Let's Investigate Sharks: All About Sharks!

Grade Level:
1st and 2nd

Time:
30 minutes (longer if additional options are chosen)

LEARNING OBJECTIVES

1. Define what a shark is.
2. Understand the importance of sharks.
3. Discover where sharks are located.
4. Learn how many shark species exist.
5. Count how many sharks species exist.
6. Describe various parts of a shark.

SKILLS

analyzing, classifying, comparing and contrasting, defining, describing, evaluating, explaining

ALIGNMENT

Common Core: *CCSS.ELA-LITERACY.SL.1.1; CCSS.ELA-LITERACY.SL.1.2; CCSS.ELA-LITERACY.SL.1.3; CCSS.ELA-LITERACY.SL.2.1; CCSS.ELA-LITERACY.SL.2.2 ; CCSS.ELA-LITERACY.SL.2.3; CCSS.ELA-LITERACY.L.1.4; CCSS.ELA-LITERACY.L.2.4*

Next Generation Science Standards: *LS1.A; LS1.B; LS1.D; LS2.A; LS2.C; LS3; LS4.C; ESS3.C; CCC1; CCC6*

Ocean Literacy Scope and Sequence:*P4A; P5A.3; P5A.4; P5B; P5B.1; P5B.2; P6C.3; P6C.5; P6C.6; P6C.7; P71*

VOCABULARY

adaptation, Ampullae of Lorenzini, apex predator, biodiversity, bycatch, biologist, carnivore, cartilage, conservation, consumer, coral reef, dermal denticles, ecosystem, endangered, environment, extinction, food pyramid, gills, lateral line, life cycle, mangrove forest, organism, population, prey, producer, scale, shark, water pollution

BEFORE YOU DIVE IN

Did you know that a shark is classified as a fish and not a mammal? Can you name any special senses that sharks have?

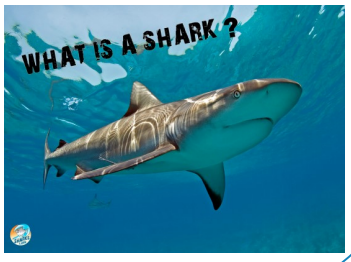
Our educators and scientists have compiled the most important and up to date key facts pertaining to sharks in an easy to follow lesson entitled Let's Investigate Sharks.

The Let's Investigate Sharks PowerPoint is packed with professional photographs combined with cartoon characters to grab the attention of young learners.

The lesson is broken down into 5 sections including: what is a sharks, why are sharks so important, where do we find sharks, how many, and shark parts.

Furthermore, all of the sections include discussion points for each slide. The vocabulary words are highlighted and definitions are included in the packet.

It is not necessary to discuss each and/or every key point. The sections can be used as stand alone curriculum or used as an entire presentation. You have the freedom to personally select the points you wish to discuss or the ones that best coincide with your current curriculum.



MATERIALS NEEDED

- computer/laptop
- internet access (optional)
- Let's Investigate Sharks PowerPoint
- Let's Investigate Sharks teaching guide
- Let's Investigate Sharks vocabulary list
- large poster board paper (optional)
- overhead projector (encouraged but not required)
- poster print out (optional)

EXTENSIONS

Coloring Sheet (multiple species available), Comparing Habitats, Design Your Own Shark, Maze Easy, Sharky Concentration, Shark Needs

TEACHING GUIDE: *LET'S INVESTIGATE SHARKS* GRADES 1 & 2

This guide is for use with the *Let's Investigate Sharks PowerPoint.* It provides key points to discuss for each slide as well as vocabulary words (highlighted in RED) that can be incorporated. It is not necessary to discuss each and every one of the key points. Select the points you wish to discuss or the ones that best coincide with your current curriculum.

The PowerPoint is broken down in sections (bold, underlined and lettered). The sections can be used as standalone curriculum or used as an entire presentation. You may find it beneficial to break the presentation of the material up into smaller sections.

SQ: Indicates a question you can ask students to engage them in a discussion (Student Question)

(*) Indicates a recommended activity to be used in that section or with a particular slide.

SLIDES

Intro:

1. SHARKS4KIDS Logo

2. Let's Investigate Sharks

A. WHAT IS A SHARK

3. What is a Shark? (Caribbean reef shark)

SQ: What is a SHARK?

-Let students give several guesses

- Sharks are cartilaginous FISH

SQ: Have you ever heard any bad things about sharks?

SQ: Do you think they are true?

-Sharks are not monsters and they do not eat people. Yes, accidents happen and people get hurt, but most times it is because the shark has mistaken the person as an animal they eat, like a seal, sea lion, or fish.

* Ask the students to come up with words they associate with sharks. Make a list on a large piece of paper, so you can save. Do this again after the presentation and see if the words change.

