

## WHERE ARE WETLANDS?

# The "Why?" Game

## TIDAL WETLANDS IN THE UNITED STATES

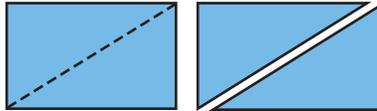
**SKILL:** Researching a topic

**COMMON CORE STANDARDS/ FLORIDA STANDARDS:** W.4.7–8; W.5.7–8

**NEXT GENERATION SUNSHINE STATE STANDARDS:** SC.4.N.1.1; SC.5.N.1.1

### MATERIALS:

- United States map
- 8 large sheets of construction paper cut as shown to create flags
- marker
- print and online references on wetlands

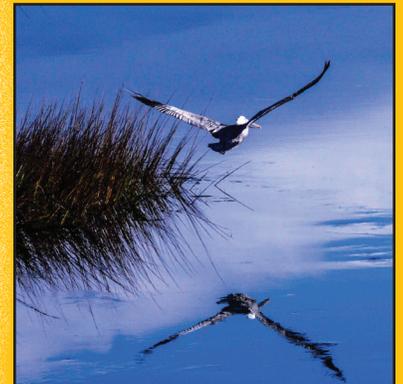


Not all wetlands are alike. Why?

**SETUP:** Write one of the statements shown in the box on each cutout flag. (Do not write the italicized answers.) Then scatter the flags on your classroom walls.

- **This is NOT a true statement: "All wetlands are tidal wetlands." Why?**  
*(There are two general types of wetlands: tidal, or coastal, wetlands and non-tidal, or inland, wetlands.)*
- **Not all wetlands are alike. Why?**  
*(Wetlands vary depending on differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors, such as degree of human disturbance.)*
- **Water levels in tidal wetlands shift back and forth. Why?**  
*(Tides going in and out cause the amount of water in a tidal wetland to vary. The changes in water cause different parts of the land to be covered by water or exposed to the air. It also changes the depth of the water.)*
- **Tidal wetlands are difficult environments for most plants. Why?**  
*(The varying salinities and fluctuating water levels create a difficult environment for most plants to grow.)*
- **Certain grasses and grasslike plants can be found in tidal wetlands. Why?**  
*(Some plants have adapted to the tidal wetland environment.)*
- **Tidal marshes are not all alike in terms of water. Why?**  
*(Some tidal marshes are freshwater marshes, some are somewhat salty, and some are salty.)*
- **It's important to protect tidal wetlands. Why?**  
*(Among other things, tidal wetlands provide protection from storms, slow down erosion, trap sediments, provide a home to many species of animals, and absorb excess nutrients that could harm estuary and ocean life.)*
- **We are still experiencing losses of tidal wetlands today. Why?**  
*(Coastal development and pollution threaten tidal wetlands.)*

**Where are wetlands found?** Why is this question an important one? Simple. Wetlands are found in almost every county and climatic zone in the United States. That means a wetland is likely to exist in or is very close to the area you and your students call home.



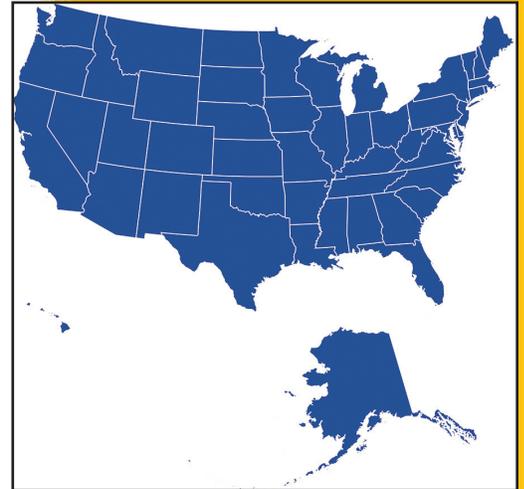
## WHAT ARE WETLANDS?

# The "Why?" Game

## TIDAL WETLANDS IN THE UNITED STATES

### STEPS:

- 1** Review what students know about wetlands. Explain that a wetland is an area where water covers the soil or is at or near the surface of the soil either year-round or for various periods of time throughout the year. Further explain that there are two types: tidal and non-tidal. Students will learn about tidal wetlands with this activity.
- 2** Display a United States map. Ask students to predict where they think tidal wetlands might be located in the United States. Mark these areas with sticky notes or another method, depending on the map you're using. As a class, confirm or clarify the students' predictions about where US tidal wