Science @ Home

SHARKS

At the Academy, shark week is every week! Celebrate the most *jaw*some fish in the sea with a variety of exciting activities for kids ages 4-8.

A group of sharks is called a *shiver*—but there's no reason to be afraid of these awe-inspiring animals. Sink your teeth into the fascinating world of sharks and rays and explore an appetizing assortment of guided videos, crafts, interactive programs, and activities.

Please note: While Science @ Home activities are designed to be conducted by kids, some little ones might need adult help with reading instructions and preparing crafts.

Day 1: Fishy Sharks

30–45 minutes

» We Heart Sharks! (video)
» Fish or not-a-fish? (activity)
» Build a fish (craft) (en español)
» Pyjama sharks at the Academy (video)

Day 2: Toothy Sharks

30–45 minutes

» Mega Tooth, Mini Tooth (video)
» Shark tooth necklace (craft)
» How Sharks Eat (video)
» Color a Great White (coloring)

Day 3: Fin-credible Sharks

30–45 minutes

» Shark Sound Journey (audio)
» Sandpaper Shark (craft) (en español)
» Baby Sharks (video)
» Three Sharks (coloring)

Day 4: Cousin Ray

30–45 minutes

» Reef Lagoon Cam (video)
» Lagoon Friends (coloring)
» Caring for rays (video)
» Spotty stingrays (craft) (en español)

Kid and caregiver extension activities

» Spotted eagle rays (video)
» Banning the Shark Fin Trade (resource)
» Seafood Watch Guide (resource)

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Fish or Not-a-Fish?

Fish come in many different shapes, sizes and colors, but they have a few things in common. Most fish have: **scales**, **eyes**, **fins**, a **mouth**, **gill slits**, and a **backbone**.

Directions

Take a look at the following 16 pictures. Some of the animals are fish and some are not fish. Circle the ones that you think are fish and draw an X through the ones that you think are not fish. Answers are on page 4.

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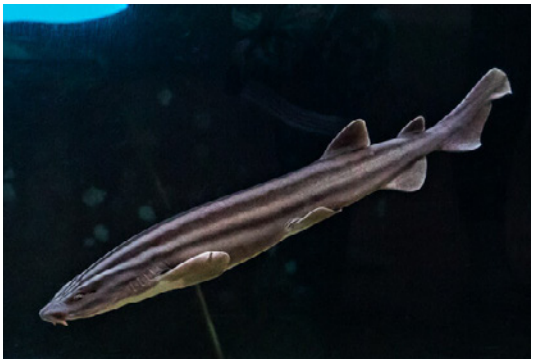

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Answers

#	Species	Fish?	Notes
1	Rockfish	YES	Has a backbone, eyes, a mouth, fins, scales, and gills.
2	Hawksbill sea turtle	no	Reptile! No gills. Does have a backbone, eyes, a mouth, fins,and scales.
3	Maroon clownfish	YES	Has a backbone, eyes, a mouth, fins, scales, and gills.
4	Cownose ray	YES	The "wings" are its fins. They have gills on their underside.
5	Dolphin	no	Mammal! No scales or gills. Does have a backbone, eyes, a mouth, and fins.
6	Reticulate boxfish	YES	Has a backbone, eyes, a mouth, fins, scales, and gills.
7	Coconut octopus	no	Invertebrate! No backbone, fins, or scales. Does have eyes, a mouth, and gills.
8	Lionfish	YES	Has a backbone, eyes, a mouth, fins, scales, and gills.
9	Leafy seadragon	YES	Has a backbone, eyes, a mouth, fins, scales, and gills.
10	Sea nettle (jelly)	no	Invertebrate! No backbone, eyes, gills, mouth, fins, or scales.
11	Moray eel	YES	Has a backbone, eyes, a mouth, fins, scales, and gills.
12	African penguin	no	Bird! No scales or gills. Uses wings as flippers. Breathes air.
13	Scuba diver	no	Human! No fins, scales, or gills. Notice the air tank on her back.
14	Pyjama shark	YES	Has a backbone, eyes, a mouth, fins, scales, and gills.
15	Bat star	no	Invertebrate! No backbone, eyes, fins, gills, or scales.
16	Humpback whale	no	Mammal! No gills or scales. Does have a backbone, eyes, a mouth, and fins.

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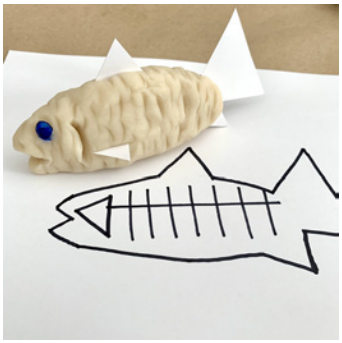

Build a Fish

What makes a fish, a fish? Most fish have these six things in common: **scales**, **eyes**, **fins**, a **mouth**, **gill slits**, and a **backbone**. Turn a ball of clay into everything it needs to be a fish.

Materials

1 ball of craft putty, sculpting clay, or play dough (recipe on page 2)
2 beads (or anything else small and round)
1 spoon
Scissors
Heavy-weight paper or construction paper
1 toothpick
Marker, crayon, or colored pencil

Directions

1. **Body**: **Shape** a ball of craft putty, sculpting clay, or play dough into your fish's body. What shape could a fish's body be? Ovals work well, but there are also round fish, square fish, flat fish, and heart-shaped fish, too!
2. **Scales**: **Press** the edge of a spoon into the body over and over to create scales.
3. **Eyes**: **Press** two beads (or other small, round objects) into the front of the fish for eyes.
4. **Fins**: **Cut out** 4 small triangles and 1 large triangle from the paper. **Press** the largest triangle into the end of the fish for the tail fin. Press the other triangles into the body to make the other fins: one on the top, one on the bottom, and one on each side.
5. **Mouth**: Make a mouth by pressing a toothpick (or edge of a spoon) into the clay where you want the mouth to be.
6. **Gills**: Make gill slits by pressing the toothpick (or edge of a spoon) between the eyes and the side fins.

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7. **Backbone**: Because you can't see the backbone from the outside, make an x-ray instead. **Put** your fish down on a blank piece of paper. **Draw** an outline around your fish. **Remove** your fish and **draw** a triangle for the skull, one line down the middle for the backbone, and several lines going across the body for the ribs.

Science words to learn together

Gills: delicate, feathery structures that fish use to breathe.

Scales: thin plates that cover and protect fishes' bodies.

Fins: flat body parts used for movement, steering, and balance.

Backbone: the spine; a bony structure that runs from the bottom of the skull to the pelvis; animals with a backbone are called vertebrates.

Play dough recipe

Adult supervision and assistance required.

1. Combine 1 cup of flour, 2 teaspoons cream of tartar, and ⅓ cup salt.
2. Add 1 cup water and 1 tablespoon cooking oil. Stir well.
3. Add food coloring of your choice.
4. Heat mixture on medium-low, stirring constantly.
5. Remove from heat when the mixture solidifies.
6. Put the play dough on wax paper and let it cool for at least 30 minutes.
7. Store in an air-tight container in the fridge for up to 2 months.

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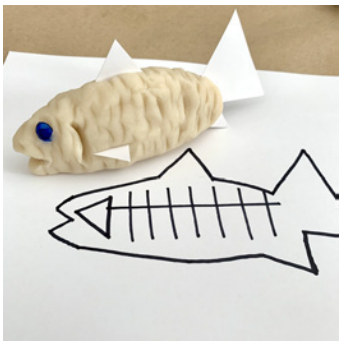

Construir un pez

¿Qué hace un pez, un pez? La mayoría de los peces tienen estas seis cosas en común: **escamas, ojos, aletas, una boca, aberturas branquiales** y una **columna vertebral.** Convierte una bola de arcilla en todo lo que necesita para ser un pez.

