

RIVER CENTER'S

FISH MORPHOLOGY



www.lrdrivercenter.org
education@lrecd.org | (561) 743-7123



CONTENTS

PREVISIT INFORMATION	3
CHECKLIST	4
BACKGROUND	5
VOCABULARY	5
LESSON TARGETS	6
STANDARDS	6
DIFFERENTIATION STRATEGIES	6
TEACHER MATERIALS	7
ENGAGE	8
EXPLORE	8
EXPLAIN	8
ELABORATE	9
EVALUATE	9
STEM CONNECTIONS	10
LOXAHATCHEE RIVER DISTRICT	10
RIVER CENTER EXHIBITS	11
POST FIELD TRIP LESSON	13

RIVER CENTER

The River Center is a program of the Loxahatchee River District. The Loxahatchee River District, an award-winning wastewater treatment facility established in 1971 to protect the Loxahatchee River from pollutants, is the leading authority on the Loxahatchee River. Its physical plant can treat up to 11 million gallons of wastewater from northern Palm Beach and southern Martin Counties each day, preventing those pollutants from entering our watershed. This special district also provides both scientific and educational programs for the Loxahatchee River and serves as an advisory agency for the many diverse efforts under way.



PREVISIT INFORMATION

We are delighted that you have chosen to bring your students to the Loxahatchee River District's River Center for an educational field experience. The River Center staff would like for your visit to be as fun and educational as possible. The goal of this field experience is to instill the students with an understanding and appreciation of the Loxahatchee River watershed through its unique plant and animal habitats as well as a new perspective on water resources and conservation. To make this an enjoyable field trip for teachers, students, and our program presenters, please follow these guidelines.

PLEASE READ

Please contact the River Center if you will be *more than 15 minutes late* or for any questions, concerns, or changes at 561-743-7123 ext. 4200 or Education@LRECD.org.

SCHEDULE

PROGRAM: 10 A.M. - 12 P.M.

LUNCH: 12:15 P.M.

Classes that usually eat lunch between 10:30am and 11:30am should have a snack before or during the bus ride to the River Center. Groups may have lunch after 12:00pm at the River Center's chiki hut.

RECOMMENDATIONS FOR A GOOD TRIP

- Students should wear name tags with their first name.
- Chaperones: 1:6 ratio for younger groups (ages 5-9) or 1:10 ratio for older groups (ages 10+).

EXPECTATIONS

- Teachers and chaperones will be responsible for discipline of the children. ***All adults will be active participants in the activities with the children.***
- Students are expected to be good listeners, respectful to our program presenters, listen carefully and follow directions.
- There are live animals on site and in aquaria, so please do not tap or bang on the aquariums or exhibits in order to avoid stressing the animals.
- Students should practice classroom behaviors including keeping their hands to themselves, not talking out of turn, and watching for attention clues.
- To minimize distractions for students, ***please remind all chaperones and teachers to switch cell phones to silent.***

ADDRESS AND DIRECTIONS

Address: 805 U.S. Highway 1 Jupiter, FL 33477

Directions:

- I-95: Exit 87A (Jupiter Exit) East Indiantown Road (Turnpike: Exit 116 Indiantown Road)
- Indiantown Road: Travel EAST until you reach U.S. Highway 1
- Turn Left (NORTH) onto U.S. Highway 1
- Travel NORTH through one stoplight, turn right (EAST) at the flashing light into Burt Reynolds Park.
- The River Center is the light blue building located by the fire station.



BACKGROUND

There are 20,000 to 40,000 species or kinds of fish. They live in different habitats, but all need food, water, and shelter. Fish are water-dwelling animals that live in oceans, lakes, rivers, stream, and ponds. They have gills for breathing oxygen in the water and most are covered with protective scales. They swim by wiggling their bodies back and forth and use fins to steer. Some fish eat plants, some eat bugs, smaller fish, and some eat decaying matter. To stay safe, some fish swim in schools to confuse predators while some hide among rocks, plants, oyster reefs, or logs.

