

Act It Out!

WHAT MAKES UP THE ST. JOHNS RIVER WATERSHED?

SKILLS: vocabulary building, participating in a collaborative discussion, researching a topic

COMMON CORE STANDARDS/FLORIDA STANDARDS:
L.4.6; L.5.6; SL.4.1; SL.5.1

NEXT GENERATION SUNSHINE STATE STANDARDS:
SC.4.N.1.1; SC.4.E.6

MATERIALS:

- student copies of the cards on page 4 (one card per student), plus one extra copy of the page
- six construction-paper signs, each labeled with one of these terms: North, South, East, West, Atlantic Ocean, St. Johns River
- length of yarn slightly longer than the width of your classroom
- two lengths of yarn approximately half the length of the one mentioned above
- masking tape

GETTING READY:

- Push student desks to the perimeter of your room to create a large open space.
- Tape the signs on your classroom walls, displaying the “Atlantic Ocean” sign below the “East” sign.
- Tape the long length of yarn at waist height so it extends from the “South” wall to the “North” wall. Tape the “St. Johns River” sign to the middle of the yarn length.
- You may wish to review these vocabulary words with students before introducing this activity: *river mouth, marsh, watershed, bank, basin, current.*

STEPS:

- 1 Display a map of Florida that shows the St. Johns River (see geology.com/state-map/florida.shtml). Point out that the river is the longest in Florida and one of the few rivers in the United States that runs south to north. Have students name areas around the river that they have visited or with which they are familiar.
- 2 Explain to students that the yarn that is extended from the “South” wall to the “North” wall represents the St. Johns River. (Clarify that, although the yarn’s path is straight, the river’s path is not.)



Words to Know

watershed: an area of land that drains surface water runoff into a water body such as a river, lake, ocean, or the Gulf of Mexico

tributary: a smaller river or stream that flows into a larger river or stream

marsh: a tract of wet or periodically flooded treeless land, usually characterized by grasses, cattails, or other monocotyledons such as sedges and palms

bank: land adjoining or next to a river, lake, canal, or channel that slopes downward

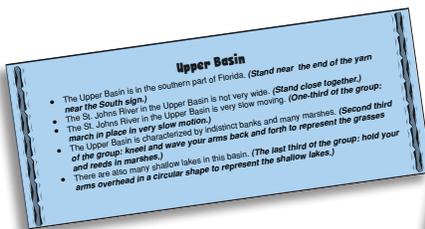
basin: land area where water drains into a stream, river or lake

current: the portion of a stream or body of water that is moving or flowing faster or with a higher velocity than the rest of the water

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- 3** Explain to students that they will work together to act out a model of the three main parts, or basins, of the St. Johns River. Then divide the class into three groups: Upper Basin, Middle Basin, Lower Basin. Show students the general locations of these basins on the map (see the sidebar). Give each student a copy of his group's card.
- 4** Have groups review the information on their cards and practice the motions indicated in bold type.
- 5** Starting with the Upper Basin, read aloud each bullet on the card one at a time (without the actions). Instruct students in that group to do the actions as directed on the card. Repeat with the other groups until the entire class has acted out the three basins of the St. Johns River.



Note: When you talk about the St. Johns River turning east near Jacksonville, some of your students may also be aware that there are two other offsets: one at Lake Dexter/Woodruff and the other on the Ocklawaha River.

- 6** Discuss these questions:
 - What do you notice about the St. Johns River? (Students may answer that it runs south to north, its waters gain speed as they travel north, the river widens as it heads north, the river empties into the Atlantic Ocean, etc.)
 - In which basin do you think Palatka is found? (the Lower Basin)
 - The Econlockhatchee and the Ocklawaha Rivers are both tributaries of the St. Johns River. We added these rivers to our model. From looking at the model, what do you think a tributary is? (A tributary is a river or stream that flows into a larger river or lake.)
 - Why do you think the three parts of the St. Johns River are called basins? What is a basin? (Answers will vary. See the definition on page 1.)

Where are the three basins of the St. Johns River located?

The Upper Basin mainly lies in Osceola and Brevard counties, with smaller areas in Okeechobee, Indian River, Orange, and Seminole counties. It includes several lakes such as Lake Hell 'n' Blazes, Sawgrass Lake, Lake Washington, and Lake Poinsett.

The Middle Basin begins in east-central Florida where the river begins to widen after being joined by the Econlockhatchee River. It runs through the Ocala National Forest and includes Lake Jesup, Wekiva River, Little Wekiva River, Lake Monroe, Econlockhatchee River, and Deep Creek.

The Lower Basin is the area in northeast Florida from Putnam County to the river's mouth in Duval County, where the river empties into the Atlantic Ocean.

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7 If time allows, have students swap cards and repeat the activity. Or have each group locate appropriate reference materials (see the list of websites below) and identify natural resources found in each basin. Provide time for groups to share the information they locate, including the sources they use.

Extensions for Grades 2-3:

Introduce the term *watershed*. Ask students if they notice what kind of word it is (*a compound word, which is made up of two smaller words*). In pairs, ask students to hypothesize about the definition of *watershed*. Have each pair share its definition; then discuss the meaning on page 1. Display a map of Florida (using the link in Step 1 on page 1). Have students identify these places: Palatka, Putnam County, Jacksonville, the St. Johns River, and the Atlantic Ocean. Ask them to tell whether they think these places are part of a watershed and give reasons for their opinions. After explaining that they are indeed part of the St. Johns River watershed, have each pair of students define *watershed* in their own words and illustrate the definition. *Common Core Standard/Florida Standard L.2.4d; Next Generation Sunshine State Standard SC.2.N.1*

Extensions for Grades 6-8:

Divide the class into several research teams. Have each team research a state other than Florida to learn about one of its major watersheds. Direct each team to identify major characteristics of its watershed and then compare its location and relative size to that of the St. Johns River watershed. Provide time for each team to present its findings to the class. *Common Core Standards/Florida Standards W.6.7; W.7.7; W.8.7; Next Generation Sunshine State Standard SC.6.E.6.2*

For more information on the St. Johns River watershed, see these resources:

- <http://www.sjrwmd.com/stjohnsriver/>
- <http://www.sjrwmd.com/stjohnsriver/tour.html>
- http://www.protectingourwater.org/watersheds/map/upper_st_johns/
- http://www.protectingourwater.org/watersheds/map/lower_st_johns/
- http://www.protectingourwater.org/watersheds/map/middle_st_johns/
- <http://abouttitusville.com/outdoors/paddling/econmap.html>

Why is the St. Johns River so lazy?

Have you ever floated down a "lazy river" at a water park? Well, the St. Johns River is a real lazy river! Why? Over its entire 310 miles, the St. Johns River only drops by a total of 27 feet. That's only about one inch per mile. The result is that the St. Johns River is very slow moving.

Why does the St. Johns River run south to north?

Unless it is pumped, water always flows downhill to lower elevations. Indian River and Brevard counties are at a higher elevation than Duval County. So, the St. Johns River runs south to north because it is heading downhill.

Upper Basin

- The Upper Basin is in the southern part of Florida. (*Stand near the end of the yarn near the South sign.*)
- The St. Johns River channel in the Upper Basin is not very wide because of the marshes that make up its headwaters. (*Stand close together.*)
- The St. Johns River in the Upper Basin is very slow moving. (*One-third of the group: march in place in very slow motion.*)
- The Upper Basin is characterized by indistinct banks and many marshes. (*The second third of the group: kneel and wave your arms back and forth to represent the grasses and reeds in marshes.*)
- There are also many shallow lakes in this basin. (*The last third of the group: hold your arms overhead in a circular shape to represent the shallow lakes.*)

Middle Basin

- The Middle Basin of the St. Johns River is in central Florida. (*Stand in the center of the area by the yarn.*)
- The St. Johns River channel begins to get wider in the Middle Basin. (*Spread out farther from each other than the students in the Upper Basin group.*)
- As the river flows north and continues to collect water from marshes and springs, it forms lakes such as Lake Harney, Lake Jesup, and Lake Monroe. (*Hold your arms overhead in a circular shape to represent these lakes.*)
- The St. Johns River is joined in this basin by the Econlockhatchee River. (*Have one student in your group tie a length of yarn to the St. Johns River yarn and extend it in a southwest direction to represent this tributary.*)
- The input of water from the Econlockhatchee River and water from the Wekiva River and springs in the area causes the current to become faster. (*March in place faster than your classmates in the Upper Basin group.*)

Lower Basin

- The Lower Basin begins by DeLand and Lake George. It includes the largest tributary of the St. Johns, the Ocklawaha River. (*Have one student in your group tie a length of yarn to the St. Johns River yarn and extend it towards the west to represent this tributary.*)
- The St. Johns River widens here to an average of two miles. (*Spread out farther from one another than the other two groups.*)
- This basin is influenced by the incoming tide from the Atlantic Ocean. The incoming tide causes the river to reverse its flow twice a day. High and sustained winds from the northeast can cause several days of reversed flow. (*March forward several steps; then walk backward the same number of steps.*)
- The St. Johns River turns east at Jacksonville and meets the Intracoastal Waterway. Here it flows into the Atlantic Ocean. (*Continue to march in place, point towards the Atlantic Ocean sign, and wave.*)

Lower Basin Lowdown

THE LOWER ST. JOHNS RIVER BASIN

SKILLS: researching a topic, citing sources, reading informational text

COMMON CORE STANDARDS/FLORIDA STANDARDS: RI.4.1; RI.5.1; W.4.7, 9; W.5.7, 9

NEXT GENERATION SUNSHINE STATE STANDARDS: SC.4.E.6.6; SC.4.L.17.4; SC.4.N.1.1

MATERIALS:

- light-colored construction paper in six different colors
- fine-tipped markers
- scissors
- access to online resources

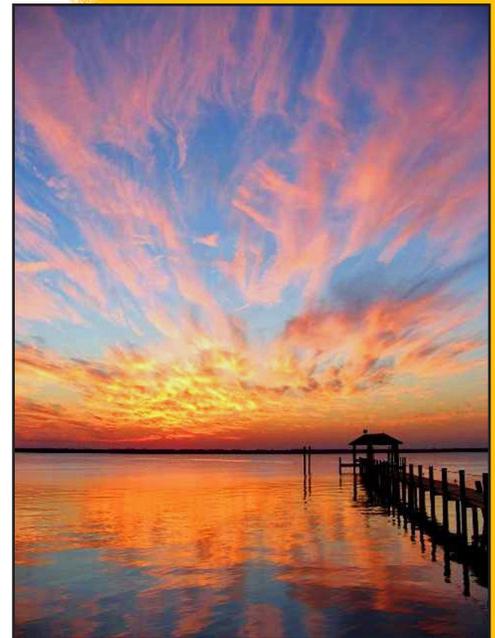
Note: This activity requires two to three class periods.

STEPS:

1 Display a map of Florida (see geology.com/state-map/florida.shtml). Show students where the Lower Basin of the St. Johns River is located (*extends about 101 miles from where the Ocklawaha River meets the St. Johns to the Atlantic Ocean; includes Volusia, Flagler, Putnam, St. Johns, and Duval counties*). Remind students that this area is called the “lower” basin because it is the ending of this south-to-north river and at a lower elevation than the middle or upper basins.

- 2** Divide the class into these six research teams.
- Cities and Counties of the Lower Basin
 - Major Water Features in the Lower Basin (rivers and tributaries, lakes, creeks, etc.)
 - Wetlands in the Lower Basin
 - Recreational Activities in the Lower Basin
 - Wildlife in the Lower Basin
 - Human Impact on the Lower Basin

Direct each team to use online resources (see the list of websites on page 8) to find at least five interesting facts about its topic.



Lower Basin Lowdown

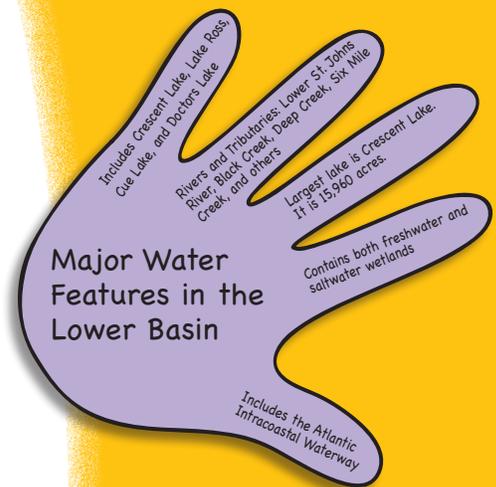
THE LOWER ST. JOHNS RIVER BASIN

3 Once each group has taken notes on its topic, distribute the materials, making sure that each group is given a specific color of paper. Have each group trace and cut out five (or more) handprints from the construction paper, as shown. Then have group members use the markers to write each fact on a handprint, citing the source of the fact on one of the cutout's fingers