Materiales

1 bola de masilla artesanal, arcilla esculpida o masa de juego (receta en la página 2)
2 cuentas (o cualquier otra cosa pequeña y redonda)
1 cuchara
Tijeras
Papel pesado o papel de construcción
1 palillo
Marcador, crayón o lápiz de color

Instrucciones

1. **Cuerpo: Forma** una bola de mastilla artesanal, esculpiendo arcilla en el cuerpo de tu pez. ¿Qué forma podría tener el cuerpo de un pez? Los óvalos funcionan bien, pero también hay peces redondos, peces cuadrados, peces planos y peces en forma de corazón, ¡también!

2. **Escamas: Presiona** el borde de una cuchara en el cuerpo una y otra vez para crear escamas.

3. **Ojos: Presiona** dos cuentas (u otros objetos pequeños y redondos) en la parte frontal del pez para ver los ojos

4. **Aletas: Corta** 4 triángulos pequeños y 1 triángulo grande del papel. **Presiona** el triángulo más grande en el extremo del pez para la aleta de cola. Presiona los otros triángulos en el cuerpo para hacer las otras aletas: una en la parte superior, otra en la parte inferior y otra en cada lado.

5. **Boca:** Haz una boca presionando un palillo de dientes (o borde de una cuchara) en la arcilla donde quieres que esté la boca.

6. **Branquias:** Haz hendiduras branquiales presionando el palillo de dientes (o borde de una cuchara) entre los ojos y las aletas laterales.
7. **Columna vertebral:** Debido a que no se puede ver la columna vertebral desde el exterior, haz una radiografía en su lugar. **Pon** tu pez en un papel. **Dibuja** un contorno alrededor de tu pez. **Retira** el pez y **dibuja** un triángulo para el cráneo, una línea por el medio para la columna vertebral y varias líneas que cruzan el cuerpo para las costillas.

Palabras científicas para aprender juntos

Branquias: estructuras delicadas y emplumadas que los peces utilizan para respirar.

Escamas: platos delgados que cubren y protegen los cuerpos de los peces.

Aletas: piezas planas del cuerpo utilizadas para el movimiento, la dirección y el equilibrio.

Columna vertebral: la columna vertebral; una estructura ósea que va desde el fondo del cráneo hasta la pelvis; animales con columna vertebral se llaman vertebrados.

Receta plastilina

Se requiere supervisión y asistencia de un adulto.

1. Combina 1 taza de harina, 2 cucharaditas de crema de tartar y ⅓ taza de sal.
2. Añada 1 taza de agua y 1 cucharada de aceite de cocina. Revuelve bien.
3. Add food coloring of your choice.Añada el colorante de alimentos que desees.
4. Calienta la mezcla en un nivel medio-bajo, revolviendo constantemente.
5. Elimina el calor cuando la mezcla se solidifique.
6. Pon la masa en papel de cera y deja que se enfríe durante al menos 30 minutos.
7. Almacena en un recipiente hermético en el refrigerador durante un máximo de 2 meses.

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Shark Tooth Necklace

Different types of sharks have different types of teeth. Some sharks have big teeth, some have small teeth. Some sharks have teeth that are thin and pointy while other sharks have teeth that are short and curved. In this craft, you decide the shape and size for your replica shark tooth and then turn it into a necklace.

Materials

Craft putty, sculpting clay, or play dough (recipe on page 2)
Pencil or chopstick
Yarn or string

Directions

1. **Look** at the different types of shark teeth on page 2 and pick one as a model for your necklace. Notice the shape of the tooth that you picked. Is it a wide triangle, or a tall and pointy triangle?

2. **Sculpt** a small, grape-sized, piece of crafting putty, sculpting clay, or play dough into a flat triangle similar to the shape of the tooth.

3. **Look** at the details of the tooth you've chosen. Is the bottom rounded inward or rounded outward? Are there any cracks or missing pieces? Does it have a smooth or jagged edge? **Sculpt** these details into the tooth you are making. (Tip: Push your fingernail or the tip of a pencil into the clay to make dents.)

4. **Poke** a hole in the tooth using a pencil or chopstick where the necklace yarn will go through. Make sure to place the hole away from the edge of the tooth so it does not break.

5. **Cut** a piece of yarn (or string) to the length you want for your necklace. **Thread** the yarn through the hole in the tooth. **Tie** the two loose ends of the yarn together to make a necklace.

6. **Investigate** more fossil specimens from the Academy's geology collections by going to: *https://www.flickr.com/photos/casgeology/albums*.

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Shark teeth

The fossilized shark teeth shown below are all from extinct species of sharks. They are kept in the geology research collections at the California Academy of Sciences.

Chiloscyllium sp.
Extinct bamboo shark

Squalus serriculus
Extinct dogfish shark

Carcharodon megalodon
Extinct Megalodon shark

Notidanion boreale
Extinct cow shark

Isurus smithii
Extinct mako shark

Play dough recipe

Adult supervision and assistance required.

1. Combine 1 cup of flour, 2 teaspoons cream of tartar, and ⅓ cup salt.
2. Add 1 cup water and 1 tablespoon cooking oil. Stir well.
3. Add food coloring of your choice.
4. Heat mixture on medium-low, stirring constantly.
5. Remove from heat when the mixture solidifies.
6. Put the play dough on wax paper and let it cool for at least 30 minutes.
7. Store in an air-tight container in the fridge for up to 2 months.

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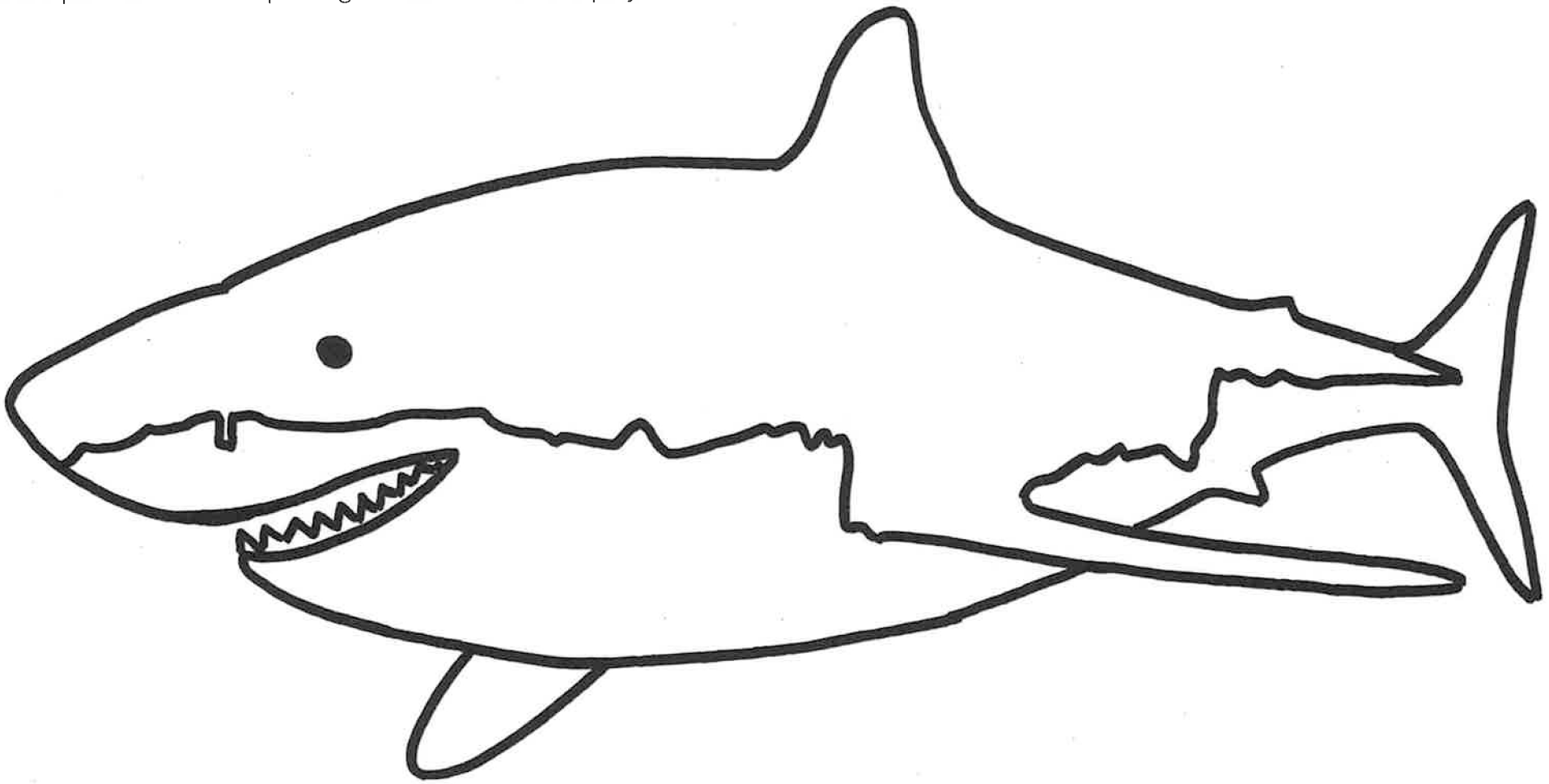
Great White Shark (*Carcharodon carcharias*)
This shark may be the largest predatory fish on Earth. Having a streamlined body shape and a powerful tail fin helps the great white chase after prey.



