



**Lesson Time**

75 minutes

**Essential Question**

What are threats to manta rays and how can you help?

**Materials**

Copies of "Survival Cards"  
Copies of "PSA"

**Objectives-Students Will**

List and explain survival factors of manta rays  
List and explain human impacts on the manta ray  
Communicate concerns to public  
Present PSA

**Florida State Standards**

**Science: SC.4.L.17.4**

Recognize ways plants and animals, including humans, can impact the environment.

**LAFS.4.SL.2.4** Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

**Background Information:**

Manta rays are slow growing fish that have long life spans. Their gestation is for one year and they will have one offspring (pup). The pups are born at 6 ft across. Generally, females will then take off two to five years to restore their energy. Because they only have one pup every 2-5 years this makes it hard for manta ray populations.

A **nursery ground** is characterized either by an abundance of food or by a lack of predators. This would be a habitat where they can more safely mature into adulthood. There are very few known nursery habitats for manta rays, so protecting them is vital.

Part of assessing and monitoring a nursery area is identifying individuals by photographs and helping the rays by removing fishing hooks and fishing line.

In one assessed area by Scientist Jessica Pate, 27% of manta rays had fishing line/hooks attached to them. Twenty five percent of the manta rays were located within 1KM of a pier/inlet/ jetty showing that they are prone to human impact.





**LAFS.K12.SL.2.4** Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

**NGSS CrossCuttingConcepts**

Cause and Effect

**5C's**

Collaboration  
Critical Thinking

**Vocabulary:**

**Cleaning station:** an area on the reef where animals visit to be cleaned of parasites and dead flesh by small cleaner fish and shrimp

**Marine Protected Areas**

**(MPA's):** a part of ocean that limits or restricts human interactions to conserve the natural ecosystem

**Nursery ground:** a habitat that enhances the growth (food) and survival (lack of predators) of juveniles

Threats to manta rays:

in 2018, manta rays were listed as threatened under the Endangered Species Act (United States). Manta rays are considered vulnerable to extinction by the International Union for the Conservation of Nature.

Manta rays are traded internationally for use of their gill plates in Chinese medicine and eaten for their meat as well. All rays face habitat loss and destruction. Manta rays face many threats similar to all marine life. They consume microplastics while feeding. They face harassment from humans and boats and get tangled in fishing lines and hooks. They also face commercial fishing dangers such as nets and being caught as an unintended species (by catch)

Few national and international conservation measures are in place for manta rays. This is concerning due to the fact that they migrate into differently "owned and managed" waters. Their predators are sharks, orcas, and humans.

**Teacher Preparation:**

1. Print sets of "Survival Cards" (1 set per 2 students)
2. Print "How you can help mantas PSA"





## **Procedures:**

### **Step 1: Engage with Video**

Video by Jessica Pate: <https://www.youtube.com/watch?v=J8HIISY3la0&feature=youtu.be&fbclid=IwAR2bSOpPRZX8Q0vVZAAkUBv5im9hO0Zsc4QXm9iUCyvx2czkPTxHJ3vLKD8>

### **Step 2: Explore: Survival Cards**

Partner

Students will play "Go Manta" with "Survival Cards." The purpose of this activity is to get students familiar with the threats manta rays encounter. **Directions:** One set of cards per two students. Shuffle cards and each student will get 5 cards. The remaining goes into a pool in the middle. Before starting students can remove sets (matching cards). Take turns asking partner if they have a card. If not, the partner says, "Go Fish". The person who gets the most sets first wins.

### **Step 3: Explain: Harmful vs Helpful**

Partner

Partners will sort "Survival Cards" into two piles: Harmful and Helpful (to survival). Use the "Discussion Teacher Guide" to discuss why the cards are in each pile. Students will then need to explain the human impacts on manta rays.

### **Step 4: Elaborate: Public Service Announcement**

Partner

Students will create a Public Service Announcement using sheet, "How you can help mantas" to raise awareness about threats to manta rays. This can be a brochure, poster, or video. Guide students to look for connections between background information, survival card clues. Students are encouraged to "publish" to social media, class website, YouTube, etc

### **Step 5: Evaluate: Present**

Students will present their PSA to classmates, schoolmates, or parents before distributing them to the public avenue of choice.

