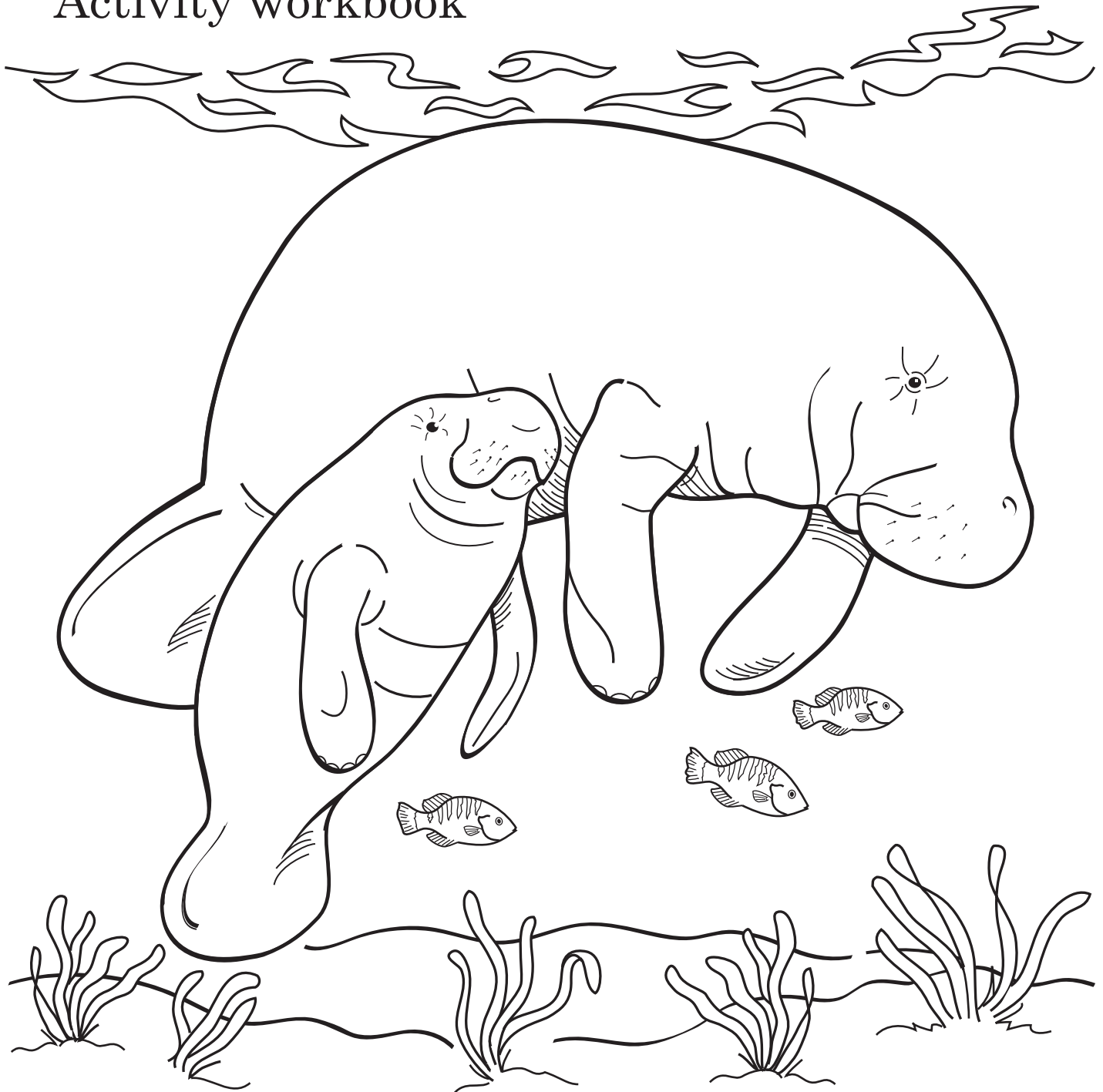


Manatee

Activity workbook



Florida Fish and Wildlife
Conservation Commission
MyFWC.com

Florida's gentle giants

The Florida manatee before and after work sheet

Before you start your lessons about manatees, take a few minutes to write down what you know about these animals. Think about what you want to know about manatees and enter the information below. At the end of your session, write down what you learned and see how your lists compare.

Name: _____ Date: _____

What I know about manatees now	What I learned about manatees
What do I want to know about manatees?	

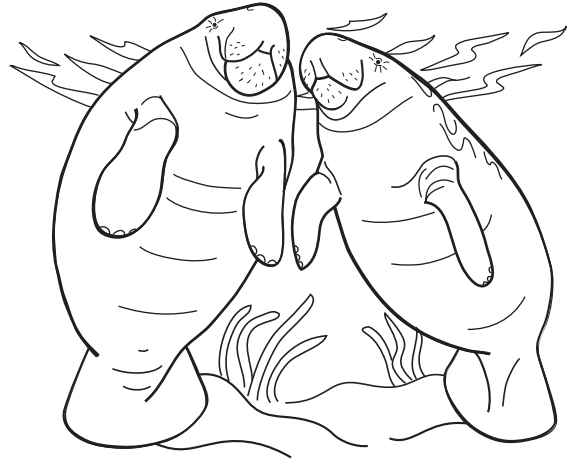
Based on what you learned about manatees, write a short story about the manatees that may live in the waterways near you. Include area landmarks, waterways and marinas in your story. How can manatees be better protected in these areas?

Remember, you can make a difference.

Note to teacher: Use the underlined words throughout this booklet as vocabulary words for your students.

What is a manatee?

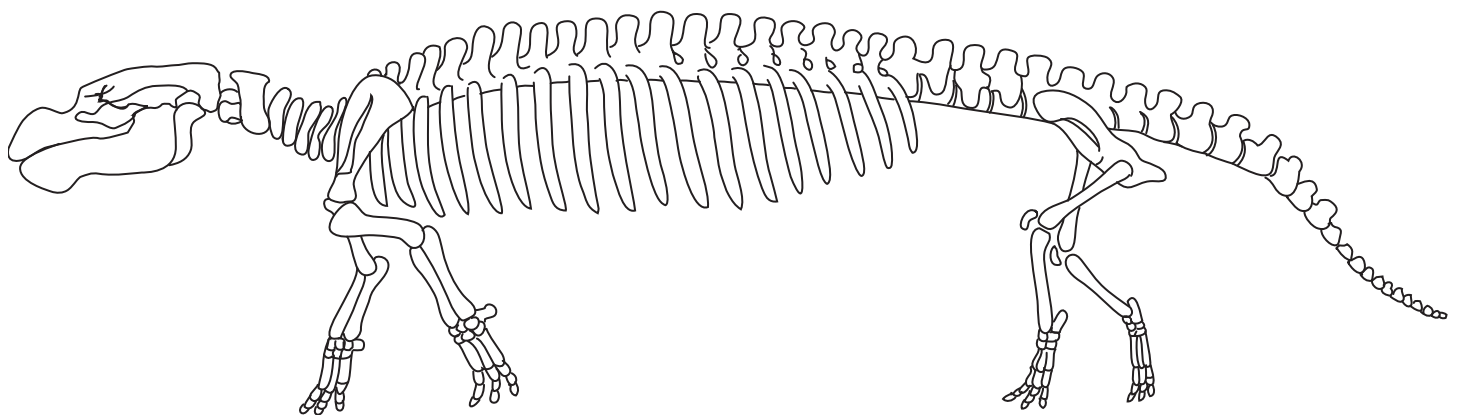
The Florida manatee (*Trichechus manatus latirostris*), a sub-species of the West Indian manatee, is an endangered aquatic mammal found in Florida's waterways. While manatees in general are sometimes called sea cows, because they consume aquatic plants, the female manatee is better known as the cow. A newborn or young manatee is called a calf, and a mature male manatee is called a bull.



Prehistoric Sirenians

For millions of years, long before Christopher Columbus discovered the New World, both dugong and manatee (Sirenians) species lived in the coastal waterways, rivers and springs of what we now know as Florida. Other Sirenian species were found in various locations around the world. The following information will help you research these unique mammals.

- Ancestral forms of Sirenians date back about 55 million years.
- Forty-five million-year-old Sirenian fossils have been found in Florida.
- The elephant (*Proboscidian*) and a hippopotamus-like prehistoric animal (*Desmostylian*) most resemble Sirenians.
- Manatee fossils have been found in Florida that date back to 1 million years ago.
- Elephants, hyraxes, aardvarks and manatees share similar characteristics.
- Research shows that the earliest known human inhabitants of Florida (Paleo-Indians) hunted the manatee for its meat, bones, hide and fat.
- Recent Sirenian fossil discoveries in Jamaica show that manatees evolved from four-footed, aquatic plant-eating land animals.



Pezosiren portelli

Activity: Research the prehistoric Proboscidian and Desmostylian species to see what these animals looked like and then compare them to Sirenians.

What do manatees look like?

Manatees are large, gray aquatic animals with thick, finely-wrinkled skin. From the blunt whiskered snout, a manatee's body is torpedo-shaped and then tapers to a flat, paddle-shaped tail. Two forelimb flippers, with up to four "finger" nails, are located near the head. Like all mammals, manatees have hair on their bodies. Although the hair is very sparse, it exists in short strands from a manatee's head all the way down to its tail. Manatees do not have external ear lobes, eyelids or eyelashes. A thin membrane protects the manatees' eyes when underwater. Stiff bristles around its mouth help manatees hold food while eating.

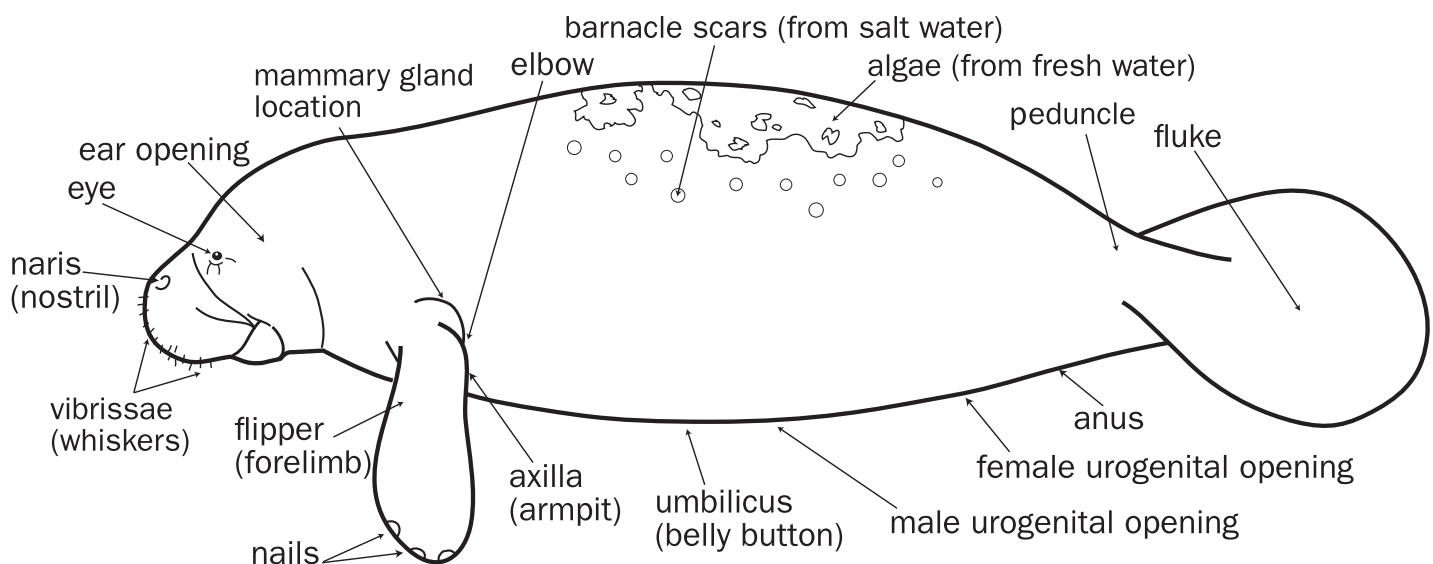
Characteristics:

- Small eyes
- Finger nails on flippers
- Fluke – paddle-shaped tail
- Peduncle (narrow part of the tail)
- Nostrils (open and close like valves)
- Ears (small opening)
- Vibrissae – stiff whiskers

Marching molars

Tooth replacement is an adaptation to the manatees' diet of aquatic plants that are mixed with abrasive sand. Over time, sand wears down the molars, which can make chewing plants difficult. The adaptation allows for new teeth to erupt at the back of the jaw and move forward until the worn-down teeth eventually fall out. Tooth replacement (*polyphyodont*) occurs throughout the life of a manatee.

Activity: Color the manatee gray. Green or brown algae and white barnacles sometimes grow on the backs of manatees. These natural colors help hide (camouflage) manatees in the water.

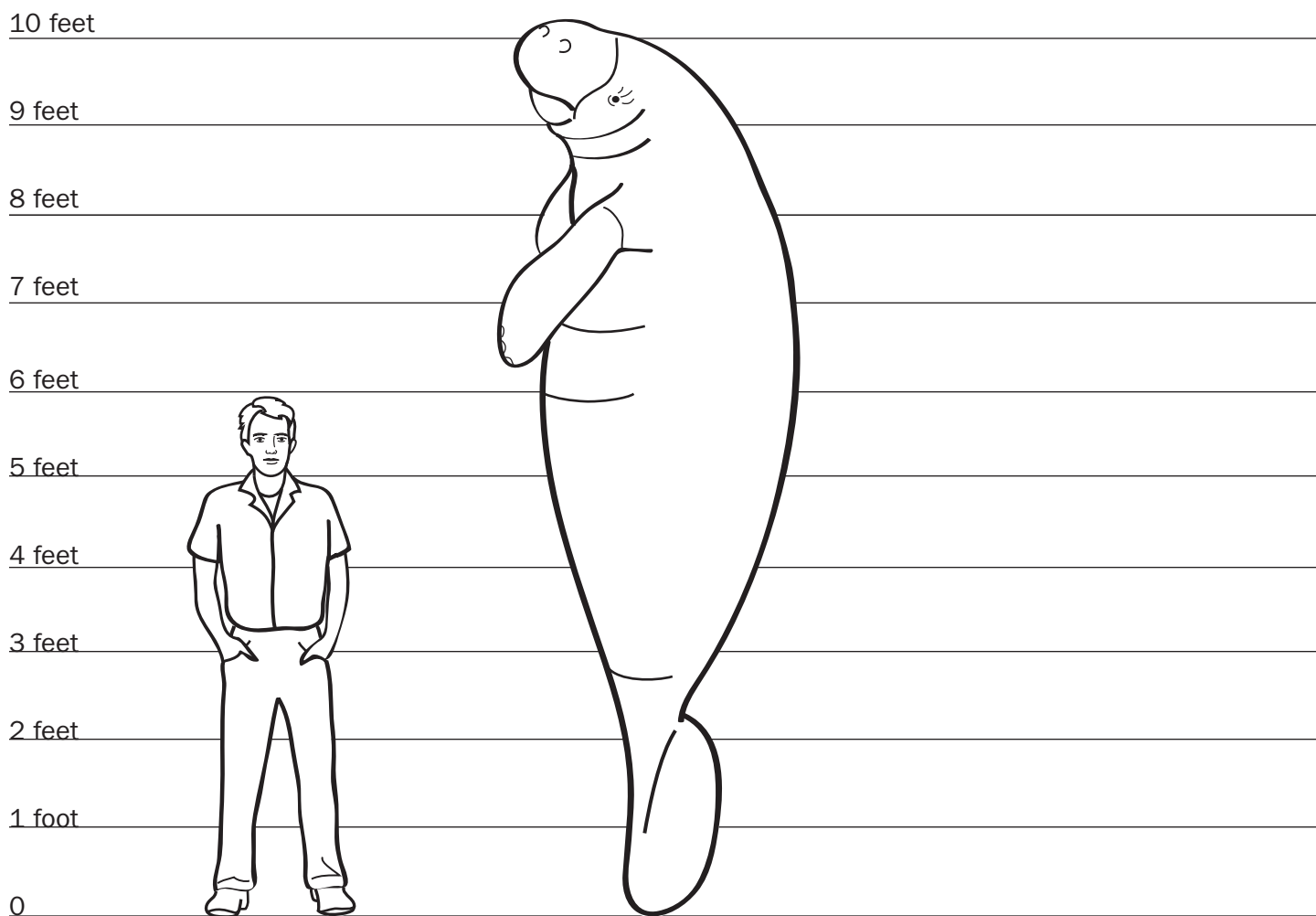


How big do manatees grow?