4 Provide time for each group to present the facts on its cutouts. Share the following points if they are not mentioned by students:

- The Lower St. Johns River Basin includes an estuary (*an area where fresh and salt water meet and mix*) that is joined at its mouth by the Atlantic Intracoastal Waterway. The river widens from Palatka to Jacksonville from about one mile to three miles. It is shallow with an average depth of less than 10 feet. The river turns east in Jacksonville towards the Atlantic Ocean, deepening to almost 30 feet. Here the river is always a mix of fresh and salt water.
- Cities in the Lower Basin include Jacksonville, Jacksonville Beach, Green Cove Springs, Orange Park, Palatka, Atlantic Beach, Bunnell, Neptune Beach, and Crescent City. Counties include Volusia (only a portion of it), Flagler, Putnam, St. Johns, Clay, and Duval.
- The Lower Basin contains both freshwater and saltwater wetlands.
- Wildlife in this basin includes alligators, spotted turtles, eastern indigo snakes, Florida black bears, manatees, and limpkins.
- The St. Johns River Lower Basin is a natural resource (water) for Palatka. Similar to other developed areas, the Lower Basin has experienced decreased water quality due to excess phosphorous and nitrogen in the water. These nutrients occur naturally in the water and plants need them; however, too much can affect water quality. Besides natural sources of phosphorous and nitrogen, other sources include seepage from septic tanks; storm water runoff from farms, cities, and residential areas, which may contain fertilizer and pesticides; and runoff from wastewater treatment plants and industrial sites.

5 Post the cutouts (grouping them by color) on a bulletin board or large wall space. Add the title "We've Got a 'Hand-le' on the Lower Basin!" Then encourage students to use their free time to illustrate their facts and add the drawings to the display.



Worth a Look! Show students each smaller watershed that makes up the larger St. Johns River watershed by using the interactive map at this website: www.sjrwm.com/watershedFacts/stationsmap.html

Lower Basin Lowdown

THE LOWER ST. JOHNS RIVER BASIN

Extensions for Grades 2-3:

List each plant and animal listed in the box on a separate index card, making duplicate cards if necessary in order to create a class supply. Randomly distribute the cards to students. Explain that the Lower Basin of the St. Johns River is home to many plants and animals. Next, have students sort themselves into two groups—plants and animals—in separate areas of the classroom. Have each student (with assistance, if needed) read aloud the plant or animal listed on her card. Ask students, “Why do you think these animals and plants thrive in this area?” Guide students to conclude that the area provides for the basic needs of these plants and animals. Have students brainstorm what they think those basic needs might be. As a follow-up, encourage each child to research to find out one reason why the Lower Basin is a suitable environment for her plant or animal. *Next Generation Sunshine State Standards SC.2.L.17.2; SC.3.N.1.6*

Animals: alligator, river otter, manatee, great blue heron, brown pelican, bluegill, snapping turtle, little green heron, great egret, cottonmouth or water moccasin, Florida redbelly cooter, Florida softshell turtle, diamondback terrapin

Plants: pickerel weed, maiden cane, bald cypress, cattail, duckweed, yellow water lily, mosquito fern, sawgrass, water lettuce



Good to Know

When talking about the plants and animals of an area, keep in mind these terms:

native species: a species that occurs naturally in a particular ecosystem, rather than or as a result of an intentional or accidental introduction into that ecosystem by humans

exotic species: a species that is introduced into an area where it does not occur naturally

invasive species: a species that disrupts or harms native species and natural systems; may be native or non-native



Lower Basin Lowdown

THE LOWER ST. JOHNS RIVER BASIN

Extensions for Grades 6-8:

Have each student or pair of students research to identify different landforms that are found in the Lower Basin. After students compile their lists, have each student write a paragraph that describes one of the landforms and explains how it is impacted (if at all) by the St. Johns River. *Next Generation Sunshine State Standard SC.6.E.6.2*

