

## Lesson Plan: Manatee

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### Summary

Students will explore the evolutionary history, unusual adaptations, and conservation status of manatees. Using a structured fact set, they will examine how manatees evolved from land mammals, how they survive in aquatic environments, and how human activity affects their population.

### Objective

Students will analyze biological traits and environmental challenges of manatees using historical data, behavioral facts, and population trends.

### Standards

NGSS MS-LS4-1: Analyze and interpret data for patterns in the fossil record

CCSS.ELA-LITERACY.RI.6.7: Integrate information from different formats to understand a topic

C3.D2.Geo.5.6-8: Analyze the effects of human activity on the environment

### Materials

9 Fun Facts list

Worksheet

Optional: whiteboard, paper, reference images

## Introduction

Begin with a discussion about aquatic mammals. Ask students to name examples and describe how they move, breathe, and survive. Introduce the manatee as a case study with surprising traits and ancient origins.

## Activity

Students will read the 9 Fun Facts and complete the worksheet. In small groups, they will discuss how each fact connects to survival, adaptation, or human impact. Each group will present one fact and explain its significance.

## Assessment

Evaluate student understanding through worksheet responses, group discussion, and ability to connect facts to broader biological concepts.

## Rubric

Criteria	Excellent (4)	Good (3)	Fair (2)	Poor (1)
Content Understanding	Clear, accurate connections to all facts	Mostly accurate with minor gaps	Basic understanding with limited connections	Misunderstood or missing key ideas
Discussion Participation	Engaged, thoughtful contributions	Participated with some insight	Minimal input	No participation
Worksheet Completion	All questions answered thoroughly	Most questions answered	Some questions answered	Few or no answers
Effort and Focus	Consistently focused and engaged	Mostly focused with minor distractions	Frequently distracted	Off-task or disengaged

## 9 Fun Facts

### **1. Manatees split from elephant ancestors over 50 million years ago.**

Both manatees and elephants belong to a group called Tethytheria. Their common ancestor was a land-dwelling herbivore that lived near the ancient Tethys Ocean. Manatees evolved into aquatic mammals while elephants stayed on land. Fossils show early manatees still had four legs. Over time, they lost their hind limbs and developed paddle-shaped tails.

### **2. The first fully aquatic manatees appeared around 40 million years ago.**

Early sirenians like Pezosiren had legs and could walk. Later species adapted to life in shallow coastal waters. Their bodies became streamlined and their limbs turned into flippers. These changes helped them swim slowly but efficiently. By the end of the Eocene, they were fully aquatic.

### **3. Manatees have lived in Florida for at least 12,000 years.**

Fossils and historical records confirm their long presence in the region. Native peoples likely saw and interacted with them. Some manatees were hunted, but others were left alone. Florida's warm springs and rivers made it a perfect habitat. Manatees have been part of the ecosystem since the Ice Age.

### **4. Manatees fart to control their buoyancy.**

Their intestines produce a lot of gas. By releasing or holding in farts, they adjust how high or low they float. This helps them move through water without much effort. Scientists have studied this strange behavior. It's one of the weirdest tricks in the animal kingdom.

### **5. Manatees were once mistaken for mermaids.**

Early sailors reported seeing mermaids near tropical shores. These sightings were probably manatees. With their round bodies and flipper-like arms, they looked like mythical sea creatures. The legend of mermaids may have started with tired sailors and distant manatee shapes.

**6. Manatees have no natural predators but still get injured.**

Their slow speed makes them easy targets for boat strikes. Many have scars from propellers. They also get caught in fishing gear and suffer during cold snaps. Even though they are peaceful, human activity puts them at risk. Conservation groups work to protect them.

**7. Manatees can hold their breath for up to 20 minutes.**

Most of the time, they surface every 3 to 5 minutes. But when resting, they can stay underwater much longer. Their lungs run the full length of their body. This helps them control buoyancy and breathe efficiently. It's a key part of their slow, gentle lifestyle.

**8. Florida's manatee population is estimated at 8,350 animals.**

This is a big increase from the 1,267 counted in 1991. Conservation efforts helped boost numbers. Manatees are now listed as threatened instead of endangered. They still face dangers from pollution and habitat loss. But their recovery shows that protection works.

**9. The total West Indian manatee population is at least 13,000.**

This includes both Florida and Antillean subspecies. The Antillean population is shrinking in some areas. Fewer than 7,000 Antillean manatees remain in the wild. Manatees are protected by federal laws and international agreements. Their survival depends on continued support.

## Worksheet

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Review

1. What group do manatees and elephants both belong to?
2. How did early manatees like Pezosiren differ from modern ones?

### Discussion

3. Why might sailors have mistaken manatees for mermaids?
4. What human activities pose risks to manatees?

### Data Analysis

5. Compare the Florida manatee population in 1991 and today. What changed?
6. How does the Antillean population compare to Florida's?

### Reflection

7. Why is buoyancy important for manatees?
8. What does the ability to hold breath for 20 minutes suggest about their lifestyle?
9. How do conservation efforts impact manatee survival?