



Smithsonian
Marine Station Fort Pierce

Exploring Mangrove Ecosystems

Distance Learning Module
Grades 5-7



Activity Packet

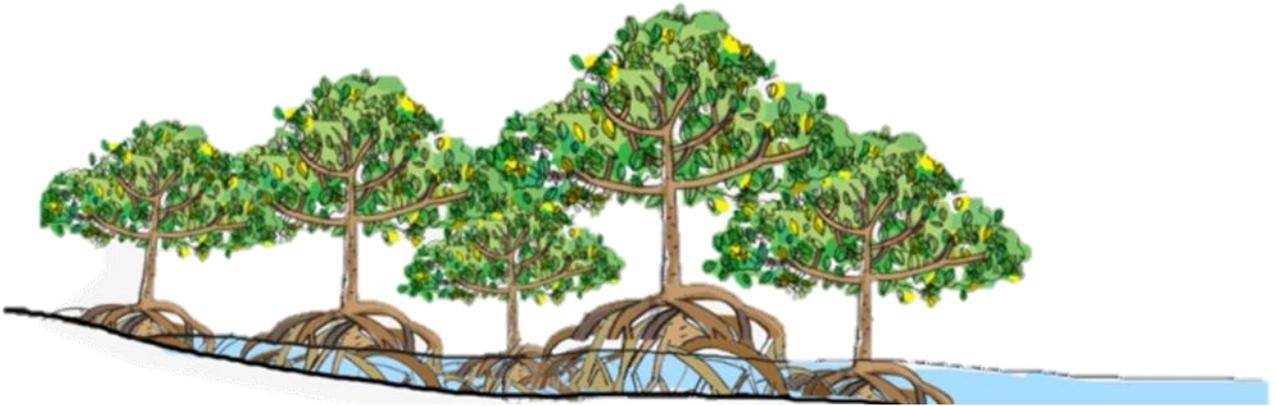


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Mangrove Identification Activity

Introduction: Practice using field guides and other identification tools to identify Florida's three species of mangroves in the following activity. For Grades 5 through 7 and to accompany the Mangrove Ecosystems Distance Learning Module.

