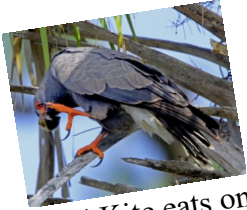


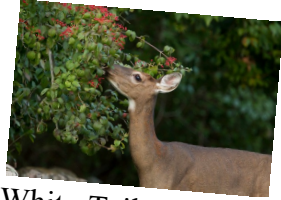
Grassy Waters Preserve Activity Packet

Classification Crossword

Use the underlined vocabulary words to complete the crossword puzzle below.



A Snail Kite eats only Apple Snails. It is a consumer.



A White-Tailed Deer is an herbivore.



Lichen is the product of mutualism between fungus and algae.



A North American River Otter is a carnivore.



A raccoon will eat almost anything it can get its paws on. It is an omnivore.



The flower of Pickerel Weed is edible. It is a producer.



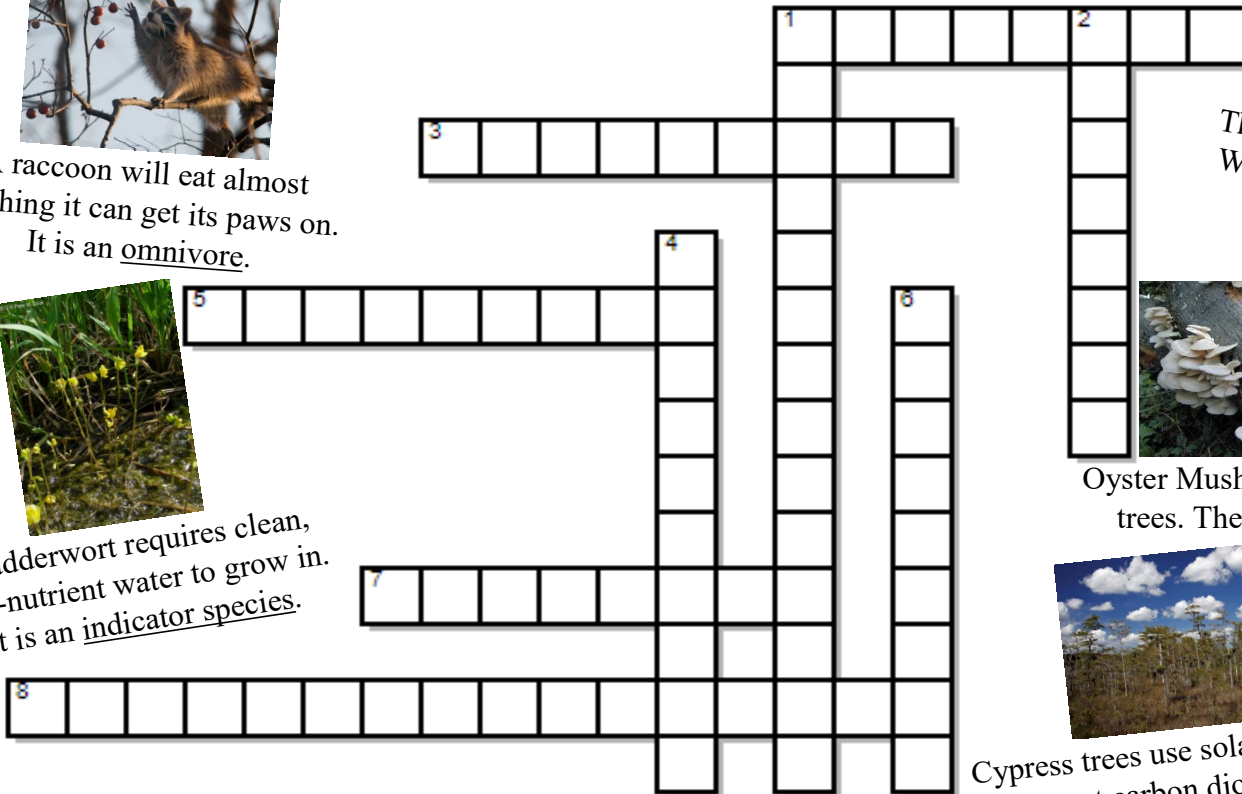
Bladderwort requires clean, low-nutrient water to grow in. It is an indicator species.