A calf weighs 60-80 pounds and is 4 to 4 1/2 feet in length at birth and grows quickly during its first two years. During this time, the female sea cow nurses its young from teats found just behind the base of the flippers. This occurs until the calf is weaned from nursing. Although the average adult manatee is ten feet long and weighs about 1,200 pounds, manatees can grow much larger. The heaviest manatee weighed was 3,600 pounds and measured 13 feet long. Female manatees (cows) tend to be larger than male manatees (bulls).

Activity: Find an object (small car, golf cart, etc.) that weighs as much as a manatee weighs.

Class project: Use roll paper to make a 3-D actual size manatee to hang in your classroom.



Average size person:
6 feet tall
150 pounds

Average size manatee:
10 feet long
1,200 pounds

Draw another
animal: _____
height: _____
weight: _____

Manatee anatomy facts and trivia

■ The digestive system of the manatee is adapted to process large amounts of high-fiber, low-protein food (aquatic plants).

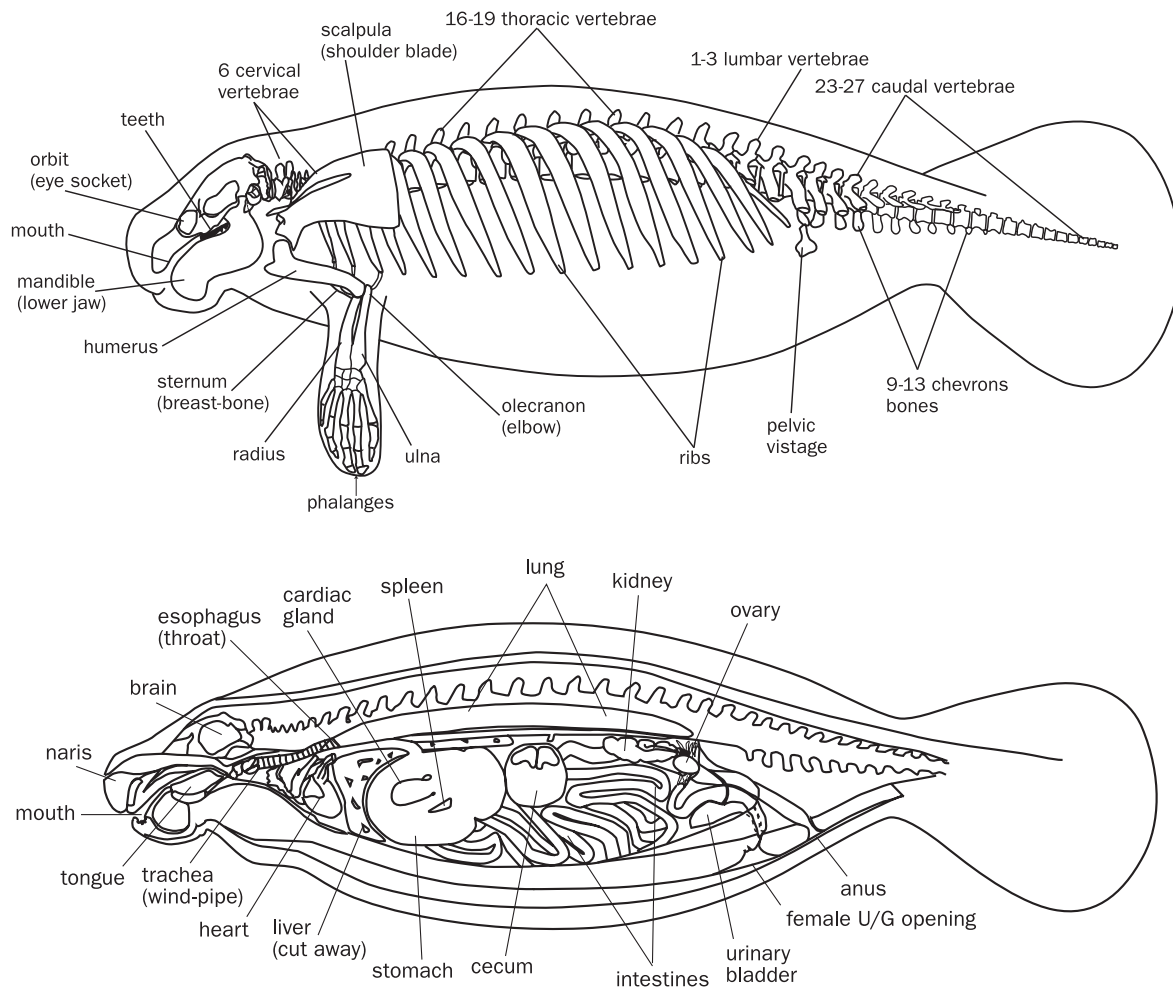
■ Manatees can eat up to 10 percent of their body weight in aquatic vegetation each day.

■ The intestines of adult manatees can measure up to 130 feet in length! It takes seven days for food to pass through this long digestive system.

■ Manatees produce a large amount of gas from the food they eat.

■ The lungs of an adult manatee may exceed three feet in length and extend along the backbone under the protection of the ribs. The length of the lungs helps manatees with buoyancy control and allows the animal to float horizontally and stay underwater for up to 20 minutes at a time.

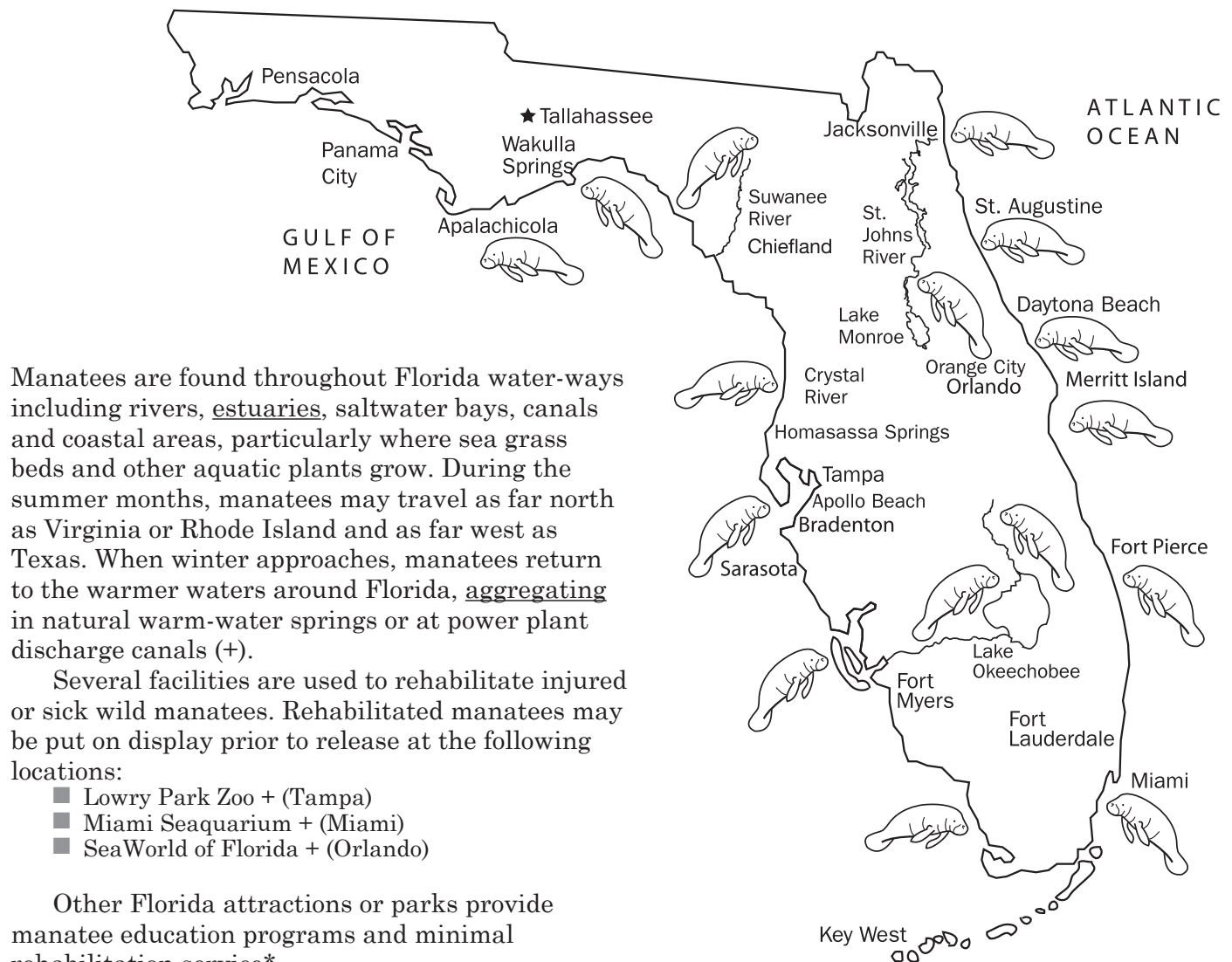
■ Manatee bones are massive and heavy and lack marrow cavities in the ribs and bones of the flippers. Heavy bones allow the manatee to easily submerge in order to graze on aquatic plants.