Drawn by Cassie Graff for the California Academy of Sciences

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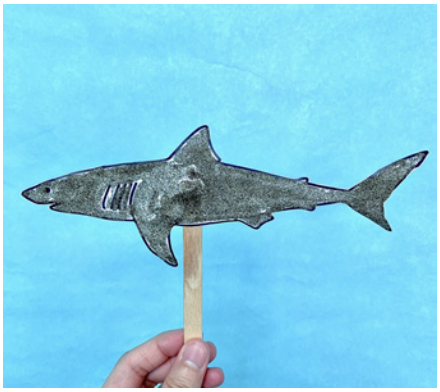


Sandpaper Shark

Have you ever wondered how a shark's scales feel? Sharks have specialized scales called *dermal denticles* that help them swim more efficiently and quietly through the water. But they sure aren't soft!

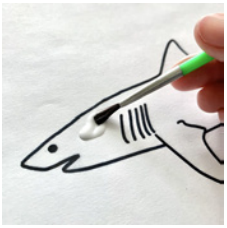
Make your own shark and learn about how this adaptation helps sharks be successful in their ocean habitat.

Materials

Shark template (page 3)
Sand
Paper
Glue
Scissors
Wooden craft stick (optional)
Magnet (optional)

Directions

1. **Learn** more about dermal denticles on page 2.
2. **Collect** a small amount of craft sand or sand from a natural environment near you. *Please note: If collecting from nature, be careful not to disturb live plants and animals, take only what you need, and make sure to follow the rules of the natural environment you are visiting.*



3. **Print out** the shark template on page 3 or draw your own shark on a piece of paper.
4. **Apply** glue to the inside of your shark outline using a brush, cotton swab, or your finger.

5. **Add** sand on top of your shark. Make sure to cover all of the glue.
6. **Shake off** any excess sand outside or over a bucket or sink and let your shark dry.

7. **Cut out** your shark.
8. *Optional*: **Glue** the back of your shark to a wooden stick or magnet.

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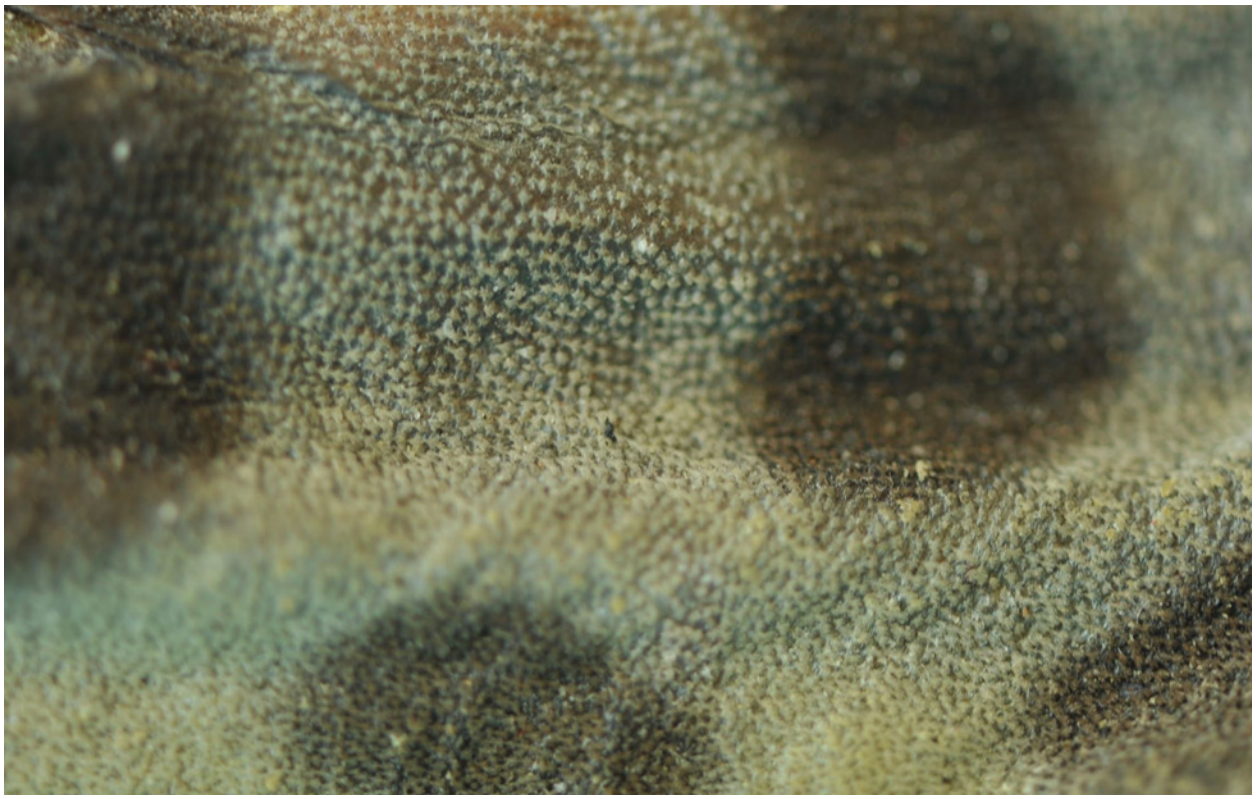
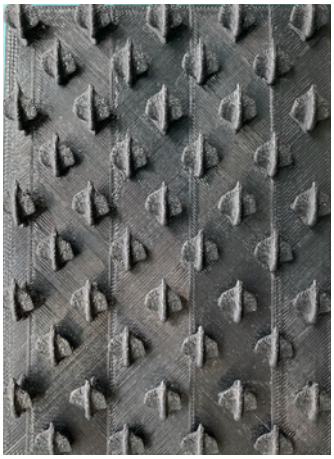


Leopard shark dermal denticles

Dermal denticles

Sharks have specialized scales called *placoid scales* or *dermal denticles*. Dermal denticles are shaped like teeth. When touched in a backwards motion from tail to head, the scales feel rough, like sandpaper. This adaptation helps sharks while swimming, allowing them to swim faster and more quietly. Dermal denticles can also prevent a shark from being easily scratched by a rough surface or another animal, and make it difficult for parasites to stick to their skin.