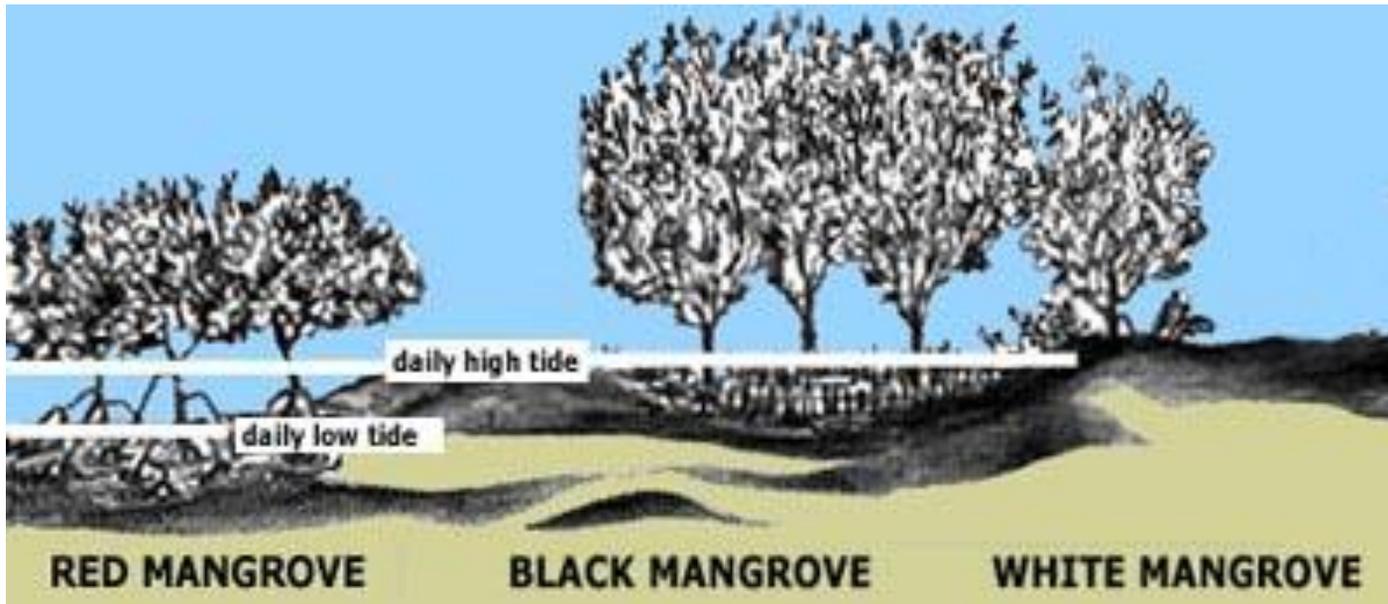


Background: In Florida, there are three species of salt tolerant trees called mangroves. These species include, Red Mangroves (*Rhizophora mangle*), Black Mangroves, (*Avicennia germinans*), and White Mangroves (*Laguncularia racemosa*). Mangrove trees are critically important to the coast and shorelines of Florida because they stabilize sediment, prevent erosion, and break up strong wave and wind energy, often created by large storm events like hurricanes. Mangroves also provide a complex nursery habitat for many commercially and environmentally important species of fish and invertebrates.



Mangrove Identification Activity

Instructions: Use the basics you learned in the Mangrove Ecosystems Distance Learning Module and then deep dive into the accompanying identification field guides to match the species of mangrove - Red, Black, or White – to the following pictures and descriptions.



Use these tools to help you identify the mangroves:

[Mangrove Field Guide](#)
[Mangrove Identification Brochure](#)

For a challenge, try to use what you already know!



1. What species has broad, waxy leaves that are elongated and come to a blunt point?



2. What species has “snorkel” roots called *pneumatophores*, that grow up out of the oxygen deprived muck?

3. What species has small, ribbed “fruit” called drupes?



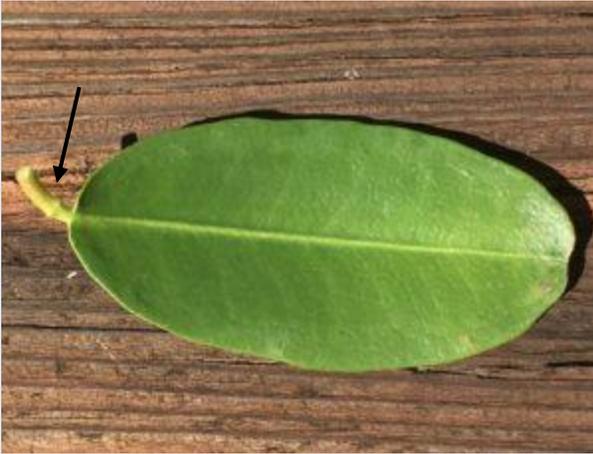


4. What species has small, white flowers that occur in *terminal* (end of the stem or branch) clusters?

5. What species can characteristically be observed with dried salt crystals on its leaves and as result of excretion?



6. What species has whiteish petals that are separated by yellow *sepals* (support the petal)?



7. What species has round leaves with two nodular nectaries on the *petiole* (stalk that joins leaf to stem)?

8. What species is characterized by cylindrical, floating *propagules* (“mangrove embryos”) that are distributed by ocean currents?