VOCABULARY

- River
- Estuary
- Ocean
- Lagoon
- Observation
- Dorsal fin
- Pectoral fin
- Caudal fin (tail)
- Scales
- Vertebrate
- Camouflage
- Brackish water
- Saltwater
- Freshwater
- Reef
- Predator
- Prey
- Herbivore
- Carnivore
- Omnivore
- Species
- Habitat
- Nocturnal
- Diurnal
- Adaptation

STANDARDS

KINDERGARTEN SCIENCE

SC.K.L.14.1: Recognize the five senses and related body parts

SC.K.L.14.3: Observe plants and animals, describe how they are alike and how they are different in the way they look and in the things they do.

SC.K.N.1.2: Make observations of the natural world and know that they are descriptors collected using the five senses.

SC.K.N.1.4: Observe and create a visual representation of an object which includes its major features.

FIRST GRADE SCIENCE

SC.1.L.14.1: Make observations of living things and their environment using the five senses.

SC.1.L.17.1: Through observation, recognize that all plants and animals, including humans, need the basic necessities of air, water, food, and space.

SC.1.P.12.1: Demonstrate and describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.

SC.1.N.1.1: Raise questions about the natural world, investigate them in teams through free exploration, and generate appropriate explanations based on those explorations.

SC.1.N.1.2: Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.

SC.1.N.1.4: Ask "how do you know?" in appropriate situations.

LANGUAGE ARTS

LAFS.K.SL.1.1, LAFS.K.SL.2.5

LAFS.1.SL.1.1, LAFS.1.SL.2.5

MATH

MAFS.K.G.1.1, MAFS.K.G.2.5

DIFFERENTIATION STRATEGIES

- Hands-on instruction
- Tutor/Peer Buddy activities
- Use of visuals
- Questioning techniques
- Modification of text or curriculum
- Working in a group setting to explain vocabulary

LESSON TARGETS

- I can describe what a habitat is.
- I can identify adaptations on a fish.
- I can explain why it is important to protect animal habitats.
- I understand why fish are important.



TEACHER MATERIALS

- A book about fish. Suggested list below:
 - *The Rainbow Fish* by Marcus Pfister
 - *Big Al* by Andrew Clements
 - *Fisheyes: A Book You Can Count On* by Lois Ehlert
 - *Fish is Fish* or *Swimmy* by Leo Lionni
- Construction Paper
- Paint
- Colored markers or crayons
- STEM Connections:
 - Class set of realistic laminated fish pictures (suggested 10 different species)
 - Sorting space in the classroom
 - String/yarn
 - Paper clips
 - Tape
 - Magnets
 - Rulers – one per student
 - Blue backdrop- sheet, tablecloth, posterboard, kiddie pool

ENGAGE

PRE-VISIT LESSON - Complete before visiting the River Center

1. Read one of the books from the suggested list in the teacher's materials or any book about fish.
2. Discuss the characteristics of fish. Compare the fish in the story to real fish.
3. Have students create and design fish using handprints. Allow them to decorate their fish, adding fins, eyes, and a mouth as well as designing a habitat. Then have the children draw its shelter (either a school of fish, grasses, rocks, or logs) and food.
4. Allow the children the opportunity to share their picture with the rest of the class. Discuss the importance of its habitat (where an animal finds its food, water, and shelter).

EXPLORE

VISIT TO THE RIVER CENTER

1. Welcome, introduction to the River Center, overview of today's field trip, and safety/rules
2. Divide the students into 2 groups to rotate through 3 different activities
 - a. Lovin' the Loxahatchee River Tour – focusing on fish species, adaptations, and habitats
 - b. Fish Morphology hands-on activity (See below)
 - c. Water resources discussion – Where our water comes from, how we use water, where it goes once it is down the drain, water conservation
3. Touch tank demonstration

EXPLAIN

FISH MORPHOLOGY LAB - Completed at the River Center

1. River Center educators will complete a shape, form, and function lesson about different mouth shapes, fin shapes, body shapes, coloration, and behaviors of fish.
2. Using different shapes of construction paper and materials students will create dorsal fins, pectoral fins, a mouth, a tail, and eyes. Different shapes or designs are descriptive of different adaptations. Their adaptations give the fish advantages for survival.
3. Using CDs, Students will add art materials such as sequins, stickers, construction paper, etc. to the CD to represent the protective scales on its outer body.
4. They can color their fish depending on its habitat and camouflaging techniques.
5. Students will show their completed fish explaining their design, how it survives, and what habitat it lives in.