For more information on the St. Johns River, including its Lower Basin, see these resources:

- http://www.protectingourwater.org/watersheds/map/lower_st_johns
- <http://www.sjrwmd.com/stjohnsriver/tour.html>
- <http://www.sjrwmd.com/stjohnsriver/>
- <http://www.theriverreturns.org/>
- <http://dep.state.fl.us/Northeast/stjohns/>

The Challenge With Algae

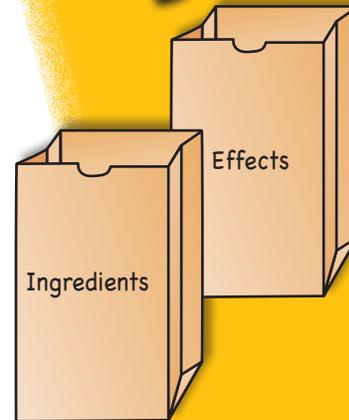
ALGAL BLOOMS

SKILLS: vocabulary, participating in a discussion, informative writing

COMMON CORE STANDARDS/FLORIDA STANDARDS: L.4.6; L.5.6; W.4.2; W.5.2

NEXT GENERATION SUNSHINE STATE STANDARDS: SC.4.E.6.3; SC.4.E.6.6; SC.4.L.17.4

NEXT GENERATION SCIENCE STANDARD: 5.ESS3-1



MATERIALS:

- cards on page 13, cut apart
- two paper lunch bags, labeled as shown
- mixing bowl and wooden spoon
- tape or small magnets

SETUP: Place the “Ingredient” cards in one bag and the “Effect” cards in the other bag.



STEPS:

- 1 Display the mixing bowl and the wooden spoon. Announce that you’d like to “bake” a perfect school day, but you’re not sure what ingredients you should use. Divide the class into several small groups. Then give groups five minutes to brainstorm a list of ingredients for the perfect school day.
- 2 Have each group share its ingredients as you list them on the board. Point out that in baking you need a combination of different ingredients in different amounts to make a cake. Explain that the same is true for a scientific phenomenon that happens in the St. Johns River watershed, called an *algal bloom*. Write this term on the board.

The Challenge With Algae

ALGAL BLOOMS

3 Write the term *algae* on the board and ask students to share anything they know about it. List their ideas on the board. Then explain that algae live in the water. They can be single-celled or have more than one cell. Algae don't have true roots, stems, and leaves like the other plants. Ask students if they have ever seen water bodies that are covered with a scum or floating, clumpy mats. Explain that what they saw was likely an *algal bloom*, a rapid increase in the amount of algae in a water system like the St. Johns River. Explain that though they can occur naturally, algal blooms can occur more frequently when certain "ingredients" are present. Have students predict what these ingredients might be. List their ideas on the board.

4 Have a student reach in the Ingredient bag, pull out a card, and read it aloud. Then have the student tape the card to the board or a wall space. Continue until all four ingredient cards have been drawn. Explain that the presence of all of these ingredients can result in an algal bloom. These blooms turn the water green and sometimes other colors. (Blooms in the St. Johns River usually consist of blue-green algae.) Sometimes the algae will grow in clumps that are covered in a jelly-like coating and float on top of the water. Other times the algae may form thick mats that float on or just below the surface. Show images of algal blooms found on the websites listed on pages 11 and 12.

5 Have each student turn to a partner and explain whether she thinks algal blooms are good or harmful for a waterway. Provide time for several students to share their opinions, making sure they include their reasons. Then have volunteers pull the cards one at a time from the Effects bag, read them aloud, and then tape them to the board. Discuss the harmful effects; then have students suggest ways to prevent more algal blooms from happening. List their ideas on the board.



The Challenge With Algae

ALGAL BLOOMS

6 As an informative writing extension, have each student use the cards on the board to write a letter to a parent or friend that describes algal blooms and their effects.