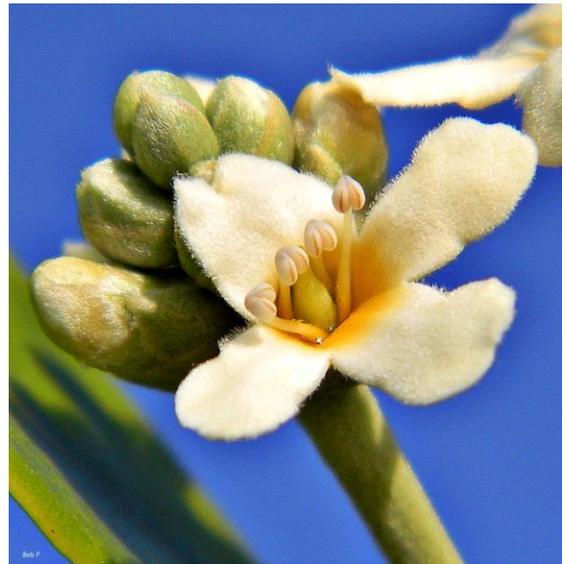


9. What species has green *propagules* that resemble lima beans and are distributed by tides and currents?



10. What species is characterized by tangling “prop” roots that are often reddish in color?

11. What species has white flowers with distinctive yellow centers? Bees love to make honey from these fragrant flowers!

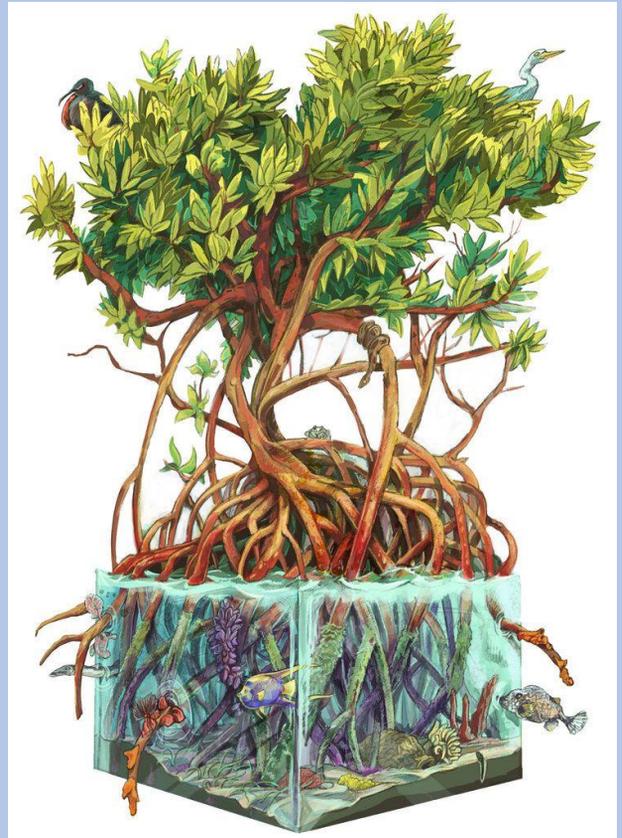


12. What species is characterized by having no aerial roots and growing higher above the tide line than the other two species?



Mangrove Identification Answer Key

1. Red Mangrove
2. Black Mangrove
3. White Mangrove
4. White Mangrove
5. Black Mangrove
6. Red Mangrove
7. White Mangrove
8. Red Mangrove
9. Black Mangrove
10. Red Mangrove
11. Black Mangrove
12. White Mangrove





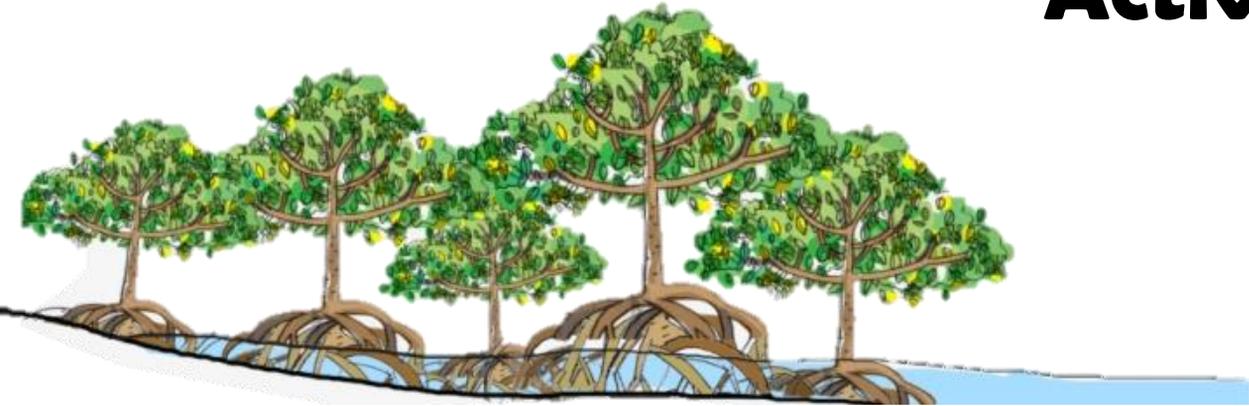
Mangrove Habitat Loss Activity



Introduction: Explore the threats to mangrove habitats in the Indian River Lagoon. This activity is great for grades 5 through 7 and should accompany the Mangrove Learning Module found on our [Distance Learning Page](#).

Materials:

- 15 items (blocks, paper clips, pens, anything small that you could spread out in front of you)
- 1 six-sided die (or a dice rolling app like [this one](#))



Background: In Florida, there are three species of salt tolerant trees called mangroves. These species include, Red Mangroves (*Rhizophora mangle*), Black Mangroves, (*Avicennia germinans*), and White Mangroves (*Laguncularia racemosa*). Mangrove trees are critically important to the coast and shorelines of Florida because they stabilize sediment, prevent erosion, and break up strong wave and wind energy, often created by large storm events like hurricanes. Mangroves also provide a complex nursery habitat for many commercially and environmentally important species of fish and invertebrates.