**Linguistically diverse learners:** Harmful and Helpful terms can be provided in native language. Use picture clues to assist with understanding.





# Discussion Teacher Guide for Survival Cards/ PSA

***The "Helpful" pile should include the following:***

## **Swimming with friends**

**Ask:** Why does swimming with friends help mantas survive?

**Answer:** Manta rays are very social animals. Females tend to hang out with other females in groups. Mantas can get more food when they feed together.

## **Got hook removed**

**Ask:** Why does getting a fishing hook removed help mantas survive?

**Answer:** Mantas often encounter humans fishing from boats, inlets, or piers. Hooks and fishing line can impede a manta's ability to feed and/or swim, leave cuts and wounds, and make them susceptible to getting tangled in more fishing gear or even coral reefs.

## **Clean water**

**Ask:** How does clean water help mantas survive?

**Answer:** Water that is free of pollutants helps manta rays stay healthy as well as the food they eat healthy.

## **A full belly of food**

**Ask:** Why does a full belly of food help mantas survive?

**Answer:** Manta rays who eat more can tend to be more healthy and larger in size.

## **Found a mate**

**Ask:** Why does finding a mate help mantas survive?

**Answer:** Manta rays only have one pup every 2-5 years. Therefore, it is important that the young survive, grow up, and find a mate to keep the population stable.

## **No predators**

**Ask:** How does a lack of predators help mantas survive?

**Answer:** A lack of predators, especially in a **nursery ground**, help the young manta rays survive.

## **Healed quickly**

**Ask:** How does healing quickly help mantas survive?

**Answer:** Manta rays spend a lot of time at **cleaning stations** where smaller fish clean wounds (from sharks or fishing gear) and also eat parasites off the manta ray.

## **Protected habitats**

**Ask:** How does a protected habitat help mantas survive?

**Answer:** Protected areas in the ocean, **marine protected areas**, can limit or ban human activity such as fishing, boating, or even SCUBA diving.

## **Scientists learn from their research**

**Ask:** How does learning more about manta rays help mantas survive?

**Answer:** The more scientists learn about manta rays the more they can help others learn about them and provide information to help protect them.



# Discussion Teacher Guide for Survival Cards/ PSA

***The "Harmful" pile should include the following:***

## **Got tangled in fishing line**

**Ask:** Why is a manta getting tangled in fishing line harmful for survival?

**Answer:** Hooks and fishing line can impeded a manta's ability to feed and/ or swim and leave cuts and wounds. Manta's must keep swimming to breathe, so if trailing a fishing line keeps them from swimming they may drown.

## **Ate plastic**

**Ask:** Why is eating plastic harmful for manta rays?

**Answer:** Manta rays can fill up of on plastic and will not get enough nutrients to stay healthy.

## **Injury**

**Ask:** How is an injury harmful for manta rays?

**Answer:** Any injury for a manta ray can make the manta less healthy, less able to get food, and more prone to predators.

## **Harassment**

**Ask:** How is getting harassed (bothered) by humans harmful to manta rays?

**Answer:** Humans want to interact with manta rays. This can disrupt social and feeding interactions of manta rays necessary for health and survival.

## **Boat Injury**

**Ask:** How does getting a boat injury harmful to manta rays?

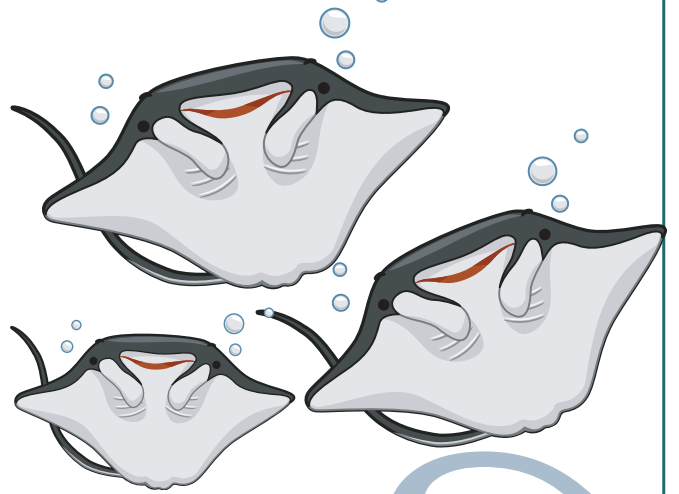
**Answer:** Boats can collide into manta rays since they tend to spend a lot of time at the surface of the water. Boat collisions can severely injure manta rays.