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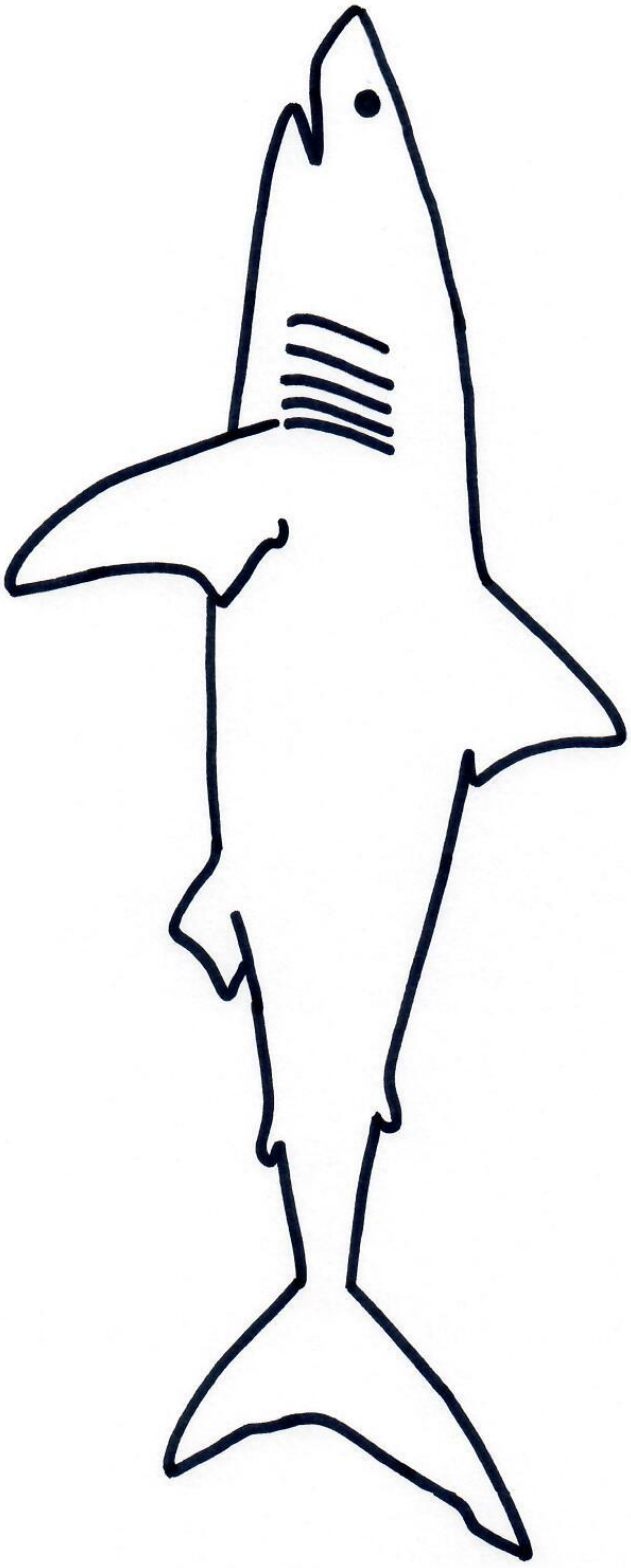

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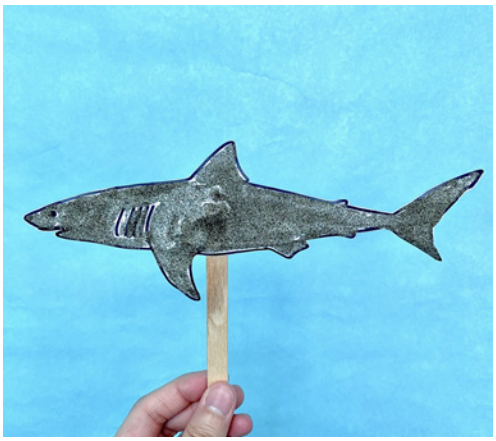


Tiburón de papel de lija

¿Alguna vez te has preguntado cómo se sienten las escamas de un tiburón? Los tiburones tienen escamas especializadas llamadas dentículos dérmicos que les ayudan a nadar de manera más eficiente y silenciosa a través del agua. ¡Pero no son blandos!

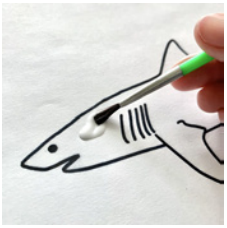
Haz tu propio tiburón y aprende sobre cómo esta adaptación ayuda a los tiburones a tener éxito en su hábitat oceánico.

Materiales

Plantilla para tiburones (página 3)
Arena
Papel
Pegamento
Tijeras
Palo de madera (opcional)
Imán (opcional)

Instrucciones

1. **Más información** sobre dentículos dérmicos en la página 2.
2. **Recoge** una pequeña cantidad de arena o arena de un entorno natural cercano a ti. *Nota: Si se recoge de la naturaleza, ten cuidado de no perturbar plantas y animales vivos, toma sólo lo que necesitas y asegúrate de seguir las reglas del entorno natural que estás visitando.*
3. **Imprime** la plantilla de tiburón en la página 3 o dibuja tu propio tiburón en un pedazo de papel.
4. **Aplica** pegamento en el interior del contorno del tiburón con una brocha, un hisopo de algodón o un dedo.
5. **Añade** arena encima de tu tiburón. Asegúrate de cubrir todo el pegamento.
6. **Sacude** cualquier exceso de arena fuera o sobre un cubo o fregadero y deja que tu tiburón se seque.
7. **Corta** tu tiburón. *Opcional:* **Pega** la parte posterior del tiburón a un palo de madera o imán.