Oyster Mushrooms grow on dying trees. They are decomposers.



Cypress trees use solar energy to convert carbon dioxide into carbohydrates for energy during photosynthesis.



Across:

1. An organism that creates its own energy from the Sun through photosynthesis.
3. An animal that eats only plants.
5. An animal that eats only animals.
7. An animal that eats plants and animals.
8. A species whose presence tells us about the quality of that environment.

Down:

1. The process plants go through to obtain energy from the Sun.
2. An organism that obtains its energy from eating other plants and/or animals.
4. An organism that obtains its energy by breaking down decaying plant and animal matter.
6. A relationship between organisms in which both organisms benefit.

The Carbon Cycle in the Everglades

Carbon is an extremely important element for plants and animals. Carbon in the atmosphere is absorbed by plants during photosynthesis to create energy. Animals then eat the plants, absorbing the carbon from the plant. When the animal breathes or dies and decomposes, the carbon is released back into the atmosphere. When a plant or animal dies and is not able to decompose, the carbon they would normally emit into the atmosphere stays stored underground. This carbon is slowly released into the atmosphere when the ground is eroded. If the carbon being stored underground is extracted by humans for burning fossil fuels, the carbon is released into the atmosphere at a faster rate than it would be released naturally.

What kind of problems do you think this would cause for the Earth's ecosystems?