4. Fish Collage

Sharks are fish.

SQ: Do you have a pet fish?

5."Whoa! Sharks are Fish Too! "

-Yes, sharks are fish, but they are different than some of the other fish that might come to mind.

SQ: How are sharks different from other fish?

6. Bones vs. Cartilage

-Sharks do not have bones. Get the students to touch their wrist bones.

-A shark's skeleton is made entirely of CARTILAGE. Have students touch their nose and wriggle it a bit.

- Cartilage is lighter (less dense) than bone and is also more flexible. Both of these attributes make it easier for sharks to maintain buoyancy (keep them from sinking to the bottom)

7. Skin vs. Scales

- Sharks do not have flat SCALES like other fish

- Sharks have placoid scales, which are also known as dermal denticles (more about skin later in the presentation).

-The dermal denticles are razor sharp tooth-like scales that reduce drag (hydrodynamic) and allow the sharks to swim faster.

B. WHY ARE SHARKS SO IMPORTANT

8. Why are Sharks so Important?

SQ: Do you think sharks are important?

SQ: In what ways are sharks important for the oceans? For humans?

9. Food Pyramid

- In a balanced ECOSYSTEM, the food pyramid shows the quantity of ORGANISMS on each level (number of animals) of the food chain. There are more PRODUCERS (base) than there are CONSUMERS (upper levels). This is necessary to keep the whole system in balance.

-Many shark species are at the top of the FOOD CHAIN (FOOD PYRAMID) in almost every part of the world's OCEANS.

- Sharks are not always APEX PREDATORS, but no matter where in the food chain they exist, they play a critical and necessary role in its balance. They help maintain healthy and sustainable populations of the animals they consume. They also eat injured, sick, dying or dead animals, which keeps the oceans clean and keeps disease from spreading. It is important for each level of the food chain to be in balance in order for the whole ecosystem to be healthy.

-Sharks are CARNIVORES meaning they eat other animals.

- Sharks eat (PREY) fish, turtles, marine mammals, birds, sea snakes and even other sharks.

10. Biodiversity

-BIODIVERSITY is critical for healthy oceans. Scientists have found a decline in ocean biodiversity and this has consequences on the stability of functioning ecosystems. This system is delicately balanced and when a component or multiple components are affected, the entire system and its interconnected parts feel the impact

-Sharks are not always apex predators, but no matter where in the food chain they exist, they play a critical and necessary role in its balance. They help maintain healthy and sustainable populations of the animals they consume. They also eat injured, sick, dying or dead animals, which keeps the oceans clean and keeps disease from spreading.

11. 100 Million

- Approximately 100 million sharks are killed each year. This is a VERY large number and the point of the slide is to get their attention and to think about just how LARGE this number is.

12. Human Impact: Sharks are in DEEP Trouble

- Sharks are primarily fished for their meat and fins, but also for their cartilage, liver and skin.

- -Shark fins are used to make shark fin soup. A bowl of this soup can cost $100.00 or more.

-Shark finning is the cruel practice of removing the fins of a live shark.

-Sharks are also caught as BYCATCH by other fisheries.

-WATER POLLUTION and habitat destruction have a negative impact on the oceans and sharks.

-The LIFE CYCLE of sharks is very different from other fish. They are slow growing and do not lay thousands of eggs.

-Some sharks will carry their babies for 12 months and only give birth to 2-15 pups.

-Baby sharks are called "pups."

- Shark POPULATIONS are declining because they cannot reproduce fast enough to recover from the millions being killed each year.

- Shark BIOLOGISTS believe many sharks are at risk of EXTINCTION due to overfishing, habitat loss, finning and being caught as bycatch.

* There is a printable poster of this slide

C. WHERE DO WE FIND SHARKS

13. Where do we Find Sharks?

SQ: Do you think there are sharks in the ocean near us? (If near an ocean)

SQ: Has anyone ever seen a shark either in the ocean or maybe in an aquarium?

* As a class, you can research what shark species can be found in your area.

14. Map of the World

-Sharks are found in every ocean around the world.

15. Habitat & Ecosystems

-Sharks can be found in lots of different ecosystems and HABITATS including the open ocean, seagrass beds, CORAL REEFS and MANGROVE FORESTS.

-They can be found in cold water, warm water and even in fresh water rivers.

- Bull sharks can actually swim in brackish (fresh and salt water mix) and freshwater. They have been found thousands of miles up rivers around the world, some are far north up the Mississippi river as Illinois.

- Different sharks can survive in different habitat because of adaptations like camouflage and tail shape or because of different behaviors.

D. HOW MANY AND DIVERSITY

16. How Many Sharks?

SQ: How many different types of sharks do you think there are?

SQ: Can you name five different sharks? How about ten?

