a shark survive

Standards:

- 3.LS4.2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
- 3.LS4.3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Materials:

- Shark adaption cards (organized by category)
    - **Distance learning adaptation:** teacher can show children all the options and randomly assign adaptations to each student
- Paper and pencils/crayons/markers

Outline:

Remind students of the information they learned about sharks and shark adaptations during their study trip. Write down the key ideas they remember, and leave them up so the students can reference them throughout the lesson.

Guide the discussion so that students see that each adaptive feature helps the shark survive successfully in a specific habitat. Tell students that they are going to work in pairs to draw sharks they create themselves. Each shark must exhibit adaptations to be determined by cards students will pick. Students should know that they will be expected to describe the habitats where their sharks live and eat, show how their sharks' adaptive features help them survive in their habitats, and make up appropriate names for their sharks.

Divide your class into pairs or small groups to work on shark models. Each group should pick one card from each adaptation category, write down the adaptations they have picked, and then replace the cards.
Students should create their sharks so that they exhibit all the adaptations the group has picked.

Have each group present its shark to the class, naming the shark according to at least one of its adaptive features and explaining where it eats and lives. Each presentation should make clear how all the adaptive features the shark exhibits help it to survive in its habitat

Extensions:

1) Have students debate the proposition: Sharks should be protected. Assign students roles such as scientist, environmentalist, doctor, restaurateur, fisherman, and beachgoer. Have students research the issue looking for information that supports their positions. Ask them to prepare their arguments and then debate the issue. *Incorporates SL.3.4*
2) If you'd like to spend some more time on the subject, have students prepare for the activity by reading up on sharks. Divide the class into research teams, and allocate time for them to use the Internet, materials you have provided, or materials in the library. They should concentrate their research on specific adaptations that help different kinds of sharks survive in their particular habitats. In class discussion, invite students to share their research findings.

Worksheets:

Shark Adaptation Cards

TEETH Thin	**TEETH** Pointed	**TEETH** Serrated
TEETH Wedge-shaped	**TEETH** Small	**TEETH** Conical
BODY SHAPE Torpedo	**BODY SHAPE** Blunt Head	**BODY SHAPE** Long Snout
BODY SHAPE Flat & Rectangular Head	**COLORATION** Light-colored Belly	**COLORATION** Gray Topside
COLORATION Blue Topside	**COLORATION** Dark Brown with Spots	**COLORATION** Mottled
TAIL & FINS Crescent-shaped Tail	**TAIL & FINS** Long Pectoral Fin	**TAIL & FINS** Tail Fin Same Length as Body
EYE Small	**EYE** Black	**EYE** Green

FINNED, FLOATING, & fabulous

A Shark Science Activity

When it comes to real sharks in the ocean, it's always best to keep your distance. But in your own backyard, get up close and personal with some shark science! In this experiment, learn what helps keep a shark from sinking.

Supplies:

- A toilet paper tube
- 3 pennies
- A roll of clear packing tape
- A paper shark (drawn or printed)
- 1/3 cup vegetable oil
- A funnel (optional)
- A 12-inch inflatable balloon
- A pool, bathtub, sink, or bucket filled with water

1.

Find or draw a picture of your favorite shark on paper. Cut it out and place it on the toilet paper tube, holding it in place with a small piece of tape.

2.

Wrap clear packing tape around the tube so that it covers the whole shark. Place three pennies across the bottom side of the tube and tape them in place as well.

3.

Fill a sink, bathtub, or bucket with water. Gently place your shark in the water and observe what happens. Remove your shark from the water.

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▸ Why do you think the shark sank?

4.

Carefully fill a balloon with 1/3 cup vegetable oil, using a funnel if you have one. Tie off the balloon once it is full.

5.

Gently insert the balloon into the toilet paper tube. Center it as much as possible.

6.

Place your shark in the water again and observe what happens this time. Is your shark able to stay afloat?

▸ Explanation:

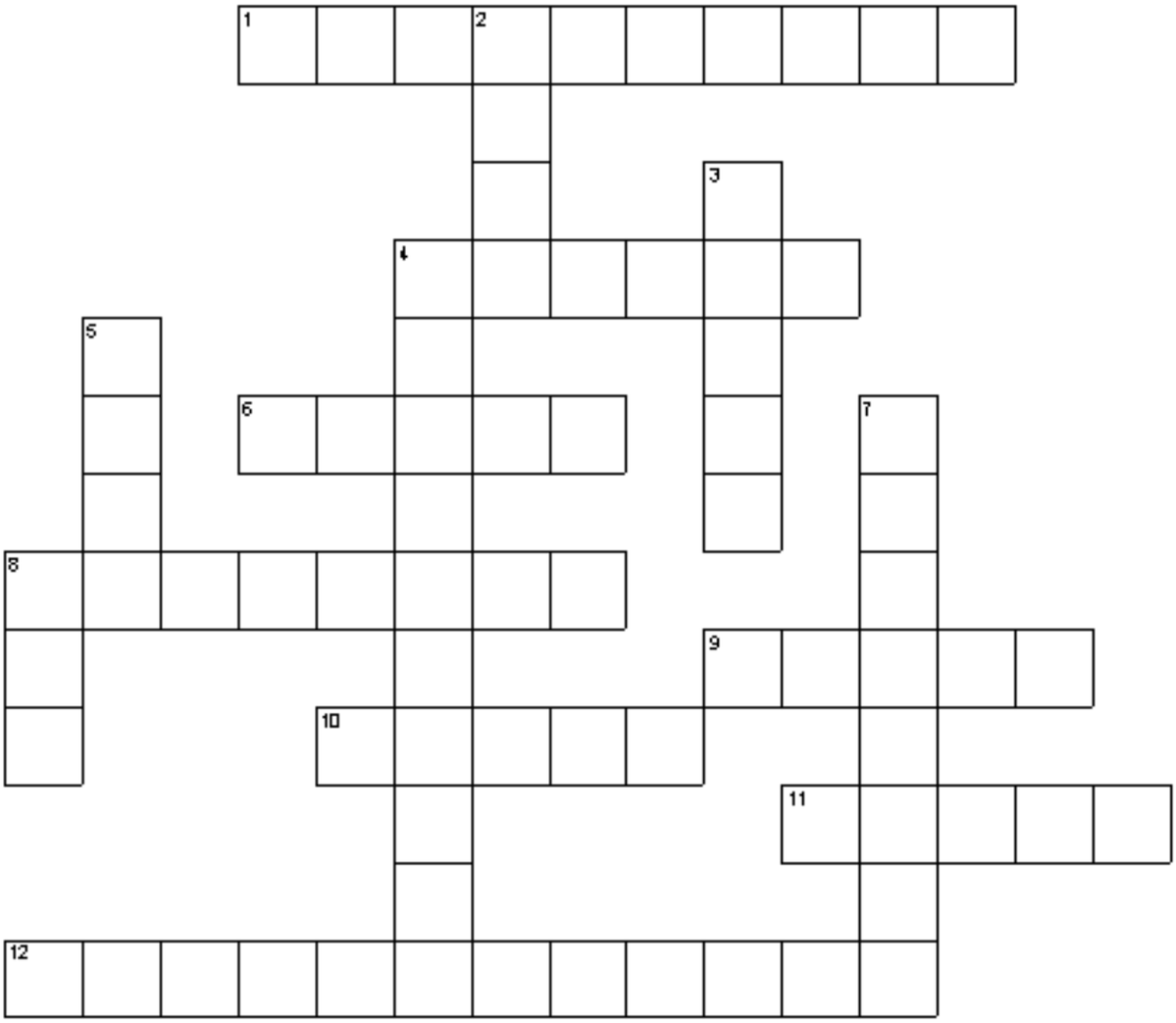
Did you know that the oil contained in a shark's liver is what keeps it from sinking to the bottom of the sea? Sharks are buoyant because their liver oil isn't as dense as the surrounding water. In fact, some sharks have livers that consist of up to 25% of their entire weight. Real sharks must also swim constantly to avoid sinking.

In this activity, the weight of the pennies represents the high density of a real shark and causes the handmade shark to sink. Adding the oil-filled balloon to the shark makes it buoyant.

▸ A Lesson from Connections Sharkademy:

Density is a physical property of matter and refers to the mass or "heaviness" of an object with a constant volume. The density of an object is often compared to the density of water. In other words, does an object float or sink? If an object is able to float in water or another type of liquid, it is considered to have **buoyancy**.

Sharks



Across

1. This shark has eyes and nostrils as far as a yard apart to help it sniff out lunch.
4. These sharks live in very deep water.
6. Most common shark fossils.
8. Tiny food for big sharks.
9. Two thirds of the sharks brain is dedicated to this sense.
10. The biggest shark in the world is also the biggest fish.
11. Number of eyelids some sharks have.
12. This shark chops round holes from its victims bodies.

Down

2. This shark is the fastest swimmer at about 43 miles per hour.
3. This shark eats almost anything!
4. This shark has attacked people more times than any other.
5. This shark can swim in fresh water and salt water.
7. This shark has a ten foot tail it uses to round up fish.
8. A baby shark is called a _____.

