



Lesson Time

75 Minutes

Essential Question

How are rays and sharks classified?

Materials

Copies of worksheets
Envelopes
Sidewalk chalk or masking tape
Yardstick and ruler

Objectives- Students Will

Classify rays and sharks
Explain physical characteristics
Compare size
Measure

Florida State Standards

Science Standard: SC.3.L.15.1

Classify animals into major groups (mammals, birds, reptiles, amphibians, fish, arthropods, vertebrates and invertebrates, those having live births and those which lay eggs) according to their physical characteristics and behaviors.

NGSS CrossCuttingConcepts

Classifying Patterns

5C's

Collaboration
Communication

Teacher Background Information

Use this information to help prepare for the lesson.

Rays and sharks are closely related and belong to a group of fish called **elasmobranchs**. While bony fish (and humans) have a skeleton made from bones, rays and sharks have a skeleton made from cartilage. Cartilage is a more flexible material, and is what makes up our noses and ears. Sharks and rays have 5 or more gill slits on each side (sharks) or underneath (rays). Bony fish, such as tuna and grouper, have one gill cover on each side. Rays and sharks live in all ocean basins around the world.

There are many different types of rays including stingrays, electric rays, butterfly rays, round rays, manta rays, guitarfish, and sawfish. There are about 630 species of rays. Most rays are **benthic** (living on the seafloor) and can be seen covering their body with sand. Others are **pelagic** and swim in the open ocean. Many, but not all rays have a stinging **venomous** barb on their tail.

COOL RAY ALERT:

Electric rays have an electric organ that can create a strong electric shock to defend themselves or stun prey. Some electric rays can generate a shock of over 200 volts. Enough to knock you off your feet!

https://www.youtube.com/watch?v=rh06A_pg-Ks





Vocabulary:

Benthic: an organism living near the seafloor

Cephalic Fin: fin extending from either side of a manta ray's mouth

Elasmobranch: Sharks, rays, skates

Disc Width: the distance between the tips of each pectoral fin of a ray

Dorsal Fin: fin located on the top or back side of a fish

Pelagic: an organism living in open ocean

Pectoral fin: side fin, balances the animal and propels it in the water

Physical characteristics: observable features of an organism

Venomous: secreting venom through barb on tail

There are about 520 species of sharks that live in all ocean basins around the world. Sharks vary in size from being the largest fish in the ocean (whale shark at about 60 feet) to the very small dwarf lantern shark at 8 inches. Some sharks must constantly swim around to breath, moving water across their gills. Some sharks can rest on the bottom and "pump" water through their gills.

Sharks also vary in their feeding methods. Whale sharks and basking sharks filter out tiny plankton from the water. Other shark species such as the tiger shark, lemon shark and hammerhead have sharp teeth they use to feed on sea turtles, fish, and stingrays.

In Florida:

Some rays also live in freshwater habitats. In Florida, the Atlantic stingray (*Dasyatis sabina*) is known to live in freshwater along the St. Johns River waterway as well as inland freshwater lakes. These populations of the Atlantic stingray are unique in that they spend their entire life cycle in freshwater.

DO THE STINGRAY SHUFFLE!

Stingrays don't want to hurt you. They only hurt humans when they are scared of getting stepped on. When you go to the beach and play in the ocean, make sure to drag your feet. This will kick up sand and disturb a buried ray and it will swim away. You can prevent yourself from accidentally stepping on a stingray barb.

Teacher Preparation:

1. Make colored copies of photos, cut, fold and place in envelope
2. Make copies of "Rays" and "Sharks" one set per group
3. Make copies of "Sidewalk Chalk Rays"
4. Gather chalk/tape yardsticks & rulers





Procedures:

Pre-Lesson: Assess prior knowledge about Manta Rays. Show Introductory Video if needed.