- There are over 500 different types of sharks that we know about. They range in size from 6 inches to 50 feet in length. They are all sharks, but they are incredibly diverse. They share common traits which classify them all as sharks, but they also have many differences. Differences include coloration, size, eye shape, fin shape and size, tooth shape and size and adaptations for hunting and survival.

17. Behaviors

-Different species have different behaviors that help them survive, which can include how they get food, hiding and being social.

- Some sharks are awesome ambush predators, using camouflage to hide and then attacking when prey is nearby (Angel sharks).

-Sharks have different personalities just like we do. Some sharks are bold, while others are shy. (Lemon sharks)

- Some sharks are social and hunt together, while others are very solitary. (dogfish vs. great white sharks)

- Juvenile lemon sharks have best buddies they hang out with.

E. SHARK PARTS

18. Shark Parts- Just What Have They Got

SQ: Do you think sharks have parts like us?

SQ: Do certain body parts help sharks survive in specific habitats?

19. Let's Dive in and Take a Closer Look

Sharks and other animals have body parts that help them seek, find and take in food when they are hungry. Different sharks have different ADAPTATIONS which also help them survive. These can include camouflage or the size and shape of their fins and teeth.

20. Teeth

-Humans have one row of teeth on the top and one row on the bottom (52 teeth total over our lives, 20 baby teeth that we lose, and 32 adult teeth).

-Sharks have several rows of teeth and they are constantly falling out. Most sharks have about 5 rows of teeth.

-Sharks will have thousands of teeth over their lifetime!

- Sharks usually lose at least 1 tooth per week. Imagine losing a tooth every time you ate an apple.

21. Teeth and Jaw Shape

-Different sharks have different shaped teeth depending on what they eat.

22. Gills

- Sharks have 5 to 7 gills slits on each side of their body

- Even though they live in the ocean they still need oxygen to live

-Sharks use their GILLS to pull oxygen from the water

- Water enters the shark's mouth and is expelled through the gill slits. This is the part of the gills we can see.

-Most sharks have to swim to stay alive, but others can rest on the bottom and pump water over their gills in order to get oxygen.

23. Lounging :

- Lemon sharks (top) and nurse sharks can lie on the bottom and pump water over their gills in order to breathe. This is called buccal pumping.

24 . Fins

-Sharks have 8 or 9 fins (some have a single dorsal fin)

-They use their fins to swim as well as stay upright while moving through the water.

25. Fin shape & function

- The shape of shark fins varies depending on what habitat they spend most of their time in. Example: A nurse shark has a flat caudal (tail fin) because it spends most of its time on the bottom.
- Some sharks like the Thresher shark can use their caudal (tail) fin to slap and stun their prey before eating them.
- The epaulette shark has an increased range of motion in its pelvic and pectoral fins allowing it to walk over the ocean floor or through tide pools.

26. Eyes

- Shark eyes are similar to our eyes in how they work.

- Shark eyes vary in size and shape depending on the habitat and depth they spend most of their time in.

-Sharks have eyelids, but they do not close all the way

-Some sharks have nictitating membranes, which protect their eyes when they are going after prey.

-Sharks without nictitating membranes can roll their eyes back in order to protect them.

SQ: Do any of these eyes looks like other animals' eyes?

27. Nictitating Membrane

-A nictitating membrane is a thin membrane similar to our eyelids.

-The membrane protects the eye when a shark is going after prey, they cannot see through this when it is closed, and must use other senses.

- Seals and sea lions have claws and fish have sharp spines, all of which could do damage to the eye of a shark during a predation event.

* There is a printable poster of this slide

28. Noses

-Sharks have 2 nares (nostrils) on the underside of their snout.

- Each nare has 2 openings: 1 for water to enter and 1 for water to exit.

- Sharks do not use their noses to breathe. They are only used for smelling.

29. Skin

- Shark skin is made up of tiny razor like scales called dermal denticles. (See next slide)

- Shark skin is very smooth in one direction (head to tail), but feels like a cat's tongue or sandpaper when you rub it the other way (tail to head).

30. DERMAL DENTICLES

- These V shaped scales make the sharks hydrodynamic, meaning they can move with less resistance through the water allowing them to swim faster, and use less energy.

-Olympic swimsuit designers, and boat builders have modeled material after the skin of sharks.

SQ: Why would it be important for sharks to be able to swim fast and smoothly through the water?

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31. Parents and Pups (2 slides)

Baby sharks are called pups

- Sharks give birth 3 main ways

  - Lay egg cases (horn shark hatching out)

  - Live babies with no umbilical cord (nurse sharks)

- Live babies with an umbilical cord (lemon sharks)

32. Do You Look Like Mom or Dad?

- Baby sharks can look like perfect miniature copies of their parents OR look very different. (Lemon shark vs Zebra shark)

- No matter how a shark is born, there is no parental care.