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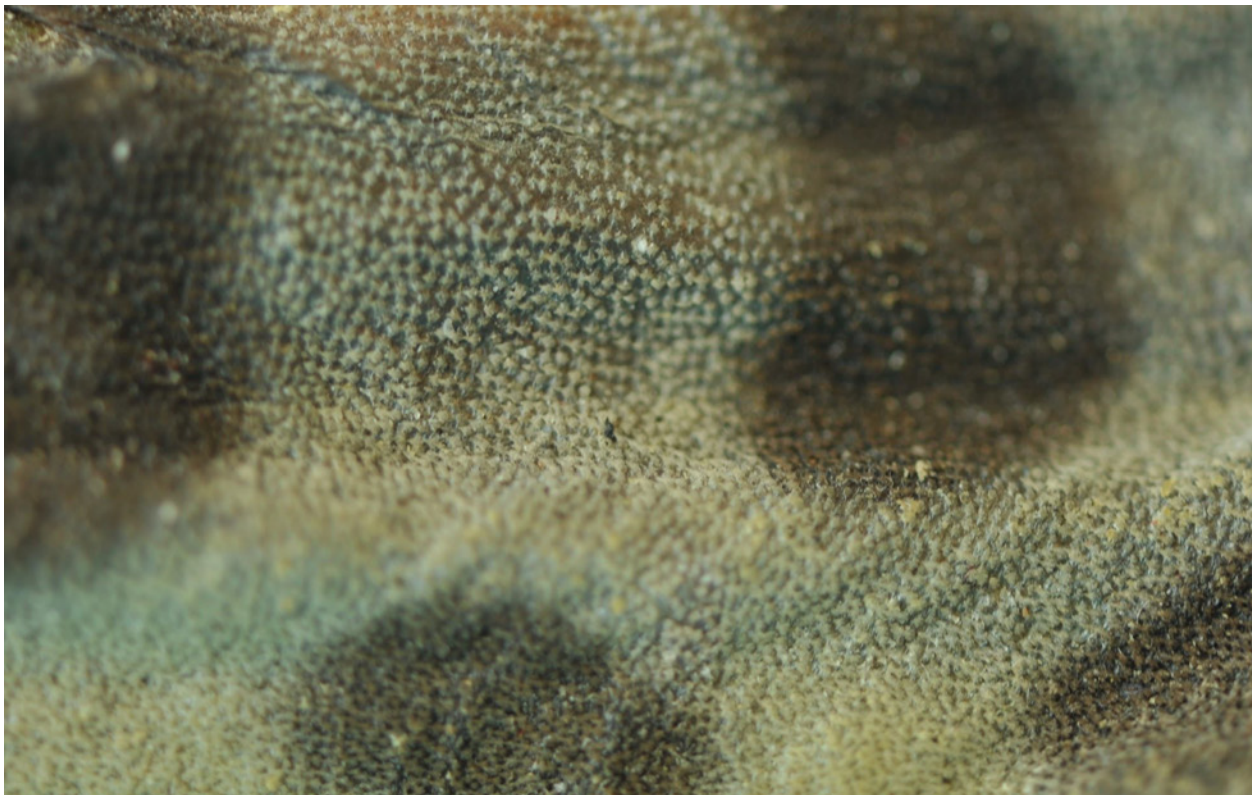
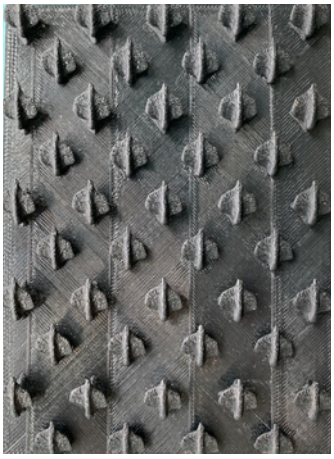


Leopard shark dermal denticles

Los dentículos dérmicos

Tiburones tienen escalas especializadas llamadas escalas placoides o dentículos dérmicos. Los dentículos dérmicos tienen forma de dientes. Cuando se tocan en un movimiento hacia atrás de la cola a la cabeza, las escamas se sienten ásperas, como papel de lija. Esta adaptación ayuda a los tiburones mientras nadan, lo que les permite nadar más rápido y más silenciosamente. Los dentículos dérmicos también pueden evitar que un tiburón sea fácilmente rayado por una superficie rugosa u otro animal, y dificultar que los parásitos se peguen en su piel.



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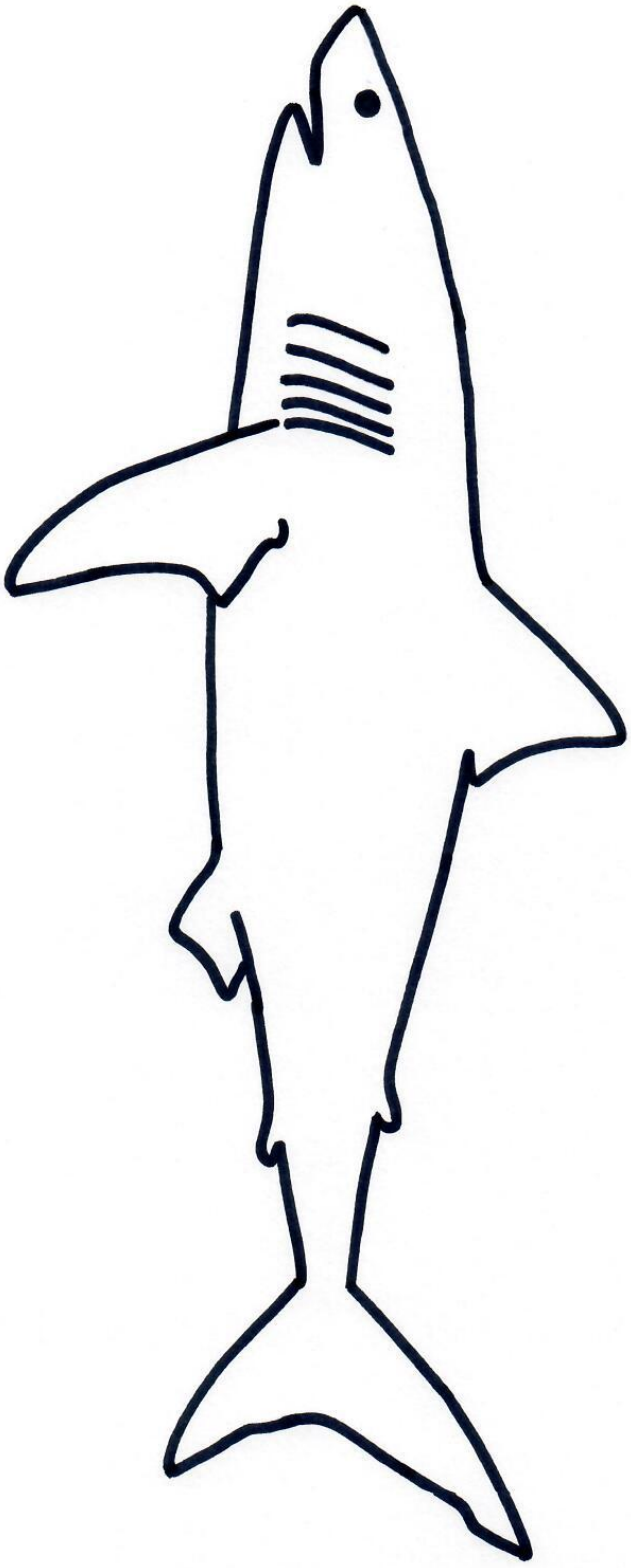