<https://www.youtube.com/watch?v=tC06jYwpmDE>

Step 1: Engage: Brainstorm

Project on wall "Brainstorming Sheet" with photographs of ray and shark. **Ask:** *What does it mean to classify? What types of questions can you think of about how rays and sharks are classified? How are they different? How are they the same?* Write ideas on the board. Answers will probably include physical characteristics. **Explain:** Physical Characteristics are what an organism looks like. These features can help scientists find patterns and classify animals into major groups. Scientists classify sharks and rays into a group of fish called **Elasmobranchs**.

Step 2: Explore: Collaborate

Partner or Small Group Work:

Print out photographs of rays and sharks. (Included). Cut out and put set into envelope. Print out "RAY" and "SHARK" information sheets.

Directions: Students will classify photographs and place onto "RAY" or "SHARK" Physical Characteristics. Instruct students to look at photograph and check the physical characteristics to determine which type of fish it is. The additional information, *Found* and *Fun Fact* is extra information for students.

Step 3: Explain: Discuss patterns

Go over answers (Teacher Key provided). Partner or Small Group Work:

Ask: *What patterns did you see? Are there any answers that surprised you? Why?*

Explain: The Sawfish and guitarfish were tricky! They were tricky for even scientists to figure out if they are sharks or rays. The reason they are rays is because their mouth and gills are underneath. It was tricky with the guitarfish because its tail looks like a shark tail.

Step 4: Elaborate: Modeling "Sidewalk Chalk Rays"

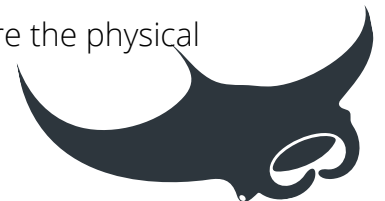
Partner or Small Group work:

This activity focuses on rays. Students will create a life size replica /model of a ray outside with sidewalk chalk or inside with tape. Students should use the illustrations to help guide them in drawing the ray.

Step 5: Evaluate: Student Sharing

Groups will present their ray model to the class in a gallery walk. Students can share the physical characteristics as they present.