33. Let's Make Sense of Shark Senses: (5 slides)

-Sharks have all five of the same senses we do, but they actually have a very special 6th sense that helps them detect prey. This slide shows how strong each sense is (how far it can reach).

34. Sight

-Sharks can see in dark or murky water.

35. Hearing

- Sharks have ears, but they are located entirely on the inside of the body. Sound travels faster and farther through water, so often times sharks are able to hear their prey long before they can see it.

36. Smell

-Sharks have an incredible sense of smell.

-Imagine being able to smell a chocolate chip cookie in an area the size of a football field.

-Some sharks can detect a single drop of fish blood within a million drops of seawater or from a quarter of a mile away. A standard track is ¼ mile (1320 feet) in length and ¼ mile is almost 4 football fields (360 feet) in length.

SQ: Do you think sharks are attracted to human blood?

* If you have a space large enough on school property you can measure out ¼ of a mile. Place a marker or half the class at one point and everyone else 1320 feet away. Or you can take the kids onto the track and have them walk/jog a lap around the track, so they can see just how far ¼ mile is.

37. Taste

-Sharks have very sensitive taste buds in their mouth and will do a “test bite” to see if something is edible or part of their normal diet. People are NOT part of the normal diet of sharks.

-Scientists believe that modern teeth (in sharks) may have developed from taste buds.

SQ: If you were to bite a crayon or t-shirt (or another item in the classroom the kids would not eat) would it taste good? Would you want to eat it?

-Sharks do not have hands like we do, so they use their mouths to figure out what things are.

-Accidents happen when sharks bite something (people) and then let go because it is not food.

-A candy bar tastes good, but the wrapper it comes in does not. We know the wrapper doesn’t taste good because we have learned it is not food. A shark learns by doing a test bite.

-We don’t taste good, so they let go, but sharks have a lot of teeth and sometimes the bite can harm a person, but it is not the shark hunting down a human and trying to eat them.

This is a challenging section, but also a great opportunity to reiterate the fact that humans are not on the menu for sharks. Yes, accidents happen, but sharks do not hunt people and consider them food.

E. Touch

- Sharks have two components to their sense of feeling and touch.

-The first is actually touching an object, including a test bite, where they not only taste, but also feel the potential prey.

-The second is a bit more complex and includes a series of canals known as the lateral line. (See next slide)

38. LATERAL LINE (see the red line on each shark in the slide)

- The lateral line is a series of interconnected canals that run from the back of the shark’s head to its tail.

-Each canal is made up of tiny pores, which allow water to penetrate the skin.

-Tiny hairs line the canal and allow the shark to detect movement in the water.

-The shark does not have to see an animal to know it is there, but can feel it by detecting movement or disturbance in the water.

-If you are in a swimming pool and your friend does a cannon ball you feel the wave, right? Imagine if you were at the opposite end of the pool and your friend wiggled his or her fingers very gently and you were able to feel that.

39. AMPULLAE OF LORENZINI

- Sharks have what is known as a 6th sense.

- This 6th sense refers to their ability to detect electrical pulses in the water.

- The black pores you can see in the image are the sensory organs that can detect these pulses. Every living thing gives off an electrical pulse. This gives sharks another tool for finding food.

-Metal objects such as boat propellers also give off pulses.

- Hammerheads and some other sharks can actually detect the very faint pulse given off by prey hiding motionless while buried in sand on the bottom.

-Sharks that are more active hunters will have more ampullae on their snout than less active species of sharks.

SQ: Do you think a healthy fish gives off the same pulse as an injured or dying fish?

* There is a printable poster of this slide

40. How Do We Learn About Sharks?

SQ: How do you think people learn about sharks?

SQ: How could you learn about sharks?

41. Ways to Learn Collage

- These images show a variety of ways we can learn about sharks.

42. Scuba Diving & Snorkeling

-In order to study sharks sometimes we need to dive in and get a closer look.

-Scuba Diving: SCUBA stands for self-contained underwater breathing apparatus. Divers use special equipment to be able to stay underwater, including an air tank they can breathe from.

-Snorkeling: People can use a snorkel, which looks like a pipe sticking up out of the water, to get air from the surface without having to lift their face out of the water.

SQ: Has anyone here been snorkeling? Do you have family members or friends who have been snorkeling or scuba diving?

SQ: How do you think snorkeling or scuba diving would allow people to learn about sharks?

SQ: What things could you learn by OBSERVING sharks in the ocean or an aquarium?

Scuba diving and snorkeling let people observe sharks and study them in their natural habitat. People can learn how they swim, what they eat and where they go.

43. Underwater Photo & Video

A great way to learn about any animal is by taking photos and videos.

SQ: What could we learn from looking at photos and videos of different animals?