# Survival Card



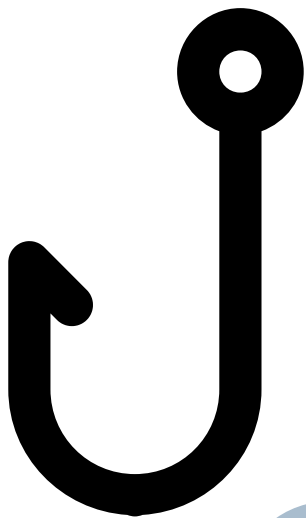
**A full belly of food**

# Survival Card



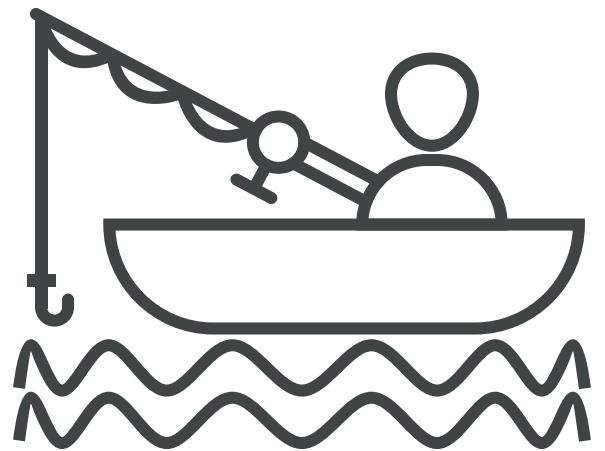
**Swimming  
with friends**

# Survival Card



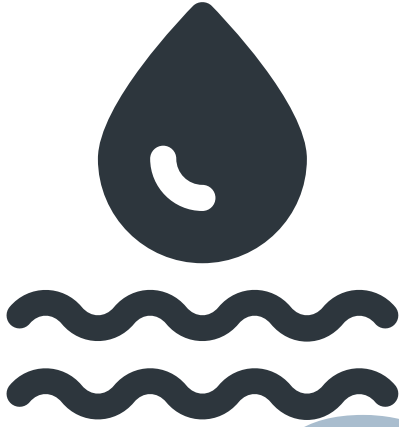
**Got hook removed**

# Survival Card



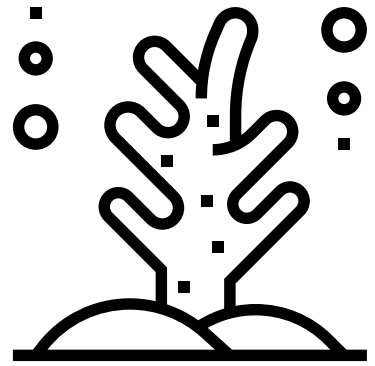
**Tangled in fishing  
line**

# Survival Card



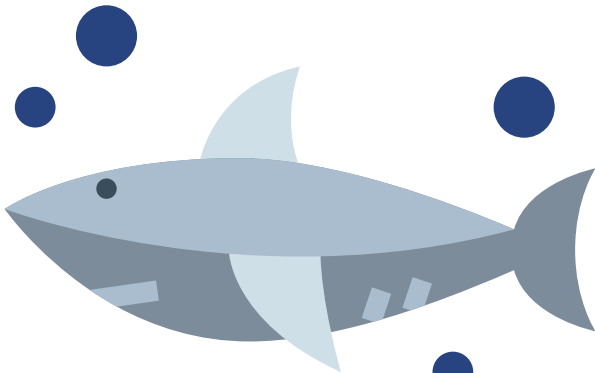
**Clean water**

# Survival Card



**Protected habitats**

# Survival Card



**No predators**

# Survival Card



**Ate plastic**

# Survival Card



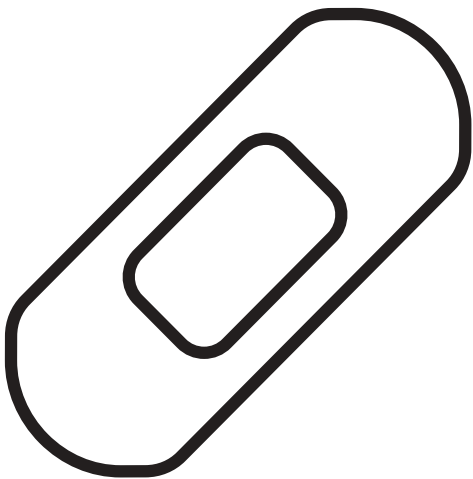
**Scientists learn from  
their research**