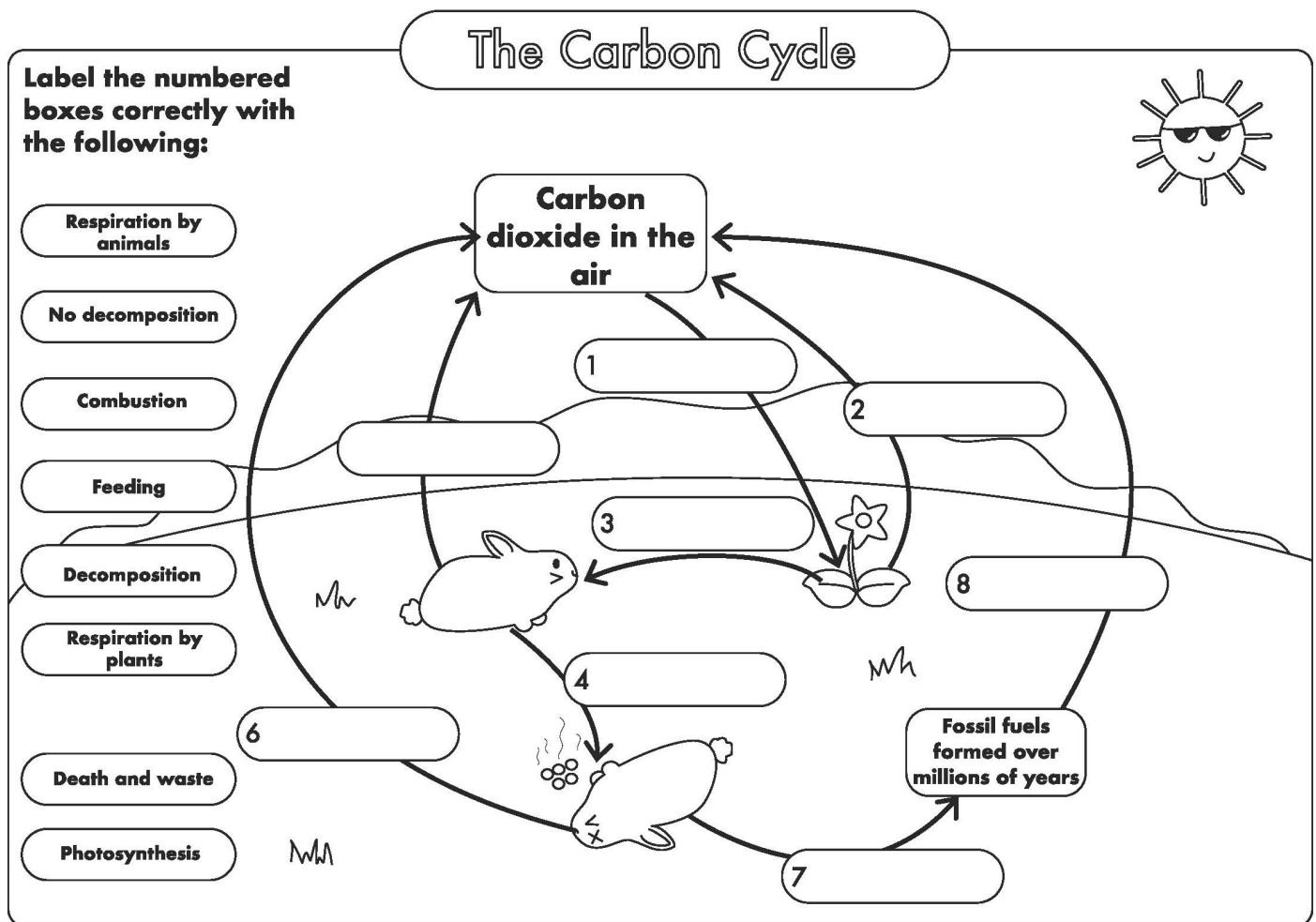


Image Source: Tes.com

The Everglades is an extremely important ecosystem because it stores a lot of carbon. In a wetland the ground is covered by water the majority of the time, so when organisms die, they fall and decompose in the water. The carbon that would normally be released into the atmosphere due to decomposition is kept underwater in the soil. Therefore, the Everglades is known as a **carbon sink**, because more carbon is being absorbed by the ecosystem than is being released into the atmosphere. When the Everglades is in its yearly dry season, the water evaporates exposing some of the soil. Some of the carbon being stored in the soil is then released back into the atmosphere to continue the carbon cycle. When the Everglades is permanently drained for agriculture or construction, the excess stored carbon is released into the atmosphere in huge quantities.