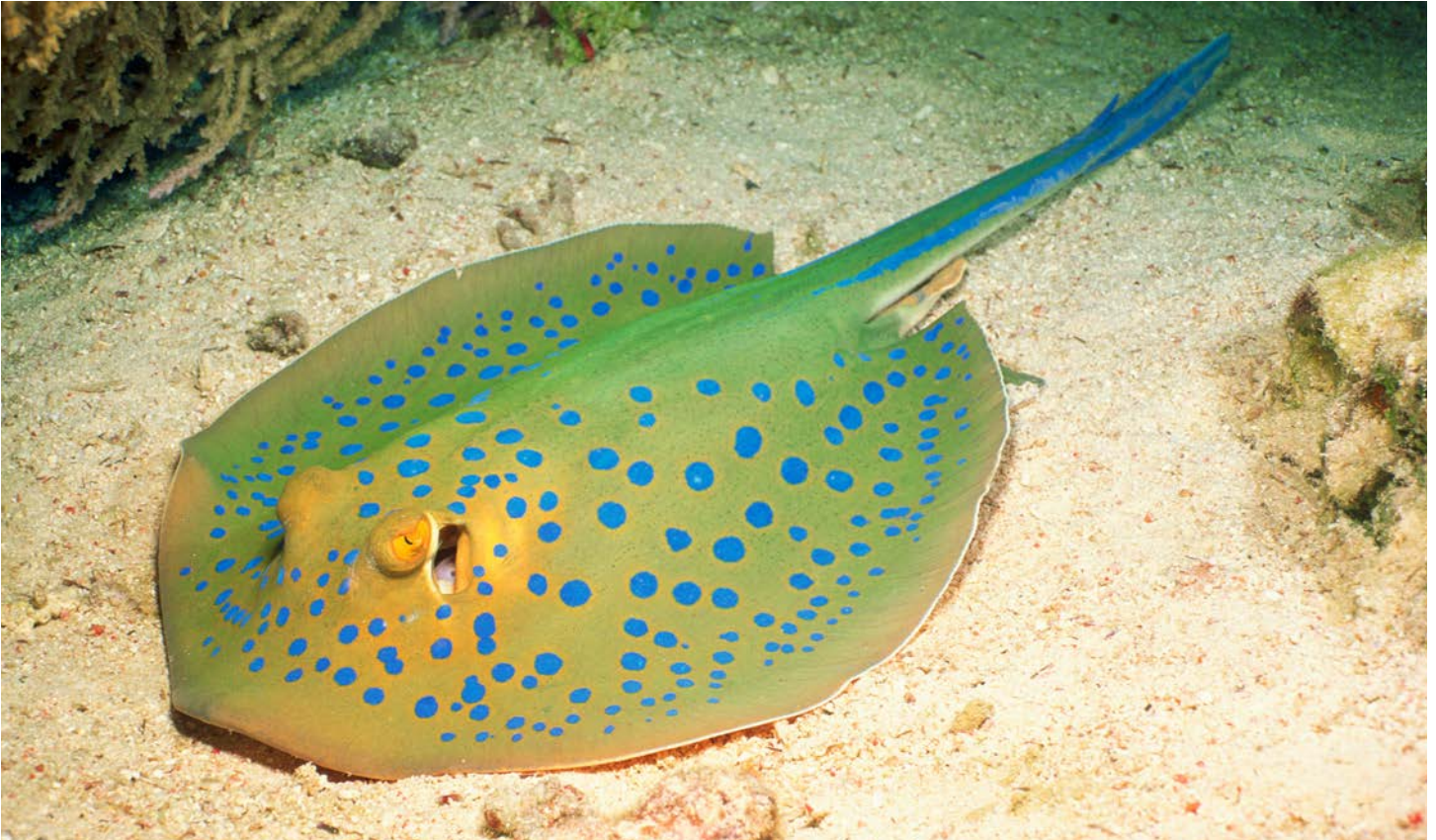
Linguistically diverse learners: Use the diagrams of shark and ray to help with understanding the fins, tail, body shape, gill location, etc.





Brainstorming Sheet:

Look at the two photographs. What types of questions could you ask about the Ray and Shark to help *classify* them? How are they different? How are they the same?





1. **FOUND:**
In the open ocean, sometime swimming past coral reefs.

FUNFACT:
Their uniquely shaped head lets them see better and find prey.
Their favorite food is a stingray.



2. **FOUND:**
In warm ocean basins, often with their "friends."

FUNFACT:
They have the largest brains relative to their body size of all fish!



3. **FOUND:**
On sandy bottoms and coral reefs.

FUNFACT:
These are electric! They have an organ that makes an electric shock.



4.

FOUND:

On sandy bottoms, in lagoons and near coral reefs. They live in the Indo-Pacific.

FUNFACT:

Eats crabs, fish, and shrimp.



5.

FOUND:

In tropical waters, in the ocean to rivers and estuaries (where a river meets the sea).

FUNFACT:

The nose or "saw" is used for feeding and protection.



6.

FOUND:

Atlantic ocean basin-
Florida, Bahamas, Caribbean.

FUNFACT:

Their tails can be up to twice as long as their bodies!



7.

FOUND:

Gulf of Mexico, Bahamas, Caribbean, Florida. On sandy and muddy bottom in shallow areas.

FUNFACT:

Scoop out holes in sand by moving "wings" (fins) to find buried food.



8.

FOUND:

In mostly cool waters, even cold water. Near coastal areas and open ocean.

FUNFACT:

They are warm blooded, so its body temperature is warmer than the water.



9.

FOUND:

In all ocean basins around the world. In coastal areas and inlets.

FUNFACT:

Can be 18 feet long. They eat marine animals, sea birds and even trash.



10.