-What they eat

-How they move

-Where they hide or spend time

-How they play

-How they act with other animals

SQ: Has anyone seen a television show with animals underwater?

SQ: What do you think would happen if you took a regular camera underwater?

-There are special housings made for cameras, so they can go in the water. The housings keep the cameras safe and dry. (Go Pros are an example of a camera you can take in the water)

44. Science & Research

SQ: How do you think SCIENTISTS learn about sharks?

SQ: What do you think scientists might want to find out about sharks?

-There are lots of ways scientists can learn about sharks.

-They can observe sharks in their natural ENVIRONMENT and take notes.

-Catch the sharks and see how long they are and how much they weigh (just like when you go to the doctor).

- They can take a DNA sample or a blood sample.

-They can study the DNA to figure out a shark family tree just like people can research their family trees.

45. Shark Tagging

- A really cool thing scientists can do is to put tags on sharks. There are lots of different tags and they can do different things.

- A simple tag might just give the shark an ID or "name." If they catch the shark again they will know it has already been caught and they can take measurements again to see if it has grown.

- Acoustic tags can be used for tracking animal movements over a long time period.

-There are larger tags that are actually miniature computers. They record a lot of information while attached to the shark.

-Location

-Water temperature

- Depth

-Speed

* Shark Tracker Website: Students can follow different tagged sharks and see where they go. As a class, you can select a shark and see where it goes for a week or 2 weeks or even a month. This is a great way for students to see real life science in action. http://www.nova.edu/ocean/ghri/tracking/

46. We need your help

-Sharks need your help! They are in deep trouble and many species are ENDANGERED or critically threatened.

- Shark CONSERVATION involves protecting sharks and their habitats.

SQ: What do you think you could do to help sharks?

- RECYCLE

- Don't liter on land or in the water and pick up any litter that you see.

- Be a junior scientist and ask good questions about sharks.

- Be a shark advocate by telling other people how cool sharks really are and that they are NOT man-eating monsters.

- Get mom and dad or other family members to use canvas grocery bags instead of plastic.

- Have a reusable water bottle instead of buying new bottles of water

- Lots of things YOU can do and every little bit helps.

- Say NO to plastic straws

- Take our OFFICIAL SHARKS4KIDS PLEDGE TO SAVE SHARKS

47. The End

GRADES 1 & 2 Vocabulary

This list of words can be used along with the *Let's Investigate Sharks* PowerPoint

1. **Adaptation:** Change an organism undergoes in order to survive. The change is maintained over time by natural selection, a very slow process.
2. **Ampullae of Lorenzini:** Tiny pores filled with a jelly like substance that can detect electrical fields traveling through the water. There are more of them on the head of the shark (around the snout) than anywhere else.
3. **Apex Predator**: An animal at the top of the food chain with no natural predators. If removed from an ecosystem, can have large cascading effects on many other species within that system.
4. **Biodiversity:** the variety of life in a particular habitat or ecosystem.
5. **Bycatch:** Certain fish or other animals (dolphin, sea turtles) that are caught unintentionally while fishing for a specific fish species.
6. **Biologist:** Biology is the study of living things. Biologists study plants, animals or humans and the environments in which they live.
7. **Carnivore:** An animal that eats primarily other animals.
8. **Cartilage:** This is flexible connective tissue found inside the body (nose & Ears).
9. **Conservation:** The protection of plants, animals, and their habitats.
10. **Consumers:** Are animals that cannot make their own food, so they must eat other animals and plants to survive. (Food chain & food pyramid)
11. **Coral Reef:** Marine ecosystems made of tiny animals called coral polyps. The polyps secrete calcium carbonate, which hardens and creates a solid structure. Animals, plants and fish live on the coral reefs.

12. **Ecosystem:** Animals, plants and nonliving things that make up an environment and impact one another.

13. **Endangered Species:** A species that is in danger of becoming extinct if actions are not taken to protect it.

14. **Environment:** All the physical surroundings and factors that influence an organism on Earth are called the environment. The environment includes everything living and nonliving.

15. **Extinction:** When all individuals of a species die. Once a species is extinct, they are gone forever.

16. **Dermal Denticles:** Tiny tooth shaped scales that cover a shark's body (also called placoid scales). They reduced resistance as the shark moves through the water (hydrodynamic), allowing it to swim faster while using less energy.

17. **Food Pyramid**: This shows the number of organisms at each level of the food chain. There are more producers (lower levels) than consumers (higher levels).

18. **Gills:** An organ used for breathing by animals in the water.

19. **Lateral Line:** A row of sensory cells along the side of a shark that allow it to detect vibrations in the water.

20. **Life Cycle:** A series of changes that happen to an organism over the course of its life.

21. **Mangrove Forest:** Mangroves are trees or bushes that can tolerate exposure to salt water. They are found along coastlines and are home to lots of organisms above and below the water.