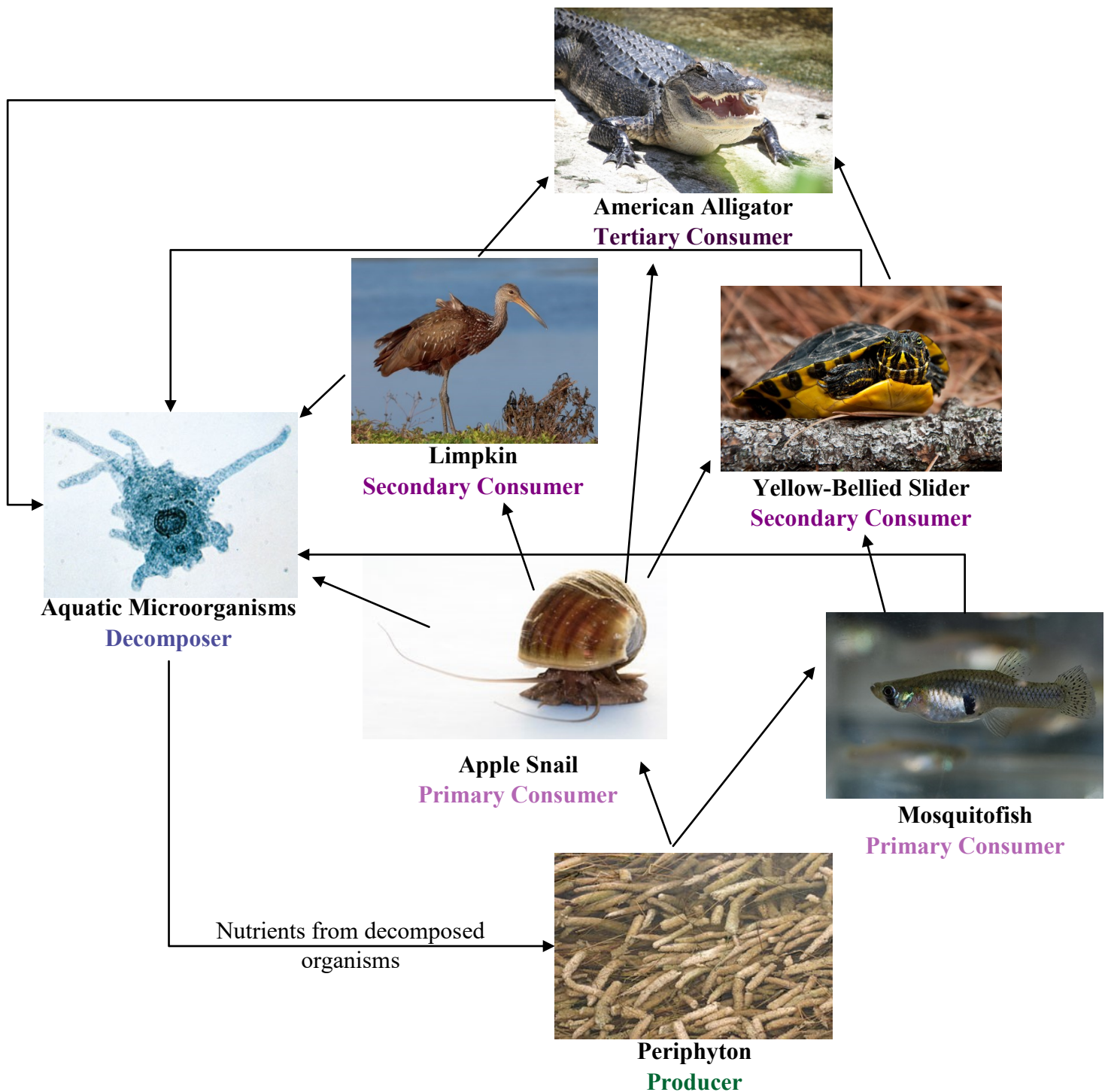
Everglades Food Web

All energy in a living ecosystem originates from the Sun.

Producers create their own energy from the Sun through photosynthesis, while **consumers** obtain their energy by eating other plants and animals. **Decomposers** obtain their energy by breaking down and absorbing decaying plants and animals.

A food web shows energy transfer within an environment through feeding relationships between **producers**, **consumers**, and **decomposers** in an ecosystem.

The energy transfer within the system is represented through arrows, as shown in the example below. The energy, and the arrows, go from prey to predator.



Now make your own food web!

Label whether each of the following animals is a **producer**, **consumer**, or **decomposer**. Then draw the arrows between the organisms to show the correct energy flow.



Eastern Gray Squirrel



Cocoplum



Red-Shouldered Hawk



Northern Cardinal



Florida Holly



Oyster Mushroom



Bobcat

Read the following article about Snail Kites from the [Everglades National Park website](#).

Then use the article to answer the questions on the following page.

Snail Kite: Species Profile



The Snail Kite uses its slender, curved bill to extract its primary prey, the apple snail, from its shell.

Now officially known as simply a Snail Kite, the subspecies from Florida and Cuba (*Rostrhamus sociabilis plumbeus*) formerly known as the Everglade Snail Kite was listed as endangered in 1967. The range of the Florida population of Snail Kites is restricted to watersheds in the central and southern part of the state. Because of a highly specific diet composed almost entirely of apple snails (*Pomacea paludosa*), survival of the Snail Kite depends directly on the hydrology and water quality of these watersheds, each of which has experienced pervasive degradation as a result of urban development and agricultural activities.

The slender, curved bill of this medium-sized raptor is an adaptation for extracting the kite's primary prey, the apple snail, from its shell. The bill is a distinguishing characteristic for field identification of adults as well as juveniles. Although sometimes confused with the northern harrier, the Snail Kite's flight is slower and characterized by more wing flapping, and the head typically is tilted down to look for snails while in flight. Snail Kites do not plunge into the water to capture snails and never use the bill to capture prey. Rather, they use their feet to capture snails at or below the surface of the water.

Snail Kite habitat consists of freshwater marshes and the shallow vegetated edges of natural and manmade lakes where apple snails can be found. Snail Kites require foraging areas that are relatively clear and open so that they can visually search for apple snails. Dense vegetation is not conducive to efficient foraging. Nearly continuous flooding of wetlands is needed to support apple snail populations that in turn sustain foraging by Snail Kites. Disposal of domestic sewage through septic tanks and runoff of nutrient-laden water from agricultural lands degrade the water quality and promote dense growth of exotic and invasive plants such as cattail, water lettuce, water hyacinth, and hydrilla, thereby reducing the ability of Snail Kites to locate apple snails. Although Snail Kites in Florida are not migratory, they are nomadic in response to water depths, hydroperiod, food availability, and other changes in habitat. Shifts in distribution can be short-term, seasonal, or long-term.