Activity: Use colored pencils to color the internal organs of the manatee.

Where can you find manatees in Florida?

Activity: On the map, circle the places where you have seen wild manatees. Put a check mark (✓) on the places where you have seen rehabilitated manatees or manatees on display.



Manatees are found throughout Florida water-ways including rivers, estuaries, saltwater bays, canals and coastal areas, particularly where sea grass beds and other aquatic plants grow. During the summer months, manatees may travel as far north as Virginia or Rhode Island and as far west as Texas. When winter approaches, manatees return to the warmer waters around Florida, aggregating in natural warm-water springs or at power plant discharge canals (+).

Several facilities are used to rehabilitate injured or sick wild manatees. Rehabilitated manatees may be put on display prior to release at the following locations:

- Lowry Park Zoo + (Tampa)
- Miami Seaquarium + (Miami)
- SeaWorld of Florida + (Orlando)

Other Florida attractions or parks provide manatee education programs and minimal rehabilitation service*

- Blue Spring State Park + (Orange City)
- Crystal River National Wildlife Refuge (Crystal River)
- Disney's Epcot Center – Living Seas exhibit* + (Orlando)
- Edward Ball Wakulla Springs State Park + (Wakulla Springs)
- Homosassa Springs State Wildlife Park* Blue Waters + (Homosassa Springs)
- Merritt Island National Wildlife Refuge + (Merritt Island)
- Manatee Springs State Park (Chiefland)
- Moore's Creek – Fort Pierce Utilities Authority + (Fort Pierce)

- Mote Marine Laboratory and Aquarium (Sarasota)
- Lee County Manatee Park at the Orange River and Florida Power & Light discharge canal + (Fort Myers)
- South Florida Museum/Parker Manatee Aquarium* (Bradenton)
- Tampa Electric Company's Manatee Viewing Center + (Apollo Beach)

Sirenians of the world



Present day Sirenians are found around the world and include three species of manatees and one species of dugong.

West Indian manatee (*Trichechus manatus*) – West Indian manatees are found from the southern United States to the northeast coast of Brazil and around islands near these shores. The Florida manatee (*Trichechus manatus latirostris*) is a sub-species of the West Indian manatee and is found in and around Florida's waterways. The Antillean manatee (*Trichechus manatus manatus*) is another sub-species that is found throughout the Caribbean and northeastern South America.

Amazonian manatee (*Trichechus inunguis*) – This species is restricted to the fresh waters of the Amazon Basin.

West African manatee (*Trichechus senegalensis*) – This species is found in the coastal waters and rivers of western Africa.

Dugong (*Dugong dugon*) – the dugong population is restricted to certain regions of the coastal waters of 43 countries within the Indian and Pacific oceans. The largest surviving populations are found in northern Australian waters.

Extinct species: **Steller's sea cow** (*Hydrodamalis gigas*) – This species was once found in the Bering Sea and was hunted to extinction within 27 years of discovery (1741-1768).

Activity: Research one of these species and draw or copy a picture of the animal.

What are the four elements of habitat that manatees need to survive?

Activity: Fill in the blanks to find out the basic elements of habitat.

1. Manatees eat plants that grow in the water. These plants are called aquatic vegetation. Aquatic vegetation is the best type of f__o__ for manatees to eat.

2. Manatees seek out and drink fresh w__t__ found in their environment. Manatees do not need to rely on people to provide this for them.

3. Manatees are migratory animals. Their travel is influenced by seasonal changes. Travel corridors are necessary for manatees to move back and forth between summer and winter habitats. People who use these same waterway corridors must respect the manatees' need for safe passage and provide adequate sp__c__ for manatees to travel.

4. Manatees seek safe, protected areas, or sh__l__ __r where they can feed, rest, play, mate, give birth or raise their young. In Florida, with the growing number of people and boats, safe protected areas are more difficult for manatees to find.

Loss of habitat is one of the most serious threats to the manatee. Human activities are a significant cause for manatee habitat loss through pollution, dredge and fill activity, water use and development.

If any of the four elements of habitat – (1)_____, (2)_____, (3)_____ and (4)_____ – are missing, manatees cannot survive. It is up to all of us to help Florida's manatees survive.

Manatees use high tides to reach feeding areas and shoreline vegetation that are not easy to get to when the tide is low.

Answers:

food, water, space and shelter.

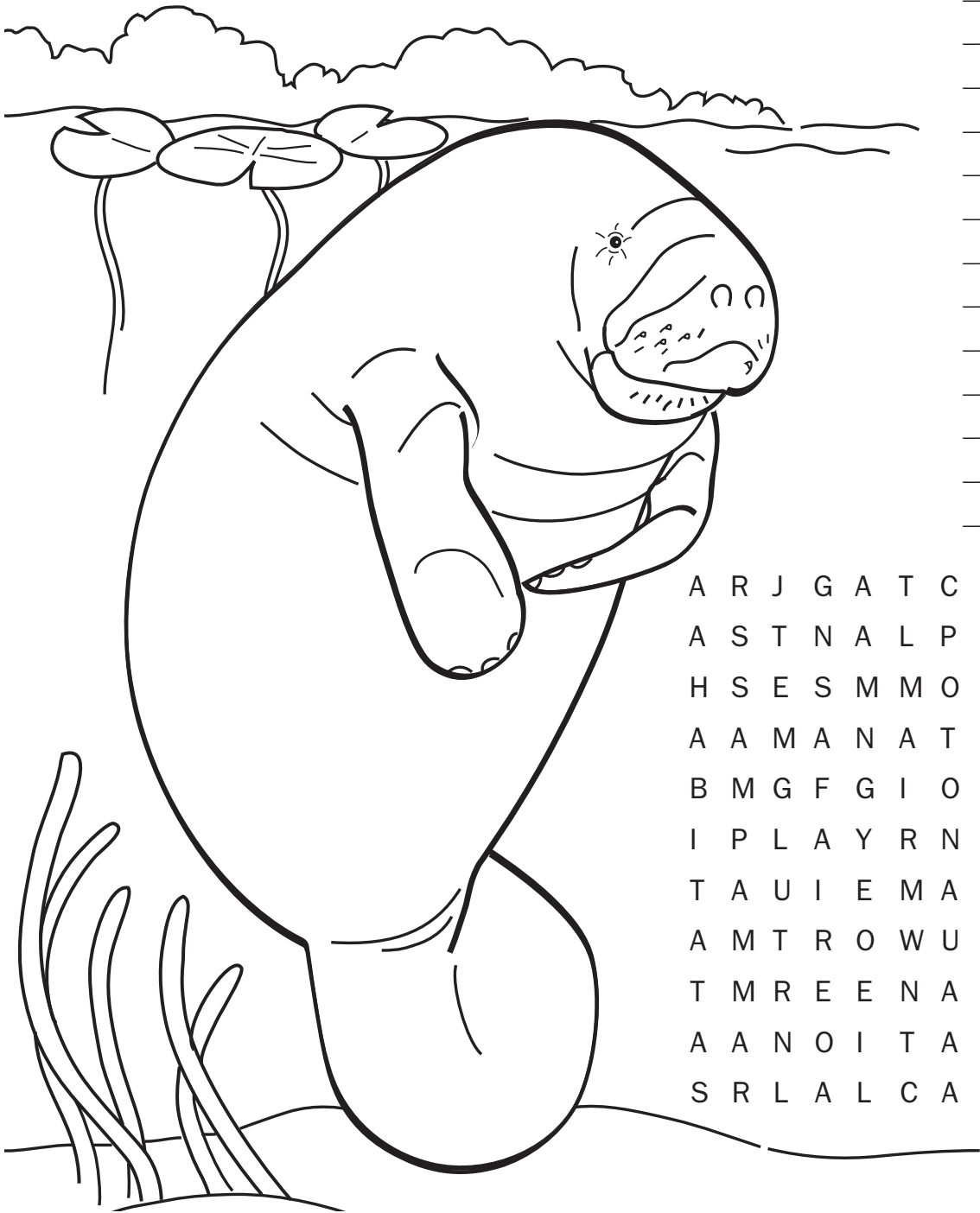


Manatee word puzzle

Find these words hidden in the puzzle. Words can be read frontward, backward, up, down and diagonally.