ELABORATE

POST-VISIT LESSON - Complete the reflection after the field trip

1. Play Fish Tag
Lots of predators besides people eat fish: larger fish, seals, bears, and pelicans are just a few. Many fish hide from predators under docks or rocks, among plants, or other places. Play a game where a predator (one child) tries to catch fish (other children) by tagging. The predator can choose what kinds of animal to be. Fish are "safe" if they stand or touch a safe spot, like a grass bed (hula hoop), mangroves (safety cone), rocks (box) or a dock (carpet square). To keep things moving, fish can stay in the safe spot only as long as it takes for them to count to five. After the predator catches some fish, play again with a new predator.
2. Have a fish snack. Use pretzels sticks as fishing poles and cream cheese or peanut butter as bait. Have the children "fish" for fish-shaped crackers.
3. Fish Poem (Identify rhyming words)

Fish

How I wish I were a fish! My day would begin flapping my fins. I'd make a commotion out in the ocean. It would be cool to swim in a school. In the sea, I'd move so free, with just one thought: Don't get caught!

EVALUATE

POST-VISIT

1. Participation in the activity.
2. After the students get back to the classroom, have them write a story about the fish they designed on the field trip.
 - a. What kind of fish did you create?
 - b. Where does it live?
 - c. What does it eat?
 - d. How does it protect itself?
3. Have the students create a background/backdrop of a habitat that their fish can swim through. Remember to have food, water, and shelter. Students can perform a play.

STEM CONNECTIONS

Creating STEM Connections

Science - See standards listed above.

Technology

- Each student will receive a realistic laminated picture of a fish. Students will describe their fish referring to how they observed fish at the River Center. Students will use a ruler to measure their fish. Students can compare, contrast, and sort their fish pictures with other students. Are some similar? How are they different? What story can you make up about the fish in the class?
- River Center's Virtual Education Videos
 - Animal Feedings (Aquarium tours and Fish Feedings) https://www.youtube.com/playlist?list=PLA39R2PcEo33NDR9rGFxW3StA--U_p99M
 - Animal Encounters (Fish of the Week) https://www.youtube.com/playlist?list=PLA39R2PcEo33eoYyDQo2LzVRx72P_42Cy

Engineering

- Add paperclips to the pictures of fish (by the mouth) that were used in the prior activity.
- Attach string to the rulers use in the prior activity. Either tie a knot or use tape.
- At the other end of string attach a magnet using tape. They have now created a magnetic fishing pole.
- Put the fish on a blue backdrop to represent the ocean and let the students go fishing!

Mathematics -

- See standards listed above.

LOXAHATCHEE RIVER DISTRICT

FOCUS AREA CONNECTIONS



WATER SUPPLY

The amount of available water affects how well an ecosystem will function. The water supply of the Loxahatchee River is affected by weather and human water usage from the aquifer systems (underground bodies of freshwater). Not enough water in the aquifers will lead to less water in the river, which can be harmful to the entire ecosystem. By recycling wastewater, the LRD limits the amount of water being pulled from the aquifers for human usage and leaves more water for the fish in the river.



STORMWATER

As stormwater enters the Loxahatchee River and its estuaries, it brings potentially harmful contaminants (pollution) to the ecosystems. Stormwater can contain chemical pollutants, solid waste, and bacteria which can disrupt the balance of water quality causing algal blooms, reducing oxygen in the water, and suffocating fish. By raising awareness about stormwater runoff, the LRD helps people to understand the importance of securing their garbage, grass clippings, and chemicals that can runoff their yard to the river.