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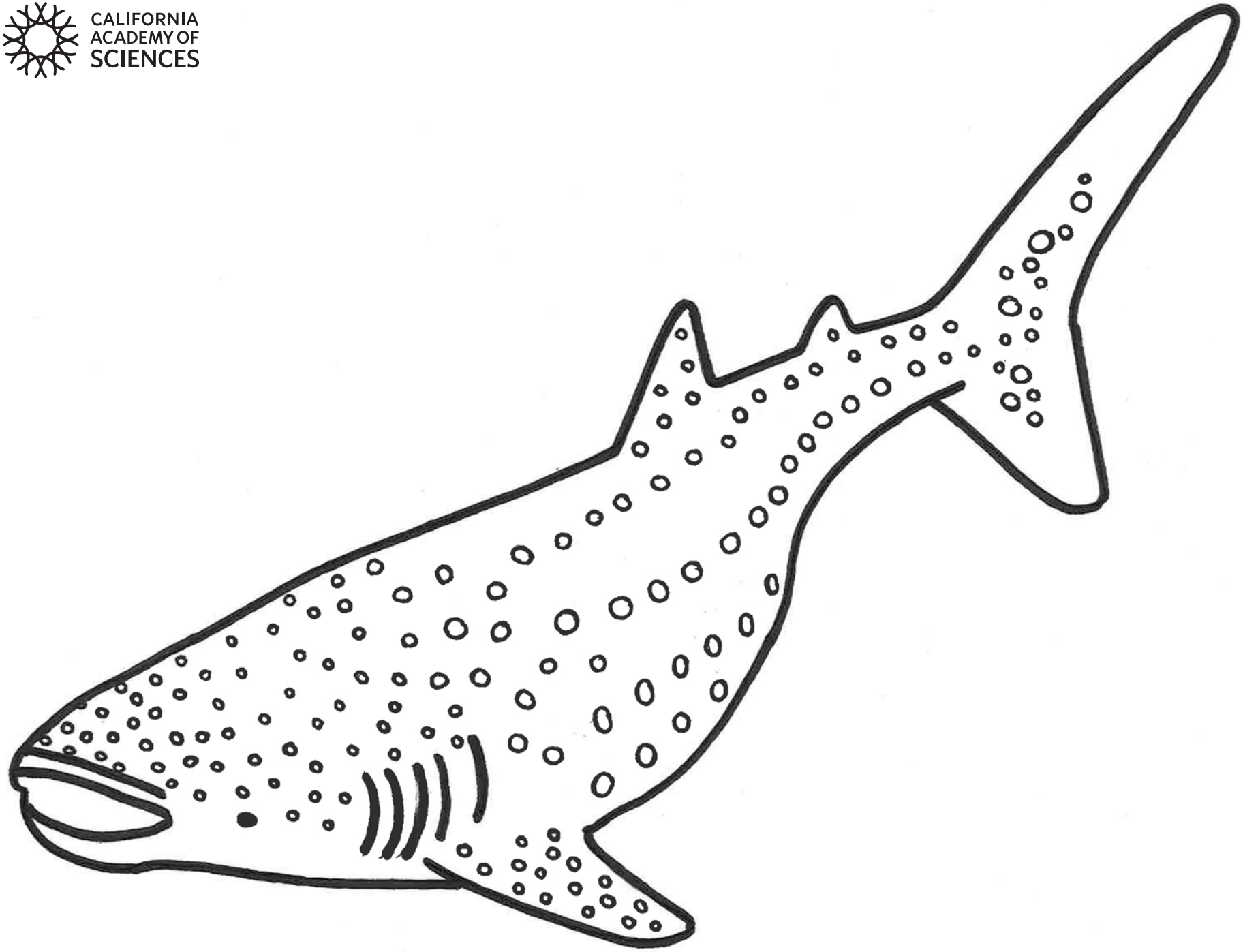

Whale Shark (*Rhincodon typus*) drawn by Cassie Graff for the California Academy of Sciences

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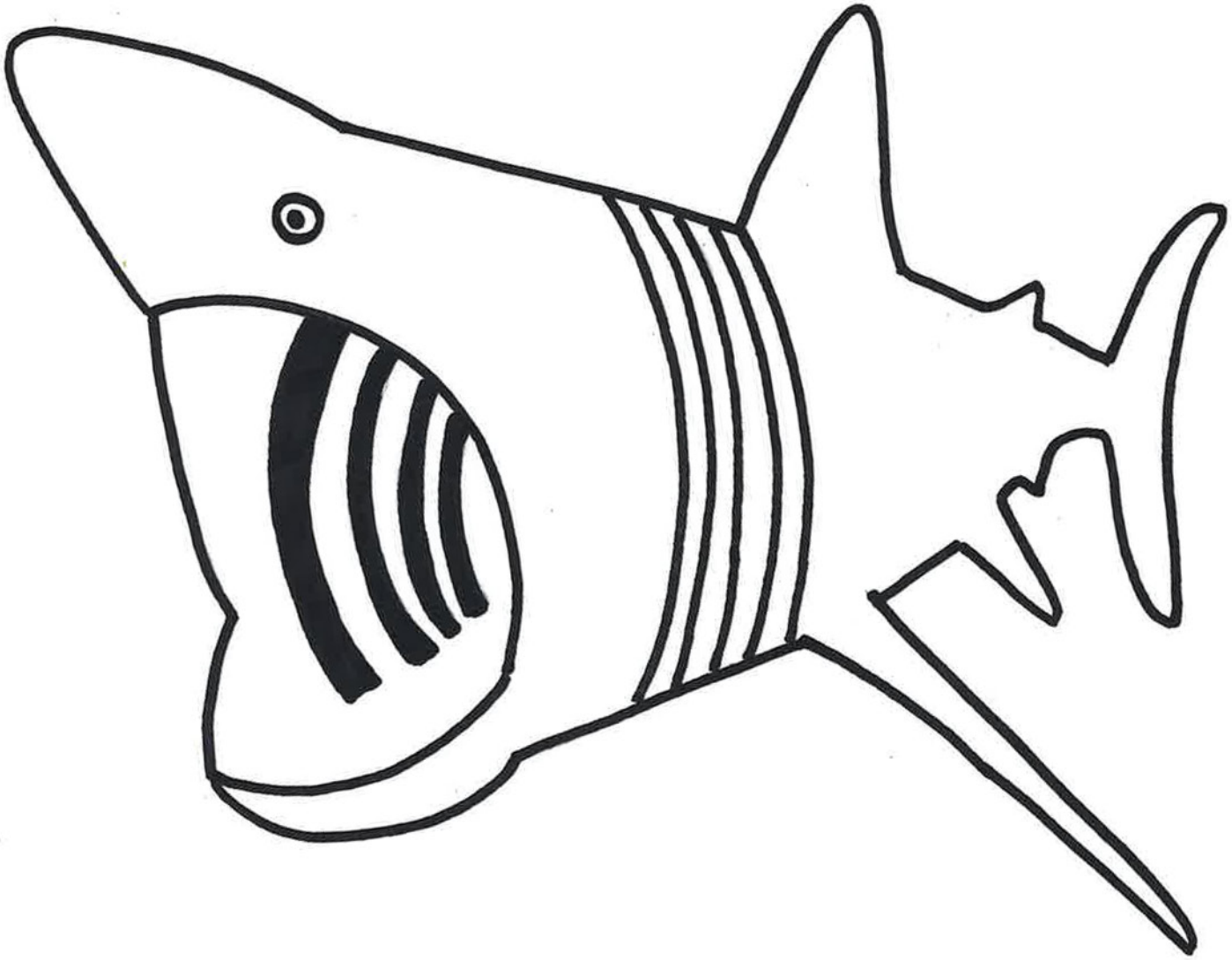
Basking Shark (*Cetorhinus maximus*)
The basking shark is one of the three largest filter-feeding sharks. They are usually seen swimming with their mouths wide open at the surface, straining plankton from the water.