protect, sea cow, manatee, mammal, aquatic plants, sea grass, habitat, eat, play, rest, travel, air, water, Florida, conservation

Activity: Put the word list in alphabetic order before doing the puzzle. _____



A R J G A T C E T O R P A B
A S T N A L P C I T A U Q A
H S E S M M O A T T E O R A
A A M A N A T E E R I L E D
B M G F G I O A E E A R S I
I P L A Y R N T N E E V T R
T A U I E M A M M A L S E O
A M T R O W U S U N M L M L
T M R E E N A M S N F L I F
A A N O I T A V R E S N O C
S R L A L C A W O C A E S T

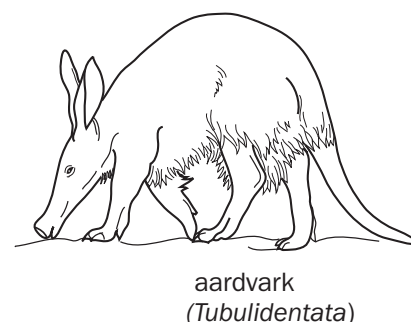
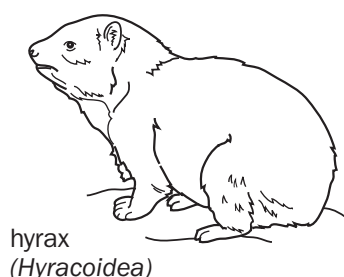
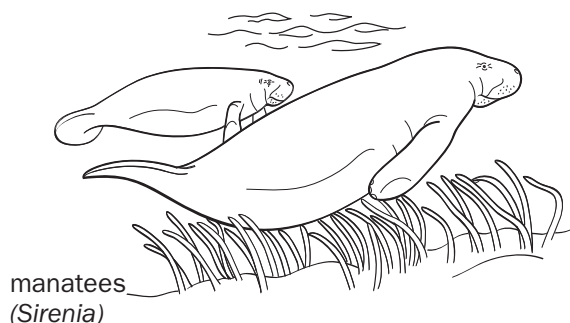
Manatee trivia word match

Activity: Fill in the blank with the word that best fits the sentence.

Words: **breathe, eyelids, heart, barrier, warm, relatives, submerged, squeaking, sideways, female, dependent, gestation**

- Manatees do not have _____, eyelashes or eyebrows. A clear nictitating membrane protects the manatees' eyes when underwater. The muscles around the eye expand and contract in a circular motion to open and close around the eye.
- A manatee's _____ beats at a rate of 50 to 60 times per minute.
- Manatees _____ air and must surface to breathe approximately every three to five minutes when active (traveling, socializing or eating).
- When resting, manatees stay _____ for long periods of time between breaths (20 minutes). A manatee can rest for many hours at a time.
- A manatee cannot turn its head _____ – it must turn its whole body around.
- A manatee communicates by making _____, chirping or whistling sounds.
- The manatee's closest modern _____ are elephants, aardvarks and hyraxes.
- The _____ (pregnancy) period of the manatee is at least 12, and possibly 13, months long.
- Calves may remain _____ on their mothers for up to two years.
- A mating herd consists of one _____ and several males that travel together for a week to a month until the female is ready to mate.
- Manatees learn about _____ water sites from their mothers.

Bonus: Study pictures of manatees and on a separate piece of paper draw a manatee's eye. How is it different from your eye? (Hint: see the first manatee trivia item above.)

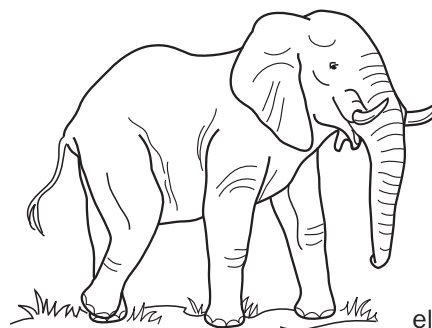


Closest modern relatives:

Elephant (order Proboscidea) –Very large mammal with toenails, dense bones, special dentition, long gestation period, with skin and sparse hair similar to a manatee.

Hyrax (order Hyracoidea) –Size of a rabbit with toenails, dense bones, special dentition, long gestation period, and a skull that resembles that of an elephant skull.

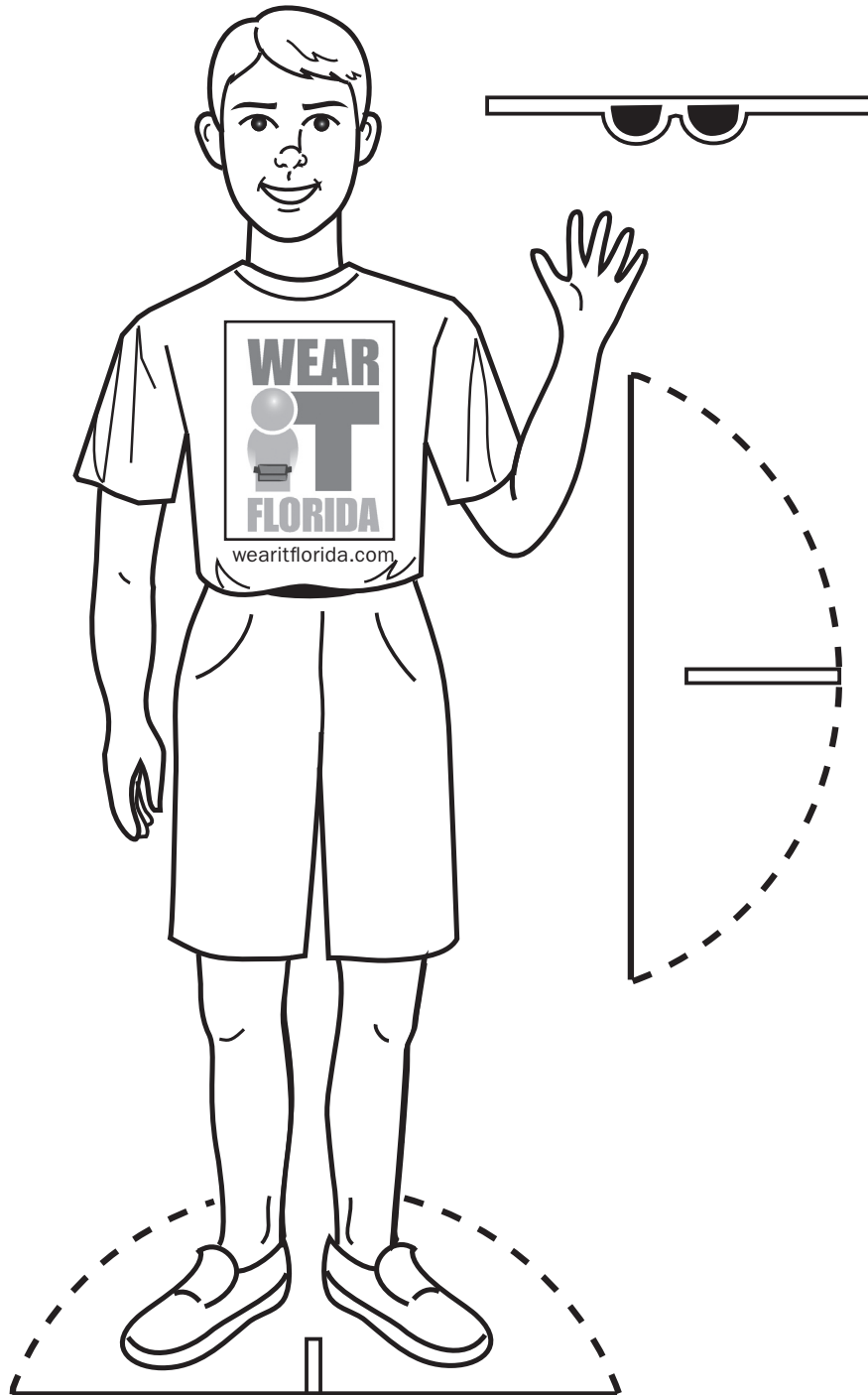
Activity: Research the characteristics of the aardvark and compare the species to manatees, hyraxes or elephants.