Mangrove density is occasionally lost from natural events, but by far the biggest threat to mangroves is human impact. Humans have been modifying mangrove habitats and using mangroves as resources for a very long time. In the Indian River Lagoon, there are approximately 8,000 acres of mangrove habitat. However, 6,000 acres were converted into mosquito impoundments and can no longer be accessed by juvenile fish for nursery habitat (FDEP).

Before mangroves could be protected by law, many acres were bulldozed for coastal development. Without mangroves, Florida's coast would look very different. In this activity you will explore the threats to mangrove ecosystems.



Instructions: The goal of this activity is to understand what is causing a decline of mangrove habitats in Florida. You will start off this game with 15 items in front of you, 10 will represent the current population density of mangroves, and 5 items should remain off to the side until you need them. Each item represents one acre of mangrove forest habitat.

You will roll the die five times to determine the outcome of your mangrove forest. Each number of the die will result in a different event that will either remove or add mangrove acres to your forest. These events are based on real life examples of threats to mangroves in the Indian River Lagoon.

Time to Roll: Each side of the die has a different outcome for the mangroves. Roll five times (or as many times as you like) to determine what will happen to your mangrove forest.

If you roll a:

- 1 - Invasive Brazilian Pepper and Australian Pine trees outcompete native mangroves, remove 4 acres.
- 2 - Construction crews break ground on a new coastal condominium building, and they have permission to bulldoze trees, remove 3 acres.
- 3 - A conservation group plants 500 new trees, add 1 acre.
- 4 - Mosquito impoundment is created, remove 7 acres.
- 5 - Winter cold front brings extended freezing temperatures, remove 1 acre.
- 6 - Local politicians enact Mangrove Protection Act, add 2 acres, and 6 of your acres are now federally protected and cannot be removed for the rest of the game.



Discussion Questions:

- How many acres of mangroves do you have left? What was the most challenging threat to the 10-acre mangrove forest?
- Some events remove more acres than others, why do you think that is?
- How challenging was it to maintain your mangrove forest population?
- How might changes in mangrove coverage impact organisms that depend on mangrove forests?
- Why do you think the Mangrove Protection Act has such a strong impact on mangrove populations?

Wrap-Up:

- In the Indian River Lagoon, mangroves are most susceptible to habitat loss because of the creation of mosquito impoundments, coastal development and being outcompeted by invasive species.
- Many different organisms depend on mangrove forests for their habitat, including oyster reefs, and seagrass meadows.
- When mangrove habitats are lost, the effects can be felt all the way to the open ocean and to coral reefs.
- In Florida, mangroves are one of the most important coastal resources.

Resources:

[Florida Department of Environmental Protection](#)