# Survival Card



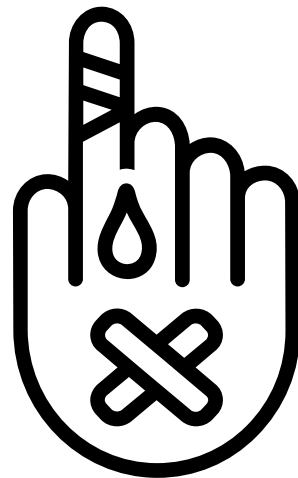
**Found a mate**

# Survival Card



**Healed quickly**

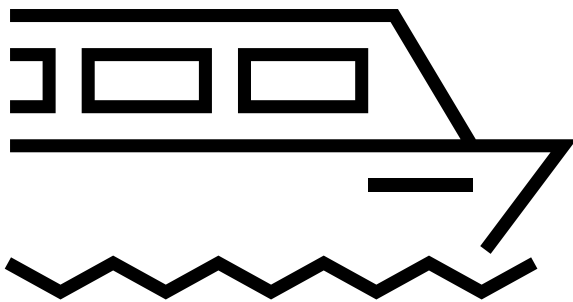
# Survival Card



**Injury**

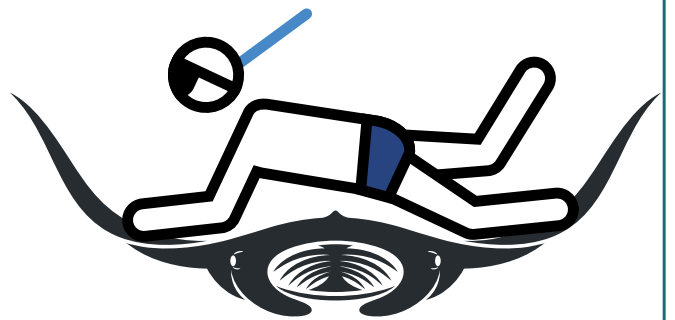


**Survival Card**



**Boat injury**

**Survival Card**



**Harassment**



# "How YOU can help Mantas" PSA

Name (s) \_\_\_\_\_

**Directions:** You and your partner will create a **Public Service Announcement (PSA)** together.

You can create this on a poster, as a brochure, or a flyer- be creative. You are encouraged to share this with your community- your neighborhood, peers from sports, church, etc.