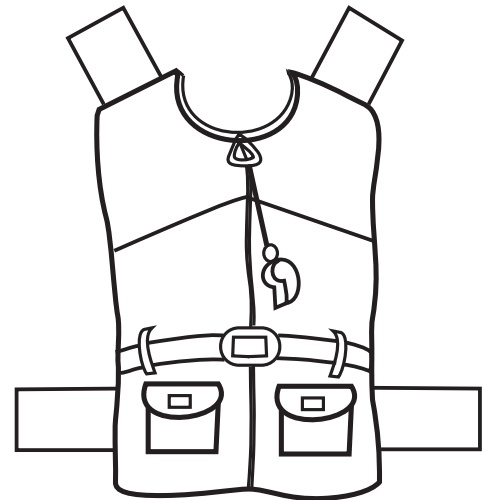
elephant
(Proboscidea)

Life jackets help save lives

Always be prepared when you plan a trip on a waterway. Practice preparing for your trip by dressing the boating safety buddy. Lightly GLUE the page to another piece of paper. CUT out the life jacket, sunglasses and other items and the boating buddy and place the items on your buddy by folding the tabs. Help your buddy be better prepared for a trip on the water.



Wear polarized sunglasses so you can see and avoid objects just below the surface of the water (such as sea grass beds, manatees and sea turtles). Polarized lenses help cut the glare from the sun on the water and also protect your eyes.



Wear your life jacket when near shore or on a boat.

Attach a whistle to your life vest that has a plastic ball inside since cork balls do not work well when wet. The whistle is used to attract a rescuer's attention and help direct them to your location.

Put a small mirror in a pocket to use to flash sunlight signals in an emergency.

Practice water safety rescues with your parents before an emergency happens.

A life jacket is also called a Personal Flotation Device or a PFD. Make sure your life jacket is Coast Guard approved and fits well. Most important...remember to **WEAR YOUR LIFE JACKET!**

Wear the proper life jacket for your activity

Type 1 – Off-shore life jacket – designed for rough weather – these will keep you afloat for a long time.

Type 2 – Near-shore life jacket – designed for near-shore, calmer waters where rescue time may be shorter.

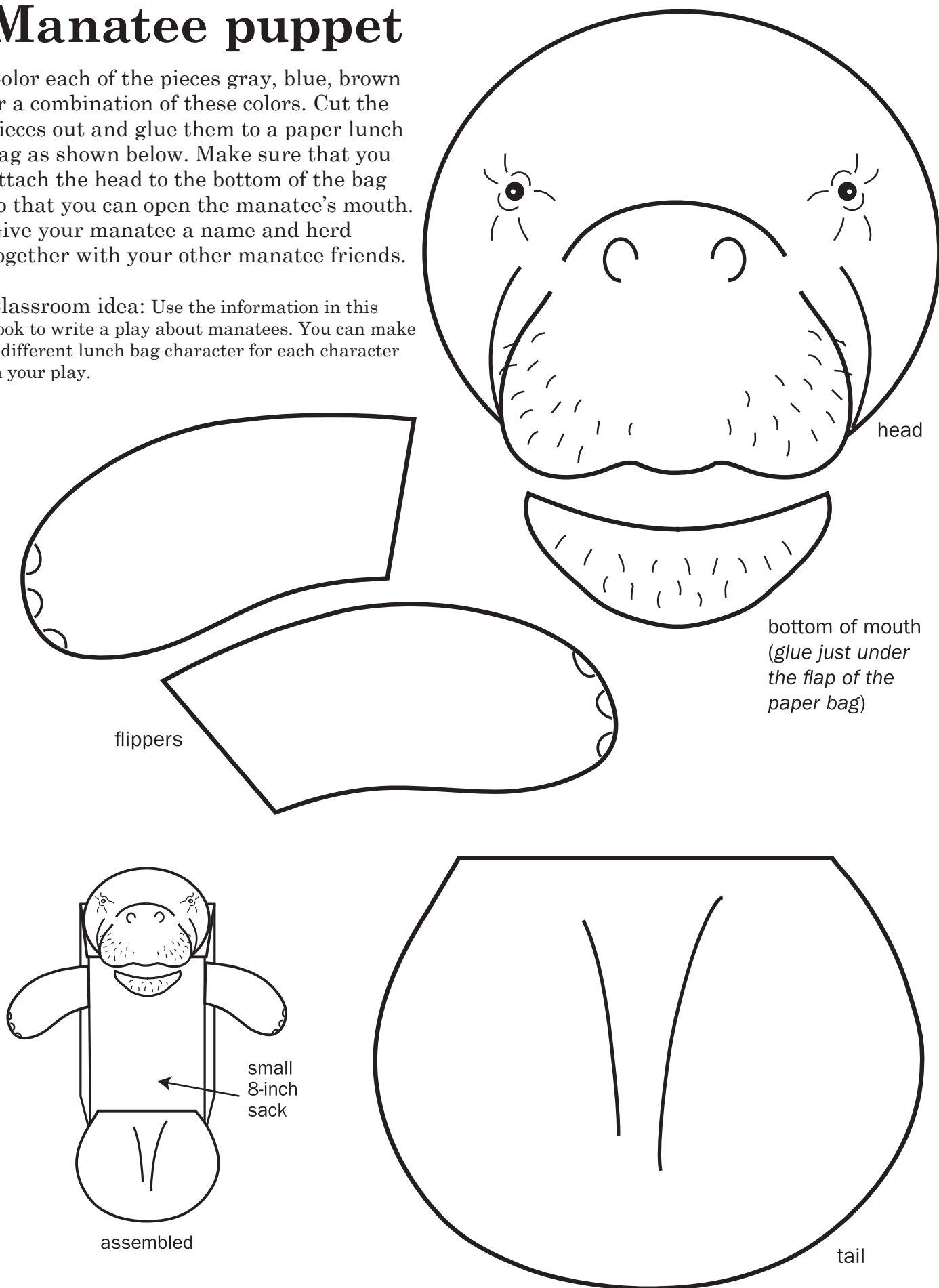
Type 3 – Sport life jacket – commonly used for watersport activities – not designed for use in rough waters.

Type 4 – Throwable flotation – seat cushion, life ring – this device is not worn and is designed to be thrown to a person who needs help

Manatee puppet

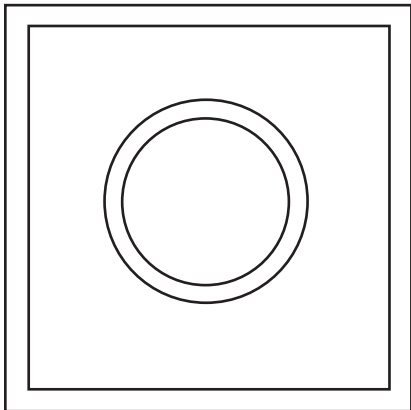
Color each of the pieces gray, blue, brown or a combination of these colors. Cut the pieces out and glue them to a paper lunch bag as shown below. Make sure that you attach the head to the bottom of the bag so that you can open the manatee's mouth. Give your manatee a name and herd together with your other manatee friends.

Classroom idea: Use the information in this book to write a play about manatees. You can make a different lunch bag character for each character in your play.

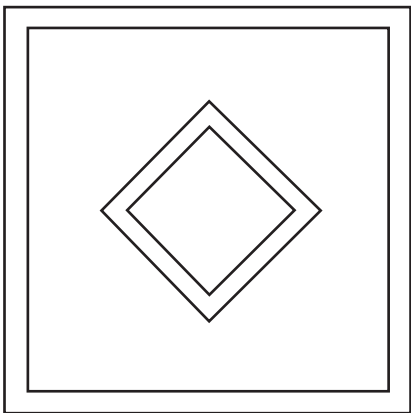


What do waterway signs mean?

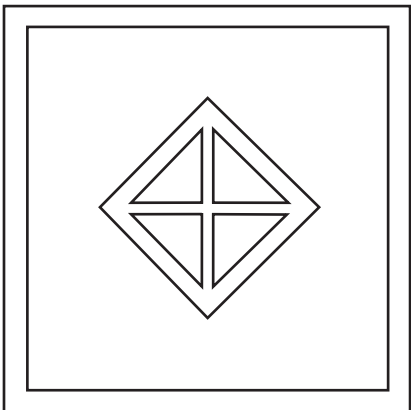
Color the sign border and shapes, below, ORANGE. The sign background is WHITE.