SHARKY Word Scramble

KASGINB

KEOCOI RUTTEC

NLGBOI

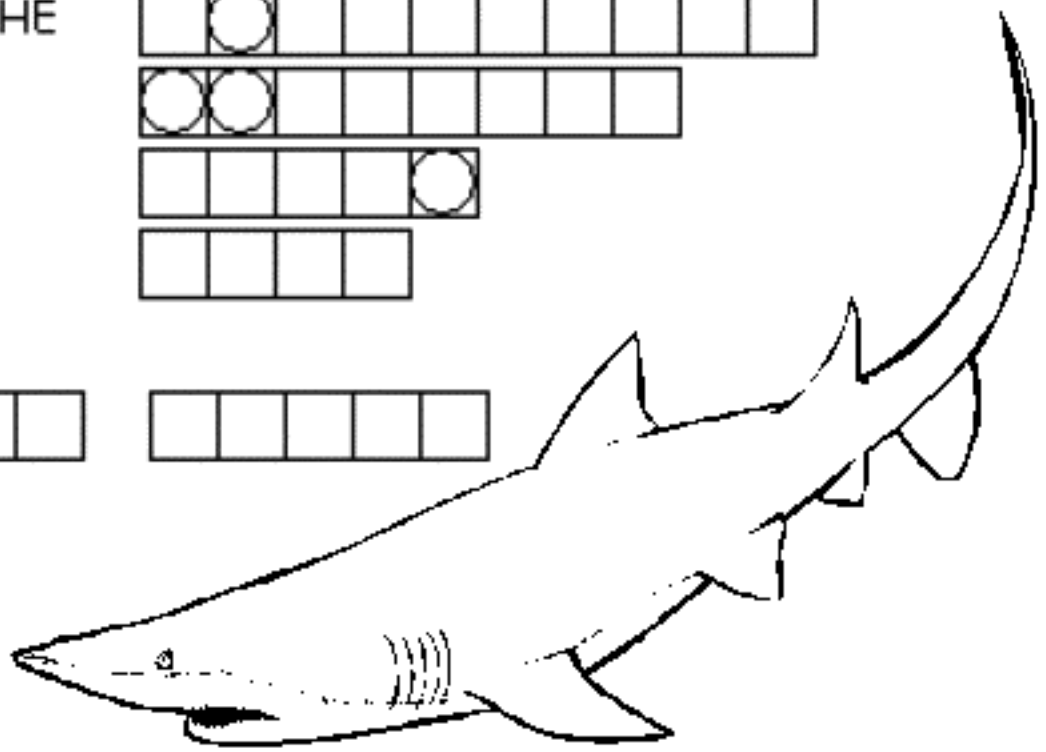
PITWEHTI

MAREDMAHHE

TEHSERRH

TEGIR

MAOK



INSTRUCTIONS:

Unscramble each of the clue words.

Take the letters that appear in ◯ boxes
and unscramble them for the final message.

Sharks Word Search

Find all the types of sharks listed in the puzzle.

X P Q C K C X C V F X A P I H
G H T U O M A G E M X I K A F
V N N S C O B R T K T J M R H
F Y O X E N K I P E D M O E M
U W V G R U G I T E E M K H X
K G B R E E L I E R T F A S P
E O Q E R B H B H C H B M E U
B B K A S W B E A W U P R R P
W L V T N A A O D O W T F H U

Y I X W Y D L T W M Q P T T Z
W N L H M O Q E L A H W S E B
G X J I B A S K I N G F E V R
L W H T R Q I B I F E Q L K I
G Y B E C Y C E E E V I D Q T
W V C Y Z W D P R Q X Z H F O

BASKING
BLUE
CARPET
COOKIECUTTER
GOBLIN
GREATWHITE
HAMMERHEAD
MAKO
MEGAMOUTH
REEF
THRESHER
TIGER
WHALE
WHITETIP
WOBBEGONG

Resources

I-Spy style activities to do using Monterey Bay Aquarium's live cams
https://www.montereybayaquarium.org/for-educators/curriculum-and-resources/games-and-activities/be-a-sea-searcher

Word Searches, Crosswords and other printables
https://www.sharktrust.org/activities-downloads

Lots of Shark videos!
http://www.supportoursharks.com/en/Education/Videos.htm#Anchor

Earth Sciences Resource book with activities and information from NOAA. Check out "Who Trashed the Ocean" for an extension about how humans affect sharks.
https://oceanservice.noaa.gov/education/discoveryourworld.html