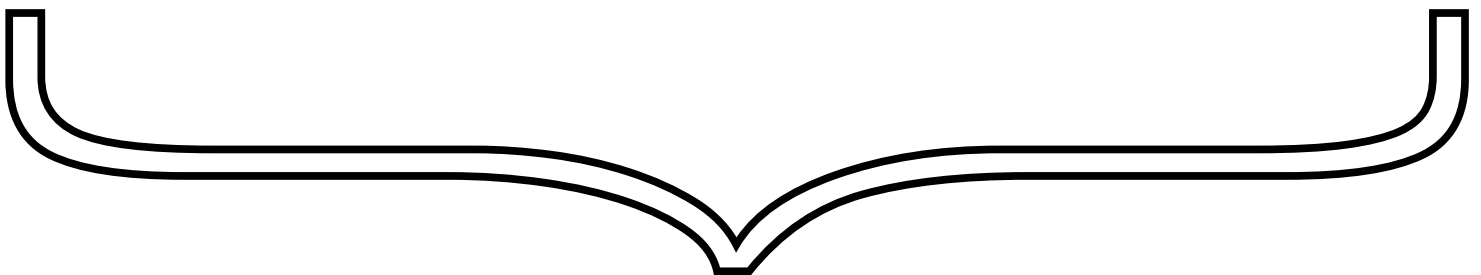
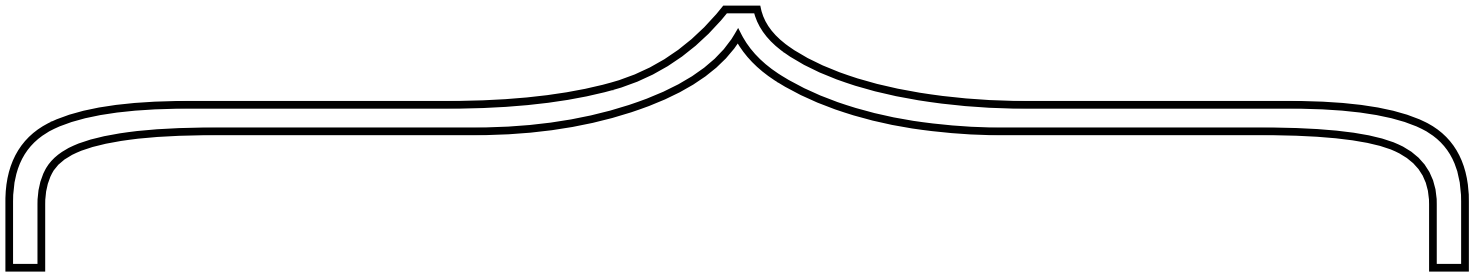
*For a successful PSA:*

Please use color and drawings!

Include what you learned from the Survival Cards

Explain how your community should help and why

Use the space below to brainstorm, take notes, make sketches, etc.





## Exit Ticket

**SC.4.L.17.4**

Name:

1. List at least 2 threats to manta rays:
  - 1.
  - 2.



## Exit Ticket

**SC.4.L.17.4**

Name:

1. Write a question that you have about helping manta rays for Scientist Jessica



## Exit Ticket

**LAFS.K12.SL.2.4**

Name:

- List 2 places where you can share your PSA
- 1.
  - 2.



Meet  
the Scientist:



**JESSICA PATE**

Project Manager / Field  
Researcher, Manta Ray  
Program, Florida

**Degree:**

Masters in Science, Marine  
Biology,  
Florida Atlantic University

**What she does in the field:**

- Measure manta rays
- Use drones to survey
- Photograph rays from boat and  
record their location
- Present research to students  
and conservation/education  
groups
- Remove fishing hooks from rays

**Research Focus:**

**Jessica** started her marine biology career working with sea turtles and magnetism in South Florida as part of her graduate degree.

She has traveled all over the world from Costa Rica to Honduras to Ghana to study marine life.

Jessica has also spent time working on a sailboat as a SCUBA diving Instructor and marine biologist.

When she was free diving in 2010 and saw a manta ray, her passion ignited. She realized that almost no one was studying manta rays. She founded the Florida Manta Project and now collaborates with MMF to study manta rays in Florida.

MMF has many staff members in other countries. Jessica is one of the few scientists working in the United States. Her current research focuses on learning about the ecology of and human impacts to Florida manta rays. She recently published her first paper on a manta ray nursery grounds on the Atlantic coast of south Florida!





# MARINE MEGAFAUNA FOUNDATION

SCIENTIST  
SERIES  
FOR STUDENTS

**Grade 4**

## **Module 3** Threats to Mantas

### **Author:**

Hilary Penner M.Ed

### **Scientific Advisory**

Jessica Pate, M.Sc  
MMF Florida Project Manager

### **Grant provided by:**



### **We value your feedback!**

Please send an email to  
florida@marinemegafauna.org  
to receive a  
Teacher Evaluation Form  
and a  
Manta ray Adoption Certificate  
for your class!

### **Resources:**

<https://www.good.is/articles/florida-manta-ray-project>

<https://oceana.org/blog/%E2%80%9CIt%E2%80%99s-kevin%E2%80%9D-meet-young-manta-revealing-new-clues-about-his-species>

<https://marinebio.life/manta-ray-research-and-dont-eat-the-goat-with-jessica-pate/>