A. A circle shape means – follow the posted rule on the sign.



B. A diamond shape means – DANGER! Look out for something in the water.



C. A diamond shape with a cross inside means – DO NOT ENTER! (all vessels)

Activity:

Match the following messages to the correct sign. Write A, B or C next to the sign messages. Check your answers to see if you are right.

- ___ Idle Speed – No Wake
- ___ Rocks
- ___ Slow Speed – Minimum Wake
- ___ Manatee Refuge
- ___ Stump(s)
- ___ Swim Area

Answers:

A, B, A, C, B, C



To report damaged waterway signs, dial 1-866-405-BUOY (2869). Give the following information:

- Location of sign
- Damage to sign
- Name
- Contact information

Remember to sign up for boating safety classes at MyFWC.com.

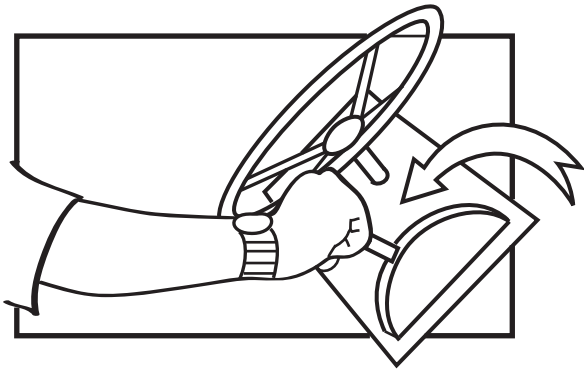
Manatee conservation

Fill in the blank space in the sentences below. Think about what the picture is suggesting you do for manatee conservation.

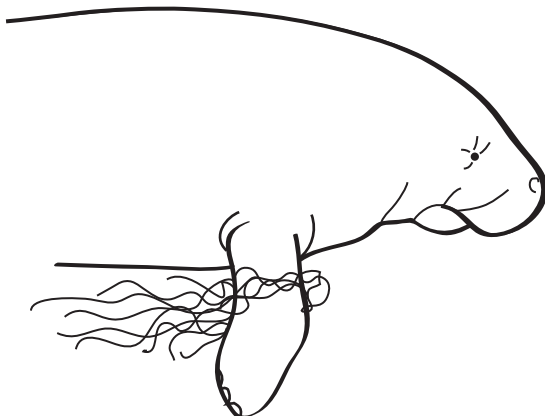


(Color the circle/slash red)

1. Manatees are wild marine mammals found mostly in Florida's coastal areas. When you see manatees in the wild, please _____ as this could change the manatee's behavior. If you see a group of manatees close to shore acting aggressively and thrashing around, it is probably a mating herd. Do not disturb the manatees or try to get their attention.



2. Collisions with boats are the single highest human-related contributor to manatee deaths each year. One of the ways that boaters could help manatees is by _____ the speed of their boats when manatees are present. When boaters follow the speed limits posted on waterway signs, they are helping to protect Florida's manatees.



3. Litter, fishing line and storm debris are found in Florida's coastal waters. Do your part by _____ and by helping with beach clean-ups or recycling efforts in your area.

Answers:

1. Do not pursue, disturb or harass manatees
2. Reducing or slowing
3. Keeping litter, fishing line, garbage, etc. out of the waterways.

Help manatees stay on the road to recovery

Floridians support the Florida Fish and Wildlife Conservation Commission's manatee conservation, research and educational efforts by purchasing a special license plate for their cars and trucks. The example below is a thank you to them.

Directions: Color the manatee gray and the letters black. The sea grass, which the manatees eat, should be green. The skyline vegetation is also green. Color the water area around the manatee blue.



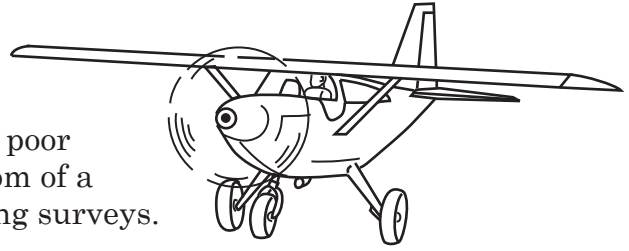
By purchasing one of these speciality plates, people of Florida help manatees.
(If your family has a Save the Manatee license plate, "thank you for your support!")

To find out more information about the Save the Manatee license plate, visit our Web site at: MyFWC.com. Plates may be purchased at tax collectors' offices or at buyaplate.com.

Population status and aerial survey

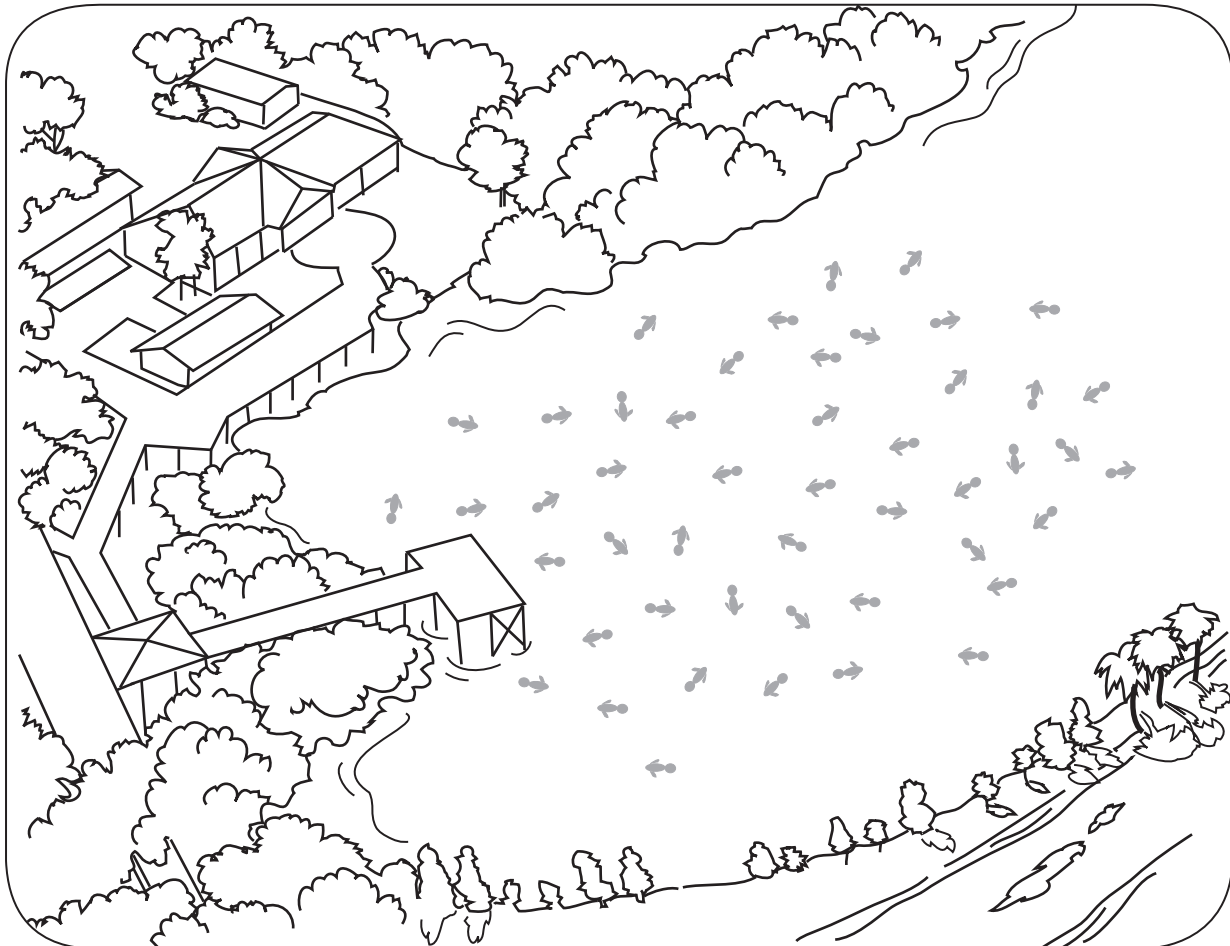
Activity: Look up the **underlined words** in the text below and write the definition on a separate piece of paper.

The Florida manatee population is believed to be at least 3,300. The exact number of manatees is hard to determine because manatees live in areas with poor water clarity, and their behavior of resting on the bottom of a waterway can make them invisible to researchers during surveys.