22. **Organism:** Living thing

23. **Population:** All of the individuals of the same species living within a given area.

24. **Prey**: Animal caught and eaten by other animals.

25. **Producers:** (food chain & food pyramid) Living things that can make their own food. Plants are producers that make food through a process called photosynthesis. They use water, carbon dioxide and sunlight (energy) to make sugar and oxygen.

26. **Scales:** A flattened rigid plate that covers the body of an animal.

27. **Shark:** Sharks are fish that have skeletons made of cartilage (cartilaginous fish). There are over 500 different species of shark.

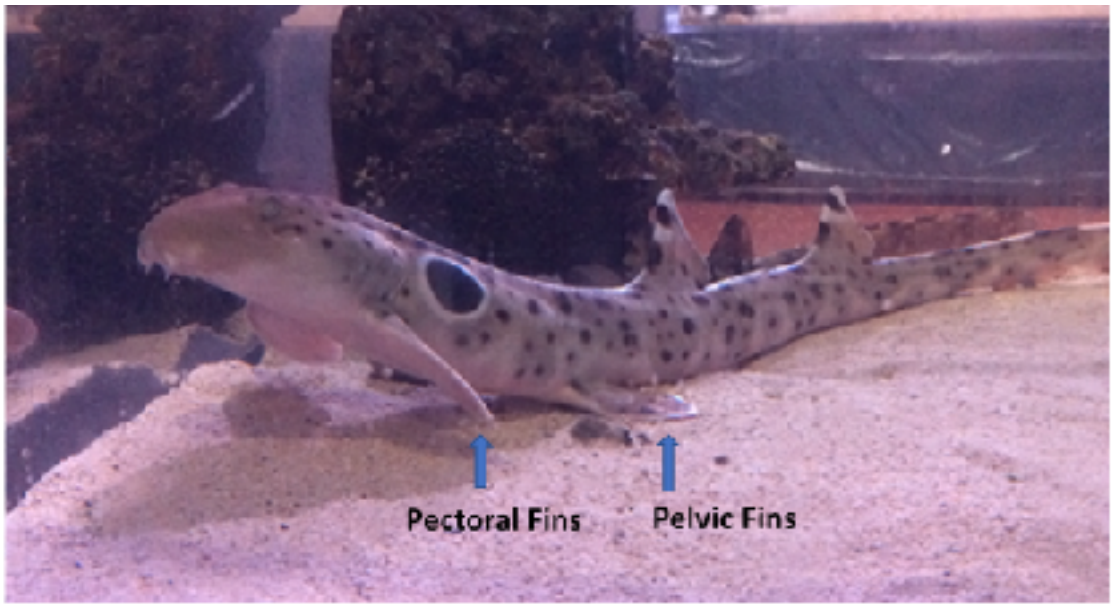
28. **Water Pollution:** Happens when water is made dirty by chemicals, waste or other hazardous materials.

Sharks4Kids
Make your own Walking Shark!
Grade 2-3 Craft

K-2-ETS1-2 Engineering and Design
3-LS4-4 Biological Evolution and Diversity

Introduction:

Epaulette SHARKS live in the shallow waters of CORAL REEFS in northern Australia up to New Guinea. They are sometimes called the "walking shark" because their strong pectoral and pelvic fins are ADAPTED to "walk" across the sea floor instead of swimming. They are small sharks growing to a maximum of 42.1 inches (107 cm) long. These sharks are CARNIVORES and feed on invertebrates (animals without backbones) that crawl in and around the coral. Their ENVIRONMENT changes quickly when the tide goes out. Taller corals become exposed to the air but the shorter coral is still underwater or at the surface. This creates small pools of water in the reef called tide pools. Swimming sharks would not be able to get the invertebrates that are hiding in these pools but the epaulette shark simply walks over the coral to get to the invertebrates! When they are out of the water they cannot get any oxygen from the water to pass through their GILLS, so to conserve energy, they have adapted to be able to slow down their heart rate and turn down their brain power.