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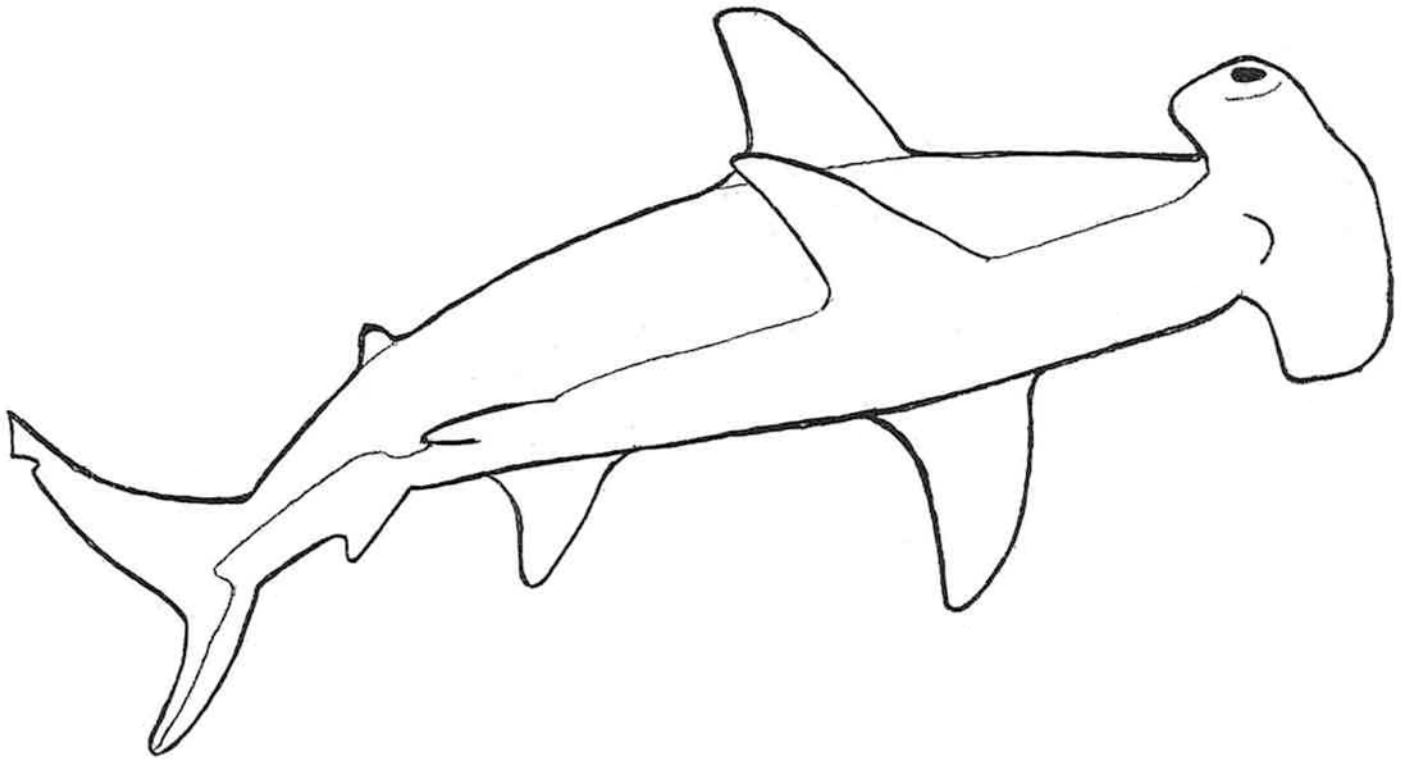

Hammerhead Shark (*Sphyrna spp.*) drawn by Cassie Graff for the California Academy of Sciences

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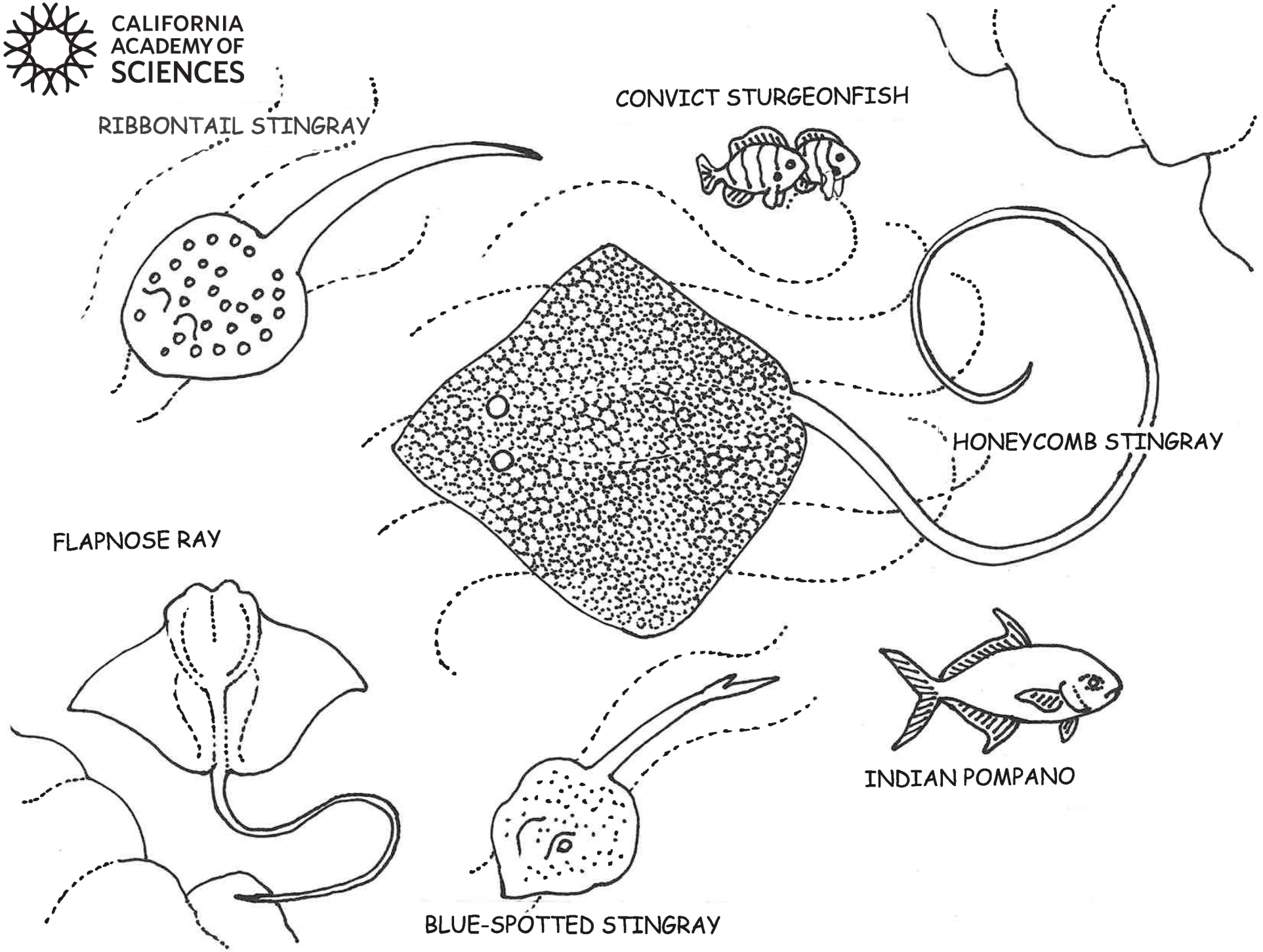

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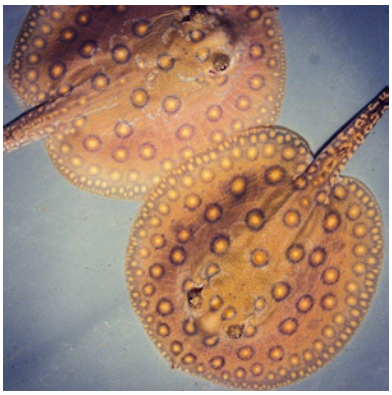
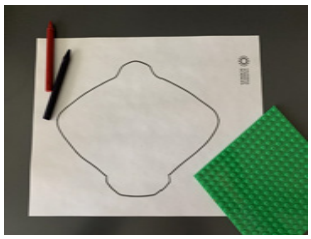


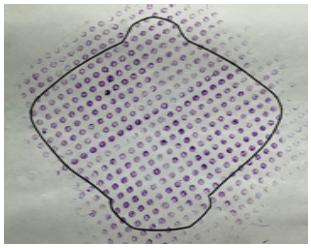
Spotty Stingrays

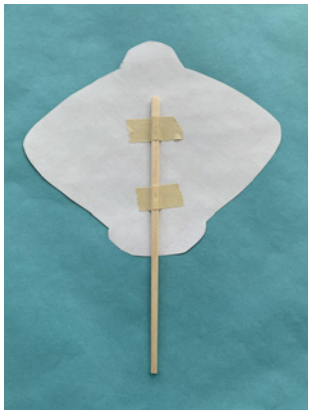
Some rays have patterns that help them blend into the sandy sea floor. Others have beautiful, bright blue spots. Create your own pattern for a ray by rubbing a textured pattern onto its back.