FOUND:

Warm waters, close to surface. In the Atlantic ocean basin.

FUNFACT:

School in large groups to migrate.



11.

FOUND:

In sandy areas resting, sometimes partly buried by sand.

FUNFACT:

Their head can be used to pin down a fish to eat.



12.

FOUND:

Coral reefs and sandy bottoms in tropical, warm waters.

FUNFACT:

Can be 300 pounds!



13.

FOUND:

In tropical and warm waters, swimming in the open ocean.

FUNFACT:

"Fly" underwater and can leap completely out of water!



14.

FOUND:

In shallow waters of the Atlantic ocean basin.

FUNFACT:

Hunt at night for fish, stingrays and mollusks.



15.

FOUND:

In all warm and tropical seas.

FUNFACT:

They are the largest fish in the sea! They filter plankton to eat.



Rays

Physical characteristics

Tail: long and skinny

Pectoral (side) Fins: "wings"

Shape: Flat

Gills: Under side of body (ventral)

Place photos here:



Sharks

Physical characteristics

Tail: Fin at end of tail

Pectoral (side) Fins: Separate from Body

Shape: long, torpedo shaped

Gills: on each side of body (lateral)

Place photos here:

Teacher Key



Sharks

Physical characteristics

Tail: Fins at end of tail

Pectoral (side) Fins: Separate from Body

Shape: long, torpedo shaped

Gills: on each side of body (lateral)

Place photos here:



1. Hammerhead Shark



14. Nurse Shark



9. Great White Shark



15. Whale Shark



9. Tiger Shark

Teacher Key



3. Atlantic Torpedo Ray



5. Sawfish



7. Yellow Spotted Stingray

Rays

Physical characteristics

Tail: long and skinny

Pectoral (side) Fins: "wings"

Shape: Flat

Gills: Under side of body (ventral)

Place photos here:



10. Cownose Ray



4. Bluespotted Ribbontail Ray



13. Spotted Eagle Ray



6. Southern Stingray



12. Round Ribbontail Ray



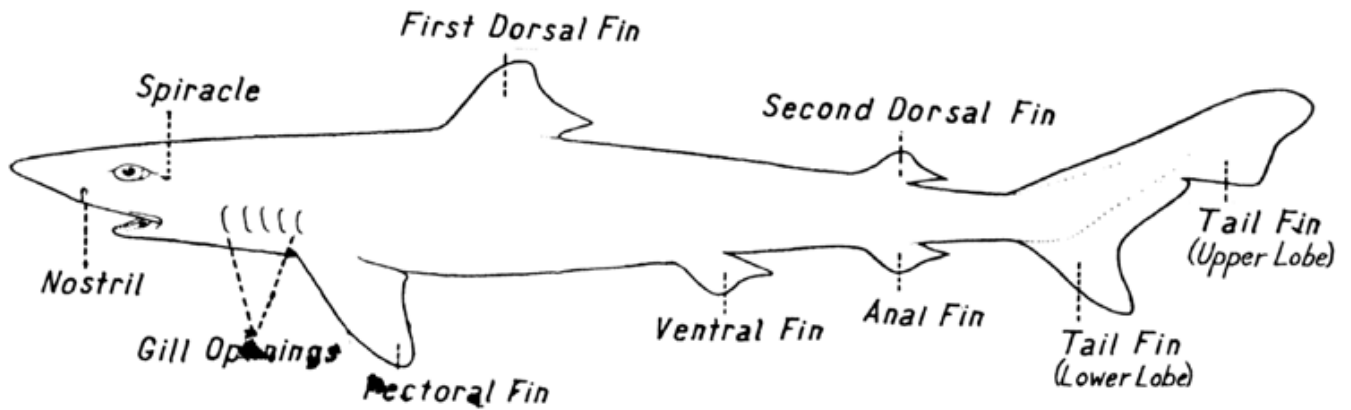
11. Guitarfish



2. Manta Ray

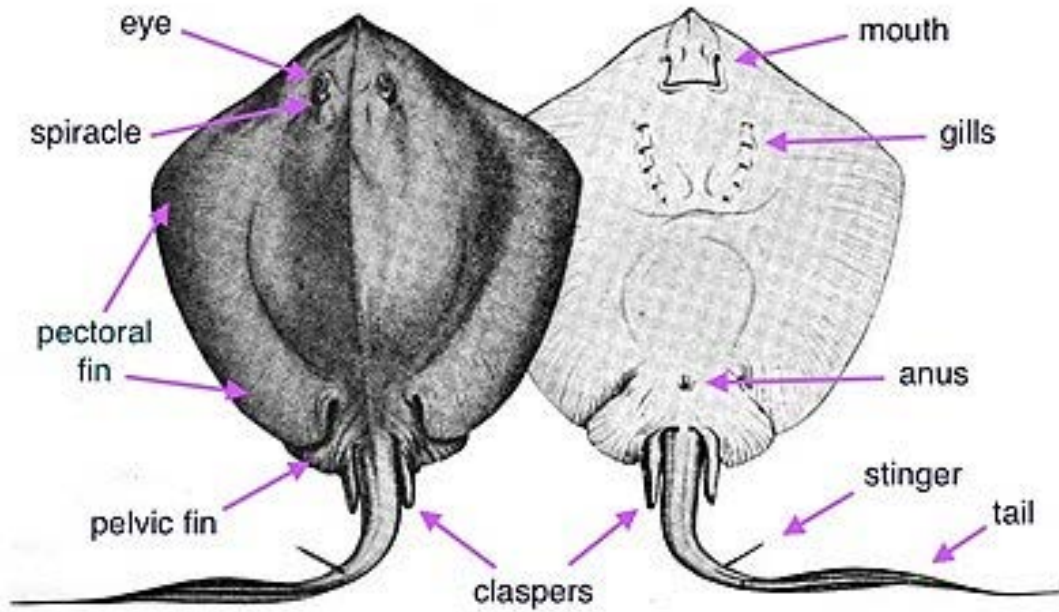


ILLUSTRATIONS OF ANATOMICAL TERMS

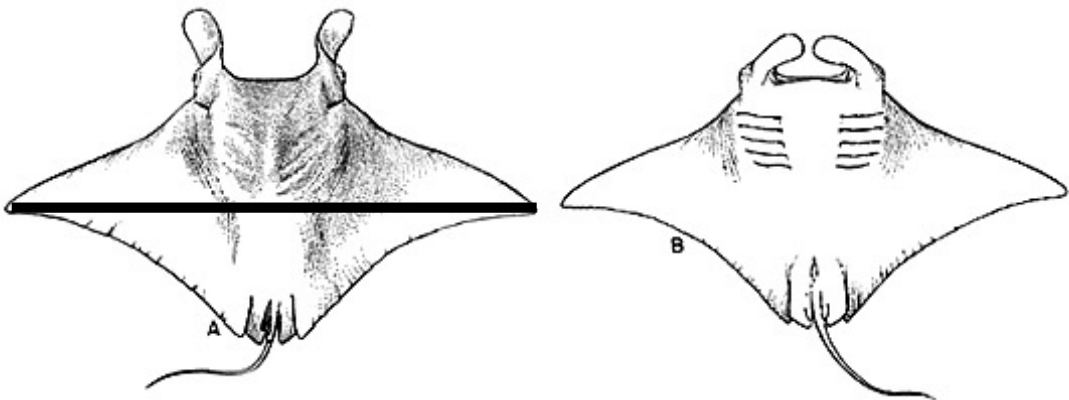


Drawing from Starks, 1921.

FIG. 8. Example of a shark.