For photos of algal blooms in the St. Johns River, go to www.sjrwmd.com/algae/index.html

Extensions for Grades 2-3:

Review the definition of *algae* (microorganisms that use photosynthesis to grow). Explain that algae reproduce and grow a lot when they have nutrients, sunlight, and warm temperatures. To grow your own algae, divide the class into groups and give each group a clear cup or container. Help each group label its cup with a marker and then fill the cup with some lake or pond water. Cover each cup with clear plastic wrap. Then place the cups in a warm, sunny spot for several weeks. Have students observe the cups daily to look for evidence of algae growth. (Look for green coloring to appear over time.) *Next Generation Sunshine State Standards SC.2.L.17.1; SC.2.L.17.2; SC.3.L.17.1; SC.3.L.17.2; Next Generation Science Standard 2-LS4-1*

Extensions for Grades 6-8:

Students may already have heard that seaweed is used to make ice cream, but would they believe that algae is, too? Have students research common uses of algae. Create a master list of its uses on a class chart. Then assign small groups of students to find out the process for making one product and prepare a “how to” presentation to share with the class. *Common Core Standards/Florida Standards W.6.2; W.6.4; W.6.7; W.7.2; W.7.4; W.7.7; W.8.2; W.8.4; W.8.7*



Too Much of a Good Thing

Lots of sunshine and warm temperatures make for a great vacation, but when combined with an excess of phosphorous and nitrogen, they can also mean trouble for area waterways. Though these nutrients occur naturally in water and plants need them, too much in a shallow, slow-moving waterway can lead to an algal bloom. How do the extra nutrients make their way to a water body? They might seep from septic tanks or enter waterways via storm water runoff from farms, cities, and residential areas. Runoff from these areas can contain excess nutrients from fertilizer and pesticides. Runoff from wastewater treatment plants and industrial sites can also contribute to the nutrient increase. The overabundance of nutrients can upset the delicate balance that keeps our water healthy.

The Challenge With Algae

ALGAL BLOOMS

For more information and images of algal blooms, go to:

- <http://www.cdc.gov/nceh/hsb/hab/default.htm>
- <http://www.oceanservice.noaa.gov/hazards/hab/>
- <http://floridaswater.com/algae/>
- <http://www2.epa.gov/nutrientpollution/harmful-algal-blooms>
- http://research.myfwc.com/features/category_main.asp?id=1510
- <http://sjrwmd.com/algae/index.html>

For more information about the St. Johns River, check out these resources:

- <http://www.sjrwmd.com/stjohnsriver/>
- <http://www.theriverreturns.org/>
- <http://dep.state.fl.us/Northeast/stjohns/>



Ingredient and Effect Cards

Use with the activity on page 9.

<p>INGREDIENT</p> <p>large amounts of the nutrients nitrogen and phosphorous</p>	<p>INGREDIENT</p> <p>sunlight</p>	<p>INGREDIENT</p> <p>warmer weather that warms the water in a water body</p>
<p>INGREDIENT</p> <p>shallow, slow-flowing water</p>	<p>can deplete the oxygen that other aquatic organisms need to live</p> <p>EFFECT</p>	<p>can deplete the sunlight that other aquatic organisms need to live</p> <p>EFFECT</p>
<p>can produce harmful toxins</p> <p>EFFECT</p>	<p>may be harmful to animals and even humans</p> <p>EFFECT</p>	<p>can kill large numbers of fish by clogging their gills</p> <p>EFFECT</p>
<p>can smother submerged water plants</p> <p>EFFECT</p>	<p>can discolor clear water or make it cloudy</p> <p>EFFECT</p>	<p>can cause the water to smell bad as the algae dies</p> <p>EFFECT</p>
<p>can cause drinking water and fish to taste bad</p> <p>EFFECT</p>	<p>can hurt tourism in the affected area</p> <p>EFFECT</p>	<p>can hurt the fishing industry and other businesses in the affected area</p> <p>EFFECT</p>

WATER HYACINTHS: AQUATIC INVADERS

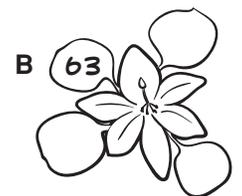
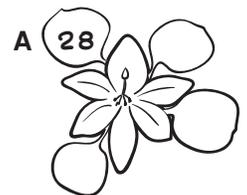
Read these sentences about a unique—and troublesome—plant found in Florida: the water hyacinth.