Whenever winter conditions are good, researchers conduct a statewide aerial survey, called a synoptic survey, to count manatees at warm water sites around the state. Researchers fly in circular patterns in assigned sections of the state on a selected day. Each researcher records the number of manatees seen in his or her section, and then submits the number of manatees counted to the FWC Fish and Wildlife Research Institute. The survey results are highly variable because of the wind and water conditions, the glare on the water and the probability of bottom resting manatees.

Endangered species status and conservation goal: The Florida manatee is currently listed as an endangered species in Florida. The conservation goal is to effectively manage the population in perpetuity throughout Florida by securing habitat and minimizing threats.



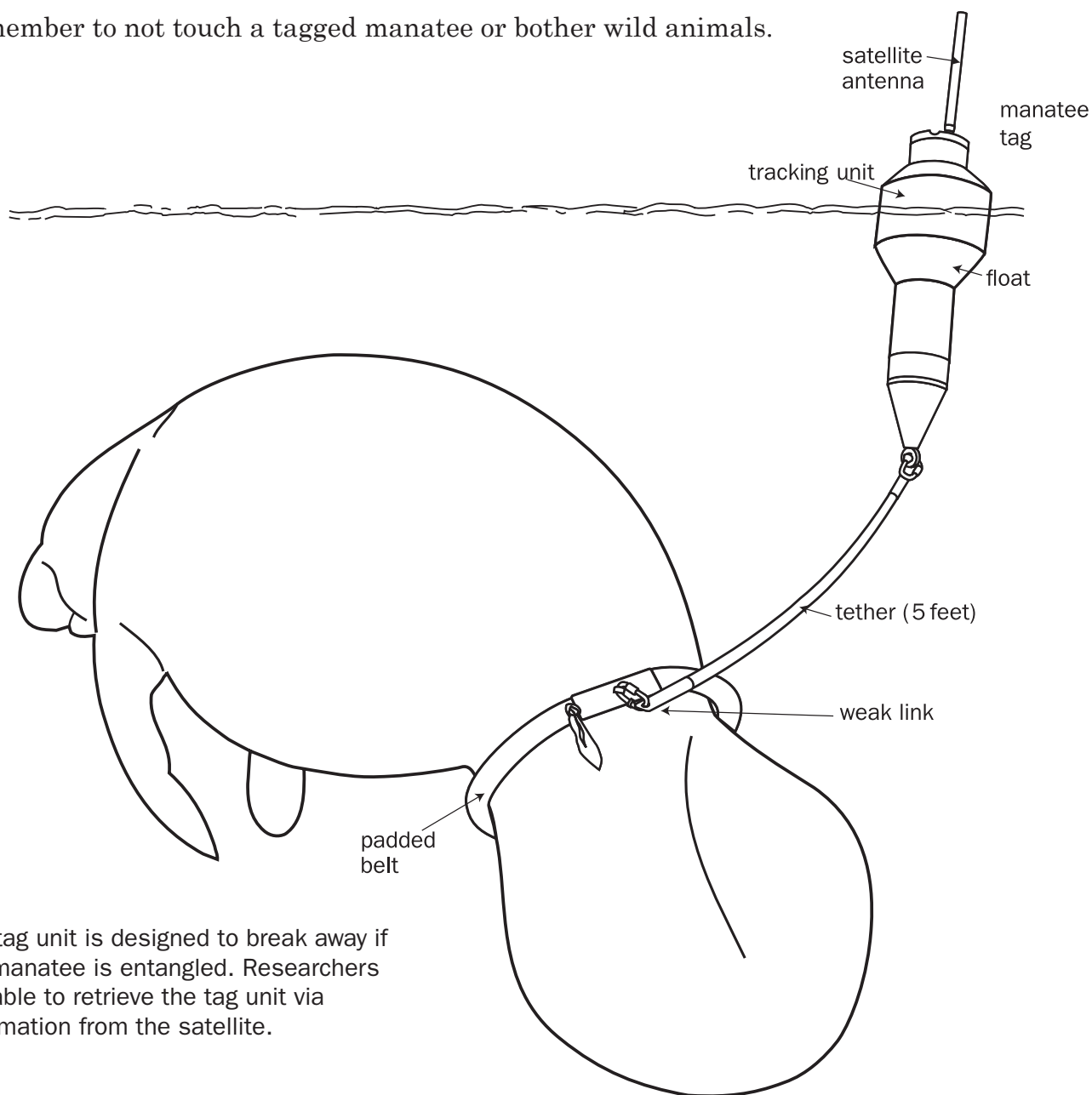
Aerial view of a warm water site.

What should you do if you see a tagged manatee?

If you see a manatee with a tag (floating cylinder unit with an antenna) attached to its tail, please leave the tag and manatee alone. The manatee tag is a tracking unit that contains a satellite and VHF transmitter. The unit allows researchers to monitor a manatee's travel patterns, habitat usage or reproductive success (females). Satellite information is recorded four times per day on each tagged manatee. The VHF beacon helps researchers locate the manatee for direct observations. When you see a tagged manatee, jot down your observation of the animal along with the tag condition, color or markings, the manatee's location, date and time of sighting and call in a report to the Wildlife Alert number, 1-888-404-FWCC.

Activity: Color the manatee and the bands at the top of the tracking unit. (Each tagged manatee has a different color band or pattern.)

Remember to not touch a tagged manatee or bother wild animals.



The tag unit is designed to break away if the manatee is entangled. Researchers are able to retrieve the tag unit via information from the satellite.

Manatee protection

Manatees are classified as an endangered species and are protected under the federal Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972. The Florida Manatee Sanctuary Act of 1978 designates the entire state of Florida as a manatee sanctuary.

If you see an injured, orphaned or dead manatee or someone harassing a manatee, please call the FWC Wildlife Alert number, 1-888-404-FWCC (3922). You may also dial #FWC or *FWC on your cell phone (Note: out of state cell phones may not work with this service).

To avoid breaking the law and being charged with manatee harassment, DO NOT do the following activities:

- Give food to manatees
- Use water to attract manatees to your family's boat or dock where manatees may be harmed
- Separate a cow and her calf
- Disturb manatee mating herds
- Pursue manatees or chase them from warm water sites
- Disturb resting manatees
- Hit, injure or harm manatees
- Jump on, stand on, hold on to or ride manatees
- Grab or kick manatees
- Block a manatee's path if one or more moves toward you
- Hunt or kill manatees
- Use your vessel to pursue or harass manatees
- "Fish" for or attempt to hook or catch manatees

Remember to watch wildlife without getting too close.

Activity: What are three ways that you can help protect manatees? (Use list above for ideas)

Class challenge:

1. Participate in a coastal or waterway clean up event.
2. Recycle fishing line:
www.fishinglinerecycling.org.
3. Make posters to increase manatee awareness at your school.



Check out our manatee decal collection!

Visit our Web pages to see the different decal designs available. Your donation to the Save the Manatee Trust Fund helps with research, recovery, protection plans, habitat protection, sign posting and educational materials for the benefit of Florida's manatees. Browse our Florida Fish and Wildlife Conservation Commission Web site for more information: MyFWC.com.

It matters to us which plate you buy

Help preserve the future of Florida's gentle giants by purchasing a manatee license plate. Proceeds directly benefit manatee research and conservation. Available at tax collectors' offices and online at buyaplate.com



A note to educators

Manatees, Florida's Gentle Giants coloring activity book was originally created by the Northeast Florida Regional Planning Council with input from the Save the Manatee Club and the Florida Department of Natural Resources. Several updates, additions and agency changes have occurred over the years. This issue has all new graphics, updated activities and more educational information about manatees. Please let us know if you have other suggestions to improve this booklet. Page layout and updated graphics are by Lizabeth West. Page four graphics are by Ann Marie Tavares. Page 16 graphic is by Llyn French.

Please credit the Florida Fish and Wildlife Conservation Commission if you use any of the text or graphics from the booklet. Donations to the Save the Manatee Trust Fund are always welcome if you are requesting bulk orders of our materials for your use.

Sunshine State Standards for Science – Grades 3-7:

SC.3.N.1.1	SC.5.L.15.1
SC.3.L.15.1	SC.5.L.17.1
SC.4.N.1.1	SC.6.N.2.2
SC.4.L.16.3	SC.6.L.15.1
SC.4.L.17.1	SC.7.L.15.1
SC.4.L.17.3	SC.7.L.15.2
SC.4.L.17.4	SC.7.L.15.3
SC.5.L.14.2	SC.7.L.17.3.



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