The ranges of the endangered Wood Stork and Cape Sable Seaside Sparrow overlap the range of the Snail Kite. Although hydrologic conditions that are more favorable to one species may not be as favorable for another species, all of these animals survived the hydrologic variability characteristic of the natural system. However, the reduced extent of suitable present-day habitat makes all of these species more vulnerable to natural as well as human-caused threats.



NPS photo



Everglades National Park preserves only about one-fifth of the original extent of the Everglades. The principal threat to the Snail Kite and other endangered Everglades species is the loss or degradation of wetlands in central and south Florida.

The principal threat to the Snail Kite is the loss or degradation of wetlands in central and south Florida. Nearly half of the Everglades have been drained for agriculture and urban development. Everglades National Park preserves only about one-fifth of the original extent of the Everglades. The present-day system of canals, levees, and water-control structures has disrupted the volume, timing, direction, and velocity of freshwater flow. The natural sheet-flow pattern under which the Everglades evolved over the last 5,000 years no longer exists. The loss of freshwater to seepage, flood-control releases to tidal waters, and extraction for irrigation and urban water supply has led to salt-water intrusion in some places. Regulation of water stages in lakes and canals is particularly important to maintain the balance of vegetative communities required to sustain Snail Kites.

Source: "Snail Kite: Species Profile." *National Parks Service*. U.S. Department of the Interior, n.d. **Web.**

Answer the following questions based off of the Everglades National Park article about Snail Kites.

1. What special adaptation do Snail Kites have? What is it used for?
2. What is the main reason the Snail Kite has become endangered?
3. What would happen to Snail Kite populations if there was a severe drought? Why?
4. Grassy Waters Preserve has a high number of Snail Kite sightings despite it being highly endangered in Florida. What do you think this tells you about our preserve's habitat and water quality? Why?
5. How can you help protect the Everglades habitats, such as Grassy Waters Preserve, that Snail Kites live in?
6. In addition to providing a habitat for Snail Kites, Grassy Waters Preserve provides drinking water for the City of West Palm Beach and surrounding communities. What are some water conservation methods you can do at home to ensure our Preserve remains a good habitat for Apple Snails and a reliable water source for people?
7. Visit the Everglades National Park website and read about three animal species you know little about. Write an interesting fact about each below.

Want to learn more...

Explore these cool websites, videos, and books to learn more about the Everglades!

Everglades Wildlife:

- Animals: Everglades National Park- Learn About the Park: Animals
- Endangered Animals: Everglades National Park- Threatened & Endangered Animals
- Plants: Everglades National Park- Learn About the Park: Plants
- Animal Videos:
 - YouTube- Meet the Residents of Everglades National Park- National Geographic
 - YouTube- Animals of the Everglades- GoTraveler (Information on animals begins at 00:52)

Grassy Waters Preserve Information:

- About Us: City of West Palm Beach Public Utilities- Grassy Waters Preserve
- Canoe and Kayak Tours: City of West Palm Beach Public Utilities- Grassy Waters Preserve Public- Program Calendar

Water Conservation:

- Water Saving Tips: Southwest Florida Water Management District
- See how much water you and your family use daily:
Southwest Florida Water Management District Water Conservation Calculator

Books about the Everglades and its Wildlife:

All books available to borrow at a Palm Beach County Library branch.

- *“The Swamp”* By Michael Grunwald (Nonfiction Everglades Novel)
- *“A Land Remembered”* By Patrick D. Smith (Historical Fiction Story of Old Florida)
- *“The Everglades: River of Grass”* By Marjory Stoneman Douglas, (Nonfiction Everglades Novel)
- *“Everglades”* By Anne Ake (Everglades Facts)
- *“National Audubon Society Field Guide to Florida”* (Field Guide to Florida Wildlife)