RIVER CENTER EXHIBITS

Connecting the tour and the activity



ALL EXHIBITS

All the aquariums with live fish and habitat representation. Students will observe different fish species, ecosystems, body shapes (fin, mouth, tail, etc.), coloration, camouflage, and adaptations (physical/behavioral/environmental) at each exhibit.



○ **WILD & SCENIC EXHIBIT**

There is a wide variety of fish, and we can compare them to learn more about each one! We have a large Black Pacu named Igor and you might notice that his mouth points upwards, plus if you see into his mouth you will see molar teeth like we have! Igor has these features because he feeds at the surface of the water, eating nuts, seeds, and berries that fall from the trees into the river! The exact opposite would be our Brown Hoplo, his mouth points downwards because he is a scavenger! The Brown Hoplo will search around the bottom of riverbanks with his mouth looking for any food left behind!

○ **CRITTER CABINETS**

Not all fish look the same, and that's because not all fish move the same way! Fish have special tail and fin shapes depending on what they eat and what habitat they live in! Goby fish have long slender bodies with downward facing pectoral fins and a rounded tail; this fish is found on the sea floor and can produce short burst of speed to avoid predators and catch prey. On the other hand, Seahorses (and pipefish) are vertical fish with very small fins. Seahorses have a long prehensile tail for grabbing; this fish is found amongst seagrasses and uses its tail to hold onto objects since it is not a strong swimmer with its tiny fins.

○ **OYSTER REEF**

Fish also have different body shapes depending on their adaptations. Our needlefish has adapted to have a slender and pointed body shape, allowing them to move quickly through the water to avoid predators and catch prey. However, our pufferfish is the opposite; they have a rounded bulky body and cannot swim very fast! Instead, Balloon pufferfish have spines all over their body to protect themselves from predators. When threatened they take in water through their mouth and make their body look as big and spiky as they can to intimidate predators.

○ **MANGROVES**

We can guesstimate what a fish eats by looking at the size/shape of their mouth. Take our Mangrove Snapper, he has a large mouth that can open-up wide – so he must be able to eat other fish! But our Sergeant Major has a tiny mouth with big lips – so this fish eats algae and other small plants!

○ **DOCK PILING**

The whitestripe sharksucker may look like he is swimming upside down, but he isn't! Their body is flat on top and has a special plate that looks a little shoe tread that helps them to attach to large animals such as sharks, turtles or manatees. The catch a ride on these other animals to get from place to place.

○ **CORAL REEF**

Not all habitats look the same, and not all fish look the same either! Fish have special colorations to help them survive in their habitat. For example, Hardhead Catfish are dark and dull in color to blend in with the mucky sea bottom where they live. Pufferfish have markings all over their back to help them camouflage from the top, while the Sergeant Major has lateral stripes to help them camouflage from the left or right side. The Soldier fish is a bright red color to help them blend in and become invisible at dawn and dusk. Red is the first color that you can't see underwater when the sun is low in the sky.

POST FIELD TRIP LESSON

Thank you for participating in a field trip at the River Center. We hope your students enjoyed their experience learning about the Loxahatchee River ecosystems as well as the different hands-on activities and animal encounters.

We are always looking for feedback and ways to improve our programs at the River Center. Please take a couple of minutes to complete the River Center's field trip survey. We would really appreciate it!

<https://www.surveymonkey.com/r/RCSchoolSurvey>

Attended a Virtual Field Trip? Use this survey: <https://www.surveymonkey.com/r/rcvirtual>

Please refer to the 5E lesson plan and the "Elaborate" section as a post-lesson activity. This is for you to utilize back in the classroom as a continuation of your experience at the River Center. They are an educational, fun, and creative way to gain more knowledge.

We appreciate your support and interest in the River Center and our programs. Please contact us with any questions or concerns. We look forward to seeing you and your students at the River Center in the future!

River Center - Loxahatchee River District
805 North U.S. Highway One
Jupiter, FL 33477
(561) 743-7123 ext. 4200
(561) 743-6314 [Fax]
education@LRECD.org
www.LRDRiverCenter.org
Explore | Experience | Connect