Materials

Stingray print-out (page 2)
Scissors
Crayon with the wrapper removed
A hard, flat, textured surface
Chopstick, tongue depressor, or any other long object
Tape







Directions

1. **Print** the ray-shaped outline on page 2, or draw your own.
2. **Lay** the paper with the ray outline onto a flat, textured surface. Examples include: a sidewalk, a rough wooden table, sandpaper, a Legos base plate, or a bamboo placemat.
3. **Remove** the wrapper from a crayon, if it has one. Then rub the flat side of the crayon over the paper. The texture of the surface underneath the paper will create a pattern on your ray as you rub.
4. **Cut out** the ray. Ask for help using the scissors if you need it.
5. **Turn** the ray over. Place the chopstick down the middle of the ray so that it sticks out a few inches from the back of the ray, like a tail. **Tape** the chopstick in place.
6. **Hold** your stingray by its tail and make it swim through your home!

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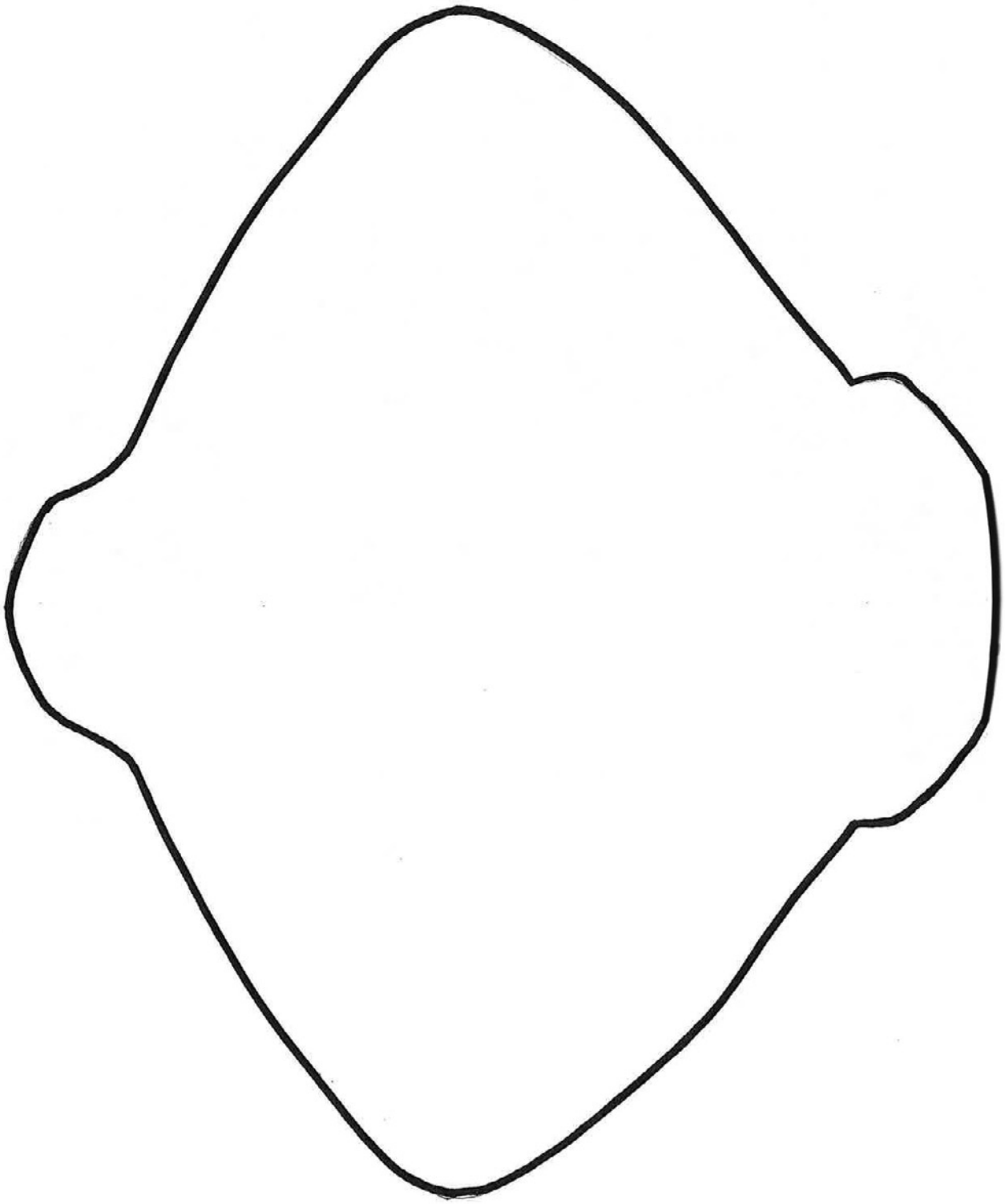

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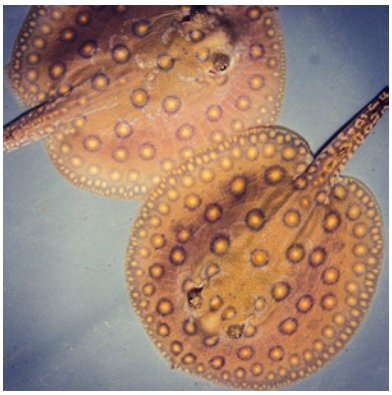
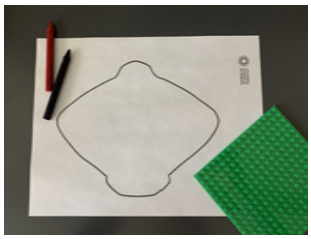


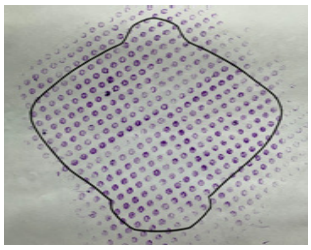
Rayas manchadas

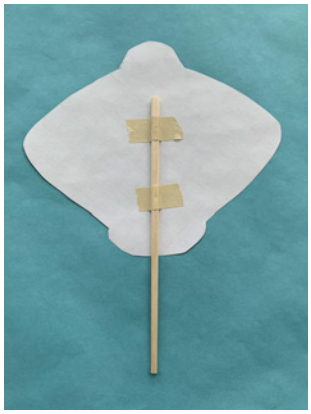
Las rayas tienen patrones que les ayudan a mezclarse en el fondo arenoso del mar. Otros tienen hermosos y brillantes puntos azules. Crea tu propio patrón para una raya frotando un patrón texturizado en su espalda.

Materiales

Impresión de rayas (página 2)
Tijeras
Crayón con la envoltura extraída
Una superficie dura, plana y texturizada
Cinta
Palillos , depresores de lengüeta o cualquier otro objeto largo







Instrucciones

1. **Imprime** el contorno en forma de raya en la página 2, o dibuja el tuyo.
2. **Coloca** el papel con el contorno de la raya sobre una superficie plana y texturizada. Algunos ejemplos son: una banqueta, una mesa de madera áspera, papel de lija, Legos, o un tapete de bambú.
3. **Retira** el envoltorio de un crayón, si tienes uno. A continuación, frota el lado plano del crayón sobre el papel. La textura de la superficie debajo del papel creará un patrón en la raya a medida que se frota.
4. **Corta** la raya. Pide ayuda usando las tijeras si la necesitas.
5. **Dale vuelta** a la raya. Coloca el palillo (o objeto largo que escogiste) en el centro de la raya para que sobresale a pocos centímetros de la parte posterior de la raya, como una cola. Usa la cinta para poner el palillo (o objeto largo) en su lugar.
6. ¡**Mantén** tu raya por su cola y haz que nade a través de tu casa!

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