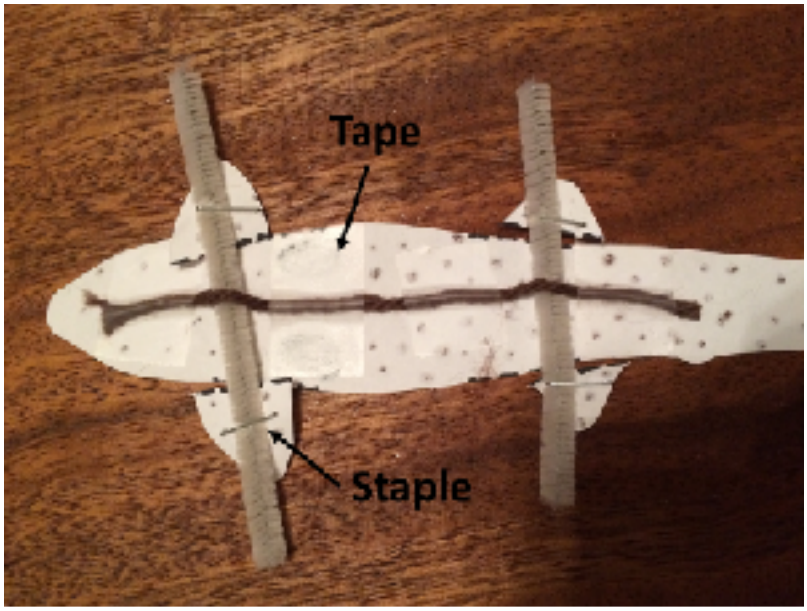
Time: 40-60 minutes

Materials:

- Epaulette Shark coloring sheet
- Scissors
- Pipe cleaners
- Yarn
- Tape/glue
- Stapler
- Popsicle sticks
- Markers/crayons/colored pencils

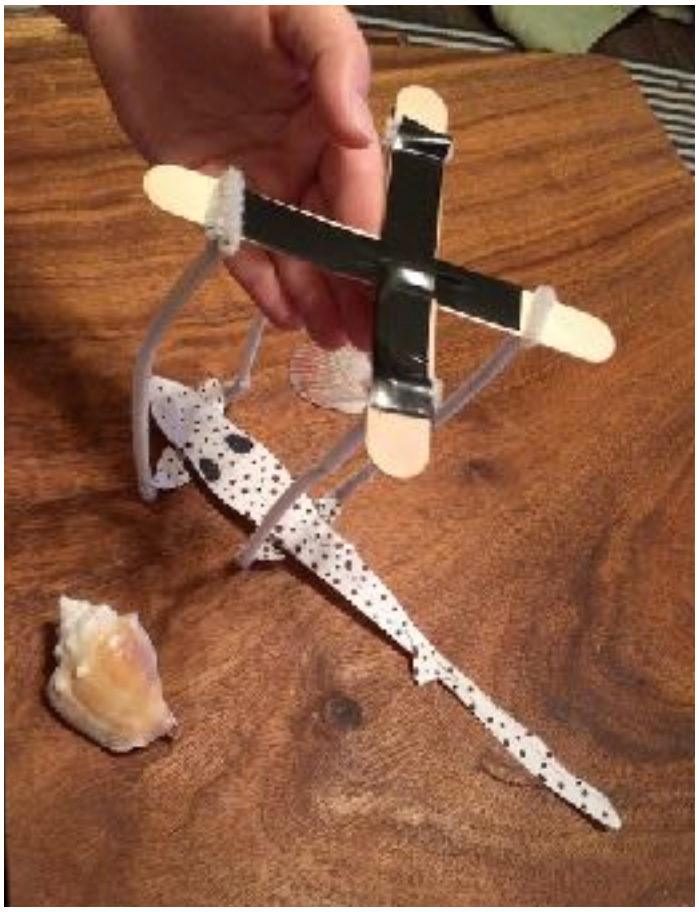
Procedure:

1. Color and cut out the Sharks4kids epaulette coloring sheet.
2. Cut along the dotted lines to cut the pectoral and pelvic fins off.
3. Take a pipe cleaner and cut it to be a few centimeters longer than the width of the shark. Flip the shark upside down and attach a pectoral fin to each end of the pipe cleaner (a single staple works well of this). Next, attach the pipe cleaner to the shark with yarn and tape so the fins can move. (see picture)



4. Repeat step three for the pelvic fins.

5. Flip the shark over and attach the end of each pipe cleaner to another pipe cleaner so they air sticking straight up.
6. Separately, glue or tape two popsicle sticks together in an X.
7. Twist the ends of the pipe cleaners to the popsicles sticks.
8. You now have your very own walking shark!



SQ & Discussion:

1)How is the epaulette shark adapted differently than other sharks?