Underline each prepositional phrase. Then circle the preposition in the phrase.

Hint: Some sentences do not include a prepositional phrase, while others may have more than one.



1. Originally from South America, the water hyacinth is a floating plant with lavender flowers.
2. Water hyacinths have dense, heavy roots that trail them in the water.
3. These pesky plants grow so fast that populations can double in just two weeks.
4. Lakes and rivers can become filled with dense, floating mats of water hyacinths.
5. If not controlled, this species can cause severe ecological and economic problems.
6. Water hyacinths were brought to Florida in the 1880s by Mrs. W. F. Fuller.
7. She got the plant at an exposition in New Orleans.
8. Mrs. Fuller planted it along the shore of her home on the St. Johns River in Palatka.
9. Within ten years, this plant had covered millions of acres of the river and its tributaries.
10. Water hyacinths jammed rivers and lakes, which limited boat traffic.
11. These plants block sunlight from the water, greatly reducing oxygen levels.
12. Without enough oxygen in the water, underwater animals like fish can die.
13. Water hyacinths can also crowd out other plant communities.
14. This aquatic invader can eliminate plant species that animals need for shelter and nesting.
15. Today, mechanical harvesters and chopping machines remove water hyacinths from the water.
16. It is illegal in Florida to possess water hyacinths without a special permit.



To check your work:

- Add the numbers of the sentences that did not have prepositional phrases. The total should equal the number in water hyacinth A.
- Add the numbers of the sentences that had more than one prepositional phrase. The total should equal the number in water hyacinth B.

Bonus: It is against the law to bring in or plant water hyacinths in Florida. On the back of this paper, sketch a poster that will make the public aware of the dangers of this invasive plant. Include at least three prepositional phrases on your poster.



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Common Core Standards/Florida Standards:
L.5.1e; W.4.10; W.5.10

Next Generation Sunshine State Standards:
SC.4.L.17.4; SC.5.L.5.1

Next Generation Science Standard: 5-ESS3-1

Note to the teacher: For grades 2–3, discuss how water hyacinths keep other species from getting their basic needs met. Have students illustrate their ideas. *Next Generation Science Standards SC.2.L.17.1; SC.2.L.17.2.* Challenge students in grades 6–8 to research other invasive species, such as kudzu, air potato, Brazilian peppertrees, pythons, feral pigs, and coyotes. *Common Core Standards/Florida Standards W.6.7; W.7.7; W.8.7; Next Generation Sunshine State Standards SC.7.L.17.2; SC.7.L.17.3; Next Generation Science Standard MS-LS2-1*

WATER HYACINTHS: AQUATIC INVADERS

ANSWER KEY

1. from South America, with lavender flowers
2. in the water
3. in just two weeks
4. with dense, floating mats; of water hyacinths
5. no prepositional phrases
6. to Florida, in the 1880s, by Mrs. W. F. Fuller
7. at an exposition, in New Orleans
8. along the shore, of her home, on the St. Johns River, in Palatka
9. Within ten years, of acres, of the river and its tributaries
10. no prepositional phrases
11. from the water
12. Without enough oxygen, in the water
13. no prepositional phrases
14. for shelter and nesting
15. from the water
16. in Florida, without a special permit

For more information about water hyacinths in Florida, see these resources:

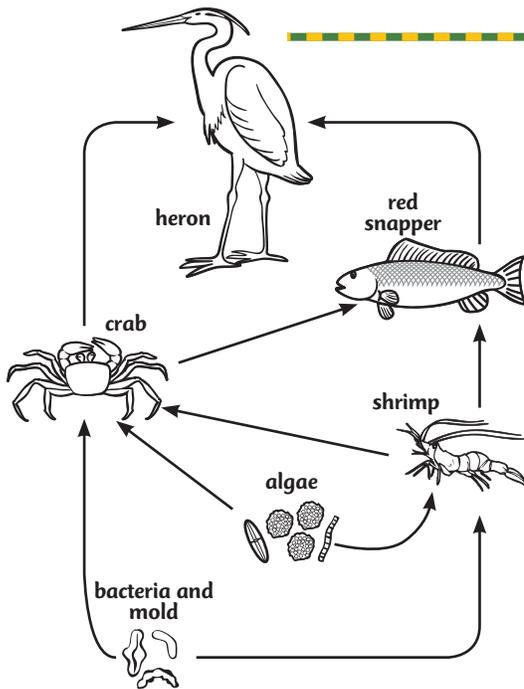
- <http://plants.ifas.ufl.edu/node/141>
- <http://plants.ifas.ufl.edu/manage/control-methods/biological-control#Water%20hyacinth>
- <http://www.ecy.wa.gov/programs/wq/plants/weeds/hyacinth.html>
- <http://aquaplant.tamu.edu/plant-identification/alphabetical-index/water-hyacinth>
- <http://myfwc.com/wildlifehabitats/invasive-plants/weed-alerts/water-hyacinth/>
- http://www.protectyourwaters.net/hitchhikers/plants_water_hyacinth.php
- <http://www.riverreturns.org/explore/history/text/19/>
- <http://www.swfwmd.state.fl.us/projects/aquaticplants/>
- <http://www.theledger.com/article/20100523/COLUMNISTS/5235028>

For more information about the St. Johns River, check out these resources:

- <http://www.sjrwmd.com/stjohnsriver/>
- <http://www.riverreturns.org/>
- <http://dep.state.fl.us/Northeast/stjohns/>

A WETLAND FOOD WEB

Read the article about plants and animals in a food web.



Plants and animals—like those that live in the St. Johns River ecosystem—depend on each other for survival. How does this relationship work? It all starts with the sun. Plants—such as seaweed, trees, and shrubs—and algae use sunlight to produce the food they need. For this reason, plants are known as **producers**.

Animals in an ecosystem can't make their own food. Instead they eat, or consume, plants or other animals. These animals are **consumers**. For example, small animals, such as shrimp, eat algae to get energy. Herons eat crab and red snapper. Organisms like bacteria and mold are **decomposers** because they get their food by breaking down the tissues of dead organisms. In doing this, they release important nutrients into the soil, which plants then use to grow and make food.

Not all consumers eat the same kinds of food. Some animals are **herbivores**; they consume producers such as plants. Some animals eat other animals, such as the many species of fish that feed on shrimp and crab. Animals that eat meat are called **carnivores**. Some animals, such as turtles, eat both plants and animals. These animals are called **omnivores**. The relationships between all of the plants and animals in a community is called a **food web**.

Answer the questions using the text and the diagram.
Write your answers on the back or on another sheet of paper.

1. Name a producer shown on the web.
2. Name a consumer from the web.
3. Name a decomposer shown on the web.
4. Name a carnivore shown on the web.
5. According to the text, what do omnivores eat?
6. Explain why “food web” is an accurate term for the relationships shown on this diagram.

Bonus: On the back of this paper, explain why this statement is true: **Decomposers are an important link in the cycling of nutrients through an ecosystem.**



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Common Core Standards/Florida Standards:
RI.4.1; RI.4.7; RI.5.1
Next Generation Sunshine State Standard:
SC.4.L.17.3
Next Generation Science Standard: 5-LS2-1

Note to the teacher: Help pairs or small groups of Grades 2–3 students research two different animals from the St. Johns River watershed, such as the American alligator, great blue heron, limpkin, West Indian manatee, river otter, nutria, pig frog, marsh rabbit, or opossum. Then have them create Venn diagrams to compare the two animals. *Common Core Standards/Florida Standards L.2.7; L.3.7; Next Generation Sunshine State Standards SC.2.L.17.1; SC.2.L.17.2.* Students in grades 6–8 can research to find examples of competition, commensalism, and parasitism in the St. Johns River watershed. *Common Core Standards/Florida Standards W.6.7; W.7.7, W.8.7; Next Generation Sunshine State Standard SC.7.L.17.1; Next Generation Science Standards MS-LS2-1; MS-LS2-4.*

A WETLAND FOOD WEB

ANSWER KEY

1. algae
2. crab, shrimp, red snapper, or heron
3. bacteria or mold
4. red snapper or heron
5. both plants and animals
6. Answers will vary but should include the fact that a web shows interrelationships between different plants and animals.

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- <http://www.sjrwmd.com/stjohnsriver/>
- <http://www.theriverreturns.org/>
- <http://dep.state.fl.us/Northeast/stjohns/>