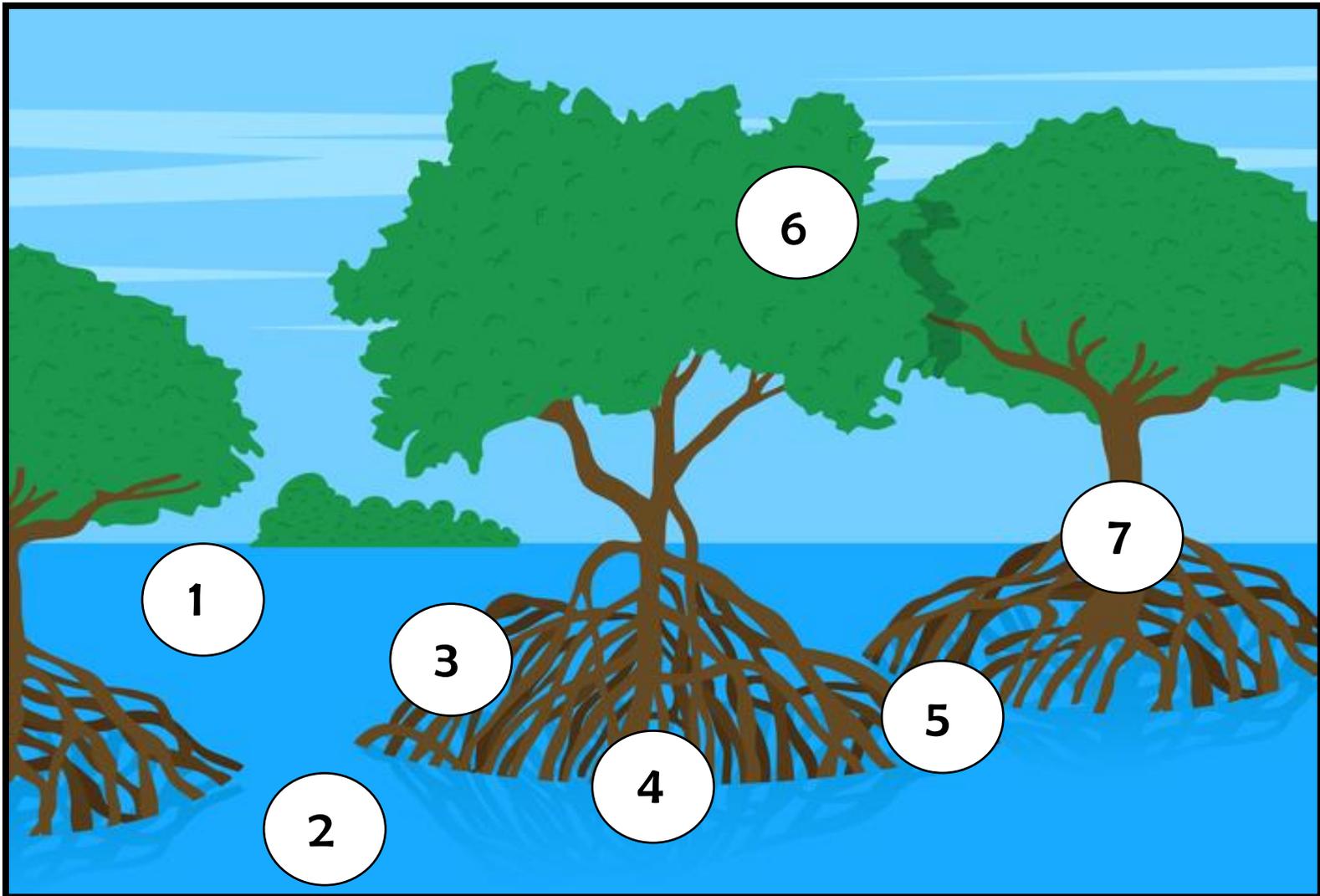
[Smithsonian's Ocean Portal: Mangroves](#)

Mapping [Mangrove Habitat in Florida](#)



Mangrove Ecosystem Challenge

Look at the choices in the box below the picture, and match organisms to *the most likely place* they'd live in a mangrove ecosystem. Because mangrove habitats are biologically rich, multiple organisms can often be found inhabiting the same areas, though they may all have different niches in the ecosystem. Therefore, there can be more than one answer for each number! On the next page, record your answers and when you're finished, check your answers with the Answer Key.



Mangrove Habitat Organisms

- | | | |
|------------------|---------------|------------------------|
| Manatee | Mangrove Crab | Oyster |
| Pelican | Fungi | Juvenile Snook |
| Sponges | Barnacles | Juvenile Spiny Lobster |
| Periwinkle Snail | Shark | Blue Heron |



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Mangrove Ecosystem Challenge Answer Sheet

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

Check your answers with the Answer Key!

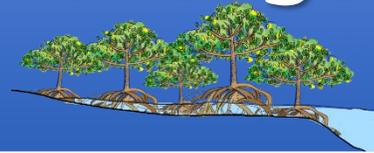




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Mangrove Ecosystem Challenge

Answer Key



Check your answers below.

Remember, because mangrove ecosystems are so biologically rich, we often find many species inhabiting the same areas. Therefore, there is more than one answer for each number!

#1: Shark or Manatee

Sharks and manatees are both found in mangrove habitats, but they fulfill different roles. Sharks are predators looking for prey, while manatees are herbivores that eat seagrass!

#2: Juvenile snook or juvenile spiny lobster

Both of these animals are predators, and hunt for small prey in this nursery habitat.

#3: Mangrove crab or periwinkle snail

Periwinkle snails will consume algae from the mangroves, while mangrove crabs are omnivorous, meaning they'll eat both plant and animal material.

#4: Oyster, barnacle, or sponges

*Sponges consume very small food like bacteria, while barnacles prefer zooplankton and oysters consume phytoplankton (**plankton** are microscopic organisms in the water).*

#5: Fungi, mangrove crab or periwinkle snail

In addition to what you now know about periwinkle snails and mangrove crabs, fungi can also be found in the same areas as crabs and snails. Fungi is a decomposer and makes nutrients for other animals to consume!

#6: Pelican or blue heron

Pelicans and blue herons use mangrove areas not only to hunt for food, but they also use branches of the mangroves to build nests and raise their young!

#7: Periwinkle snail, mangrove crab or fungi

See #5