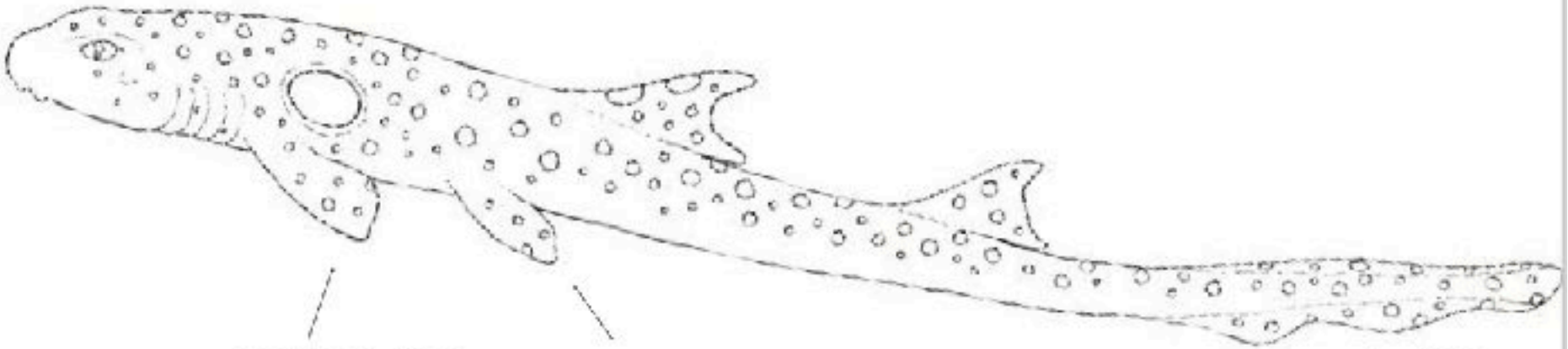
2)What advantage does this adaptation give the shark?

3)Are there any disadvantages to this adaptation?

Epaulette Shark (*Hemiscyllium ocellatum*)

When the tide goes out, this shark can use its pectoral and pelvic fins to walk out of the water and over rocks and coral to get to tide pools filled with trapped *benthic invertebrates* such as crustaceans and worms. They cannot get oxygen when they are out of the water so they must slow their heart rate down and use less brain power to conserve energy.

- Found in coral reefs around the northern coast of Australia up to New Guinea
- Can grow up to 42.1 inches (107 cm)



Artwork: K Dekany

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Comparing Habitats
Grade 1-2 Craft

2-LS4-1 Biological Evolution: Unity and Diversity

This craft can be used with the *Let's Investigate Sharks PowerPoint*. Vocabulary is highlighted in red and a full vocabulary list for the PowerPoint can be found within the curriculum packet.

SQ: Indicates questions you can ask the students to engage them in a discussion.

Introduction:
The following craft compares two ocean habitats that are very different- mangroves and sandy bottom. Mangroves are an important habitat for many species of animals including sharks! Red Mangroves *(Rhizophora mangle)* have a lot of BIODIVERSITY because they are salt tolerant with twisted roots that provide great shelter and PREY for animals throughout their LIFE CYLES. These trees are important to CONSERVE because they are also great for people! Not only are they the habitat for tasty shellfish like crabs and lobsters but they also provide us with protection from storms. The twisted roots anchor in sand and mud so that when the storm waves hit the shoreline, the roots help hold everything in place while reducing the energy of the waves to protect the environment from erosion. Finally, these trees can also help prevent WATER POLLUTION by filtering the water that flows through them. They're so important to the ENVIRONMENT that they are protected in the state of Florida and often permits are required to trim or remove them.

Unlike CORAL REEFS or mangroves, the sandy bottom environment offers little protection. Animals that live here must be flat to hide in the sand or small enough to burrow down into the sand for protection. Large APEX PREDATORS, such as hammerheads cruise through these environments looking for stingrays.

Time: 40-60 minutes total. This craft can be split into two sessions if time is a constraint.

Mangrove Habitat

Materials:

- One paper plate per student
- Brown yarn
- Green tissue paper
- Scotch tape
- Markers
- Norman the nurse shark coloring sheet

Procedure:

1. Students can start by coloring and drawing a mangrove scene on the top of a paper plate. They can draw in crabs, lobsters or other fish.
2. Next, students will fold the plate in half. Using the yarn and scotch tape, students will design their own mangrove roots by connecting the top and bottom of the plate.
3. Next, take small strips of tissue paper and crumble them up before taping along the top of the plate.
4. Finally, students can color and cut out Norman and glue him in the mangrove roots.

Sandy Bottom:

Materials:

- Clear plastic sandwich size bag for each student such as a Zip-lock
- Oatmeal
- Clear Packing tape
- One paper plate per student
- Sharks4Kids Hammerhead Character

Procedure:

1. First, color and cut out sharks4kids stingray and tape to the inside of the bag on the bottom facing up.
1. Fill the bag with a small scoop of oatmeal- just enough to almost cover the stingray and seal the bag tightly.
2. Tape the bag to a second paper plate.
3. Cut out and color the hammerhead shark character and place on the back of the mangrove habitat paper plate. The mangrove habitat will

then be stacked on the plate with the stingray to create two different habitats back to back.

Discussion SQ:

1. How are these habitats different from each other?
2. How are the animals different from each other?
3. Would a stingray do well in the twisted mangroves?
4. Would a small shark do well in the sandy bottom?
5. Where would you like to live if you were a shark and why?

Share this and what you've learned with your friends and family!