Disc Width



Sources: [http://content.cdlib.org/view?](http://content.cdlib.org/view?docId=kt938nb3cq;NAAN=13030&doc.view=frames&chunk.id=d0e295&toc.depth=1&toc.id=&brand=calisphere)

<https://en.wikipedia.org/wiki/Stingray>

<https://www.floridamuseum.ufl.edu/discover-fish/species-profiles/manta-birostris/>



Sidewalk Chalk Rays

Use sidewalk chalk to go outside and draw your ray. Or use tape if indoors. Reference this sheet to guide your drawings. **Disc Width:** The distance between the tips of each pectoral fin on ray.

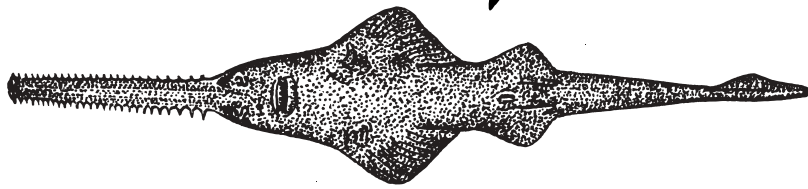


Giant Manta Ray

Disc width- 22 ft

Tail length- 4 ft

How many students wide? _____



Sawfish

Average length-18 feet

How many students long? _____



Spotted Eagle Ray

Disc width- 9 ft

Tail length- 8 ft

How many students wide? _____

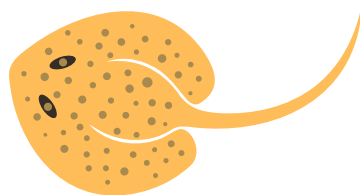


Southern Stingray

Disc width- 6 ft

Tail length- 59 inches

How many students wide? _____

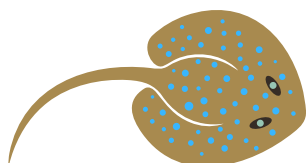


Yellow Spotted Ray

Disc width-14 inches

Tail length-5 inches

How many shoes wide? _____



Bluespotted Ribbontail Ray

Disc width-12 inches

Tail length-18 inches

How many shoes wide? _____



Exit Ticket

SC.3.L.15.1

Name:

List 3 physical characteristics of Rays:

- 1.
- 2.
- 3.



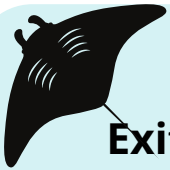
Exit Ticket

SC.3.L.15.1

Name:

List 3 physical characteristics of Sharks:

- 1.
- 2.
- 3.



Exit Ticket

SC.3.L.15.1

Name:

Why do scientists classify animals?



MARINE MEGAFUNA FOUNDATION

SCIENTIST SERIES FOR STUDENTS

Grade 3

Module 1 Rays and Sharks

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Grant provided by:



We value your feedback!

Please fill out this Teacher Evaluation form at shorturl.at/zlJT4
As a Thank You, your class will receive a *Manta ray Adoption Certificate!*

We'd love to see your lessons in action!

Please send an email to florida@marinemegafauna.org and tag us in social media.

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Resources:

<https://www.floridamuseum.ufl.edu/discover-fish/skates-rays/faq/>

<https://www.floridamuseum.ufl.edu/discover-fish/species-profiles/manta-birostris/>

<https://www.floridamuseum.ufl.edu/discover-fish/species-profiles/dasyatis-americana/>

<https://www.floridamuseum.ufl.edu/discover-fish/species-profiles/aetobatus-narinari/>

<https://www.floridamuseum.ufl.edu/discover-fish/species-profiles/urobatis-jamaicensis/>

https://animaldiversity.org/accounts/Dasyatis_america/

<https://www.sanbi.org/animal-of-the-week/blue-spotted-ribbontail-ray/>

<https://www.nwf.org/Educational-Resources/Wildlife-Guide/Fish/Sawfish>

<https://www.floridamuseum.ufl.edu/discover-fish/skates-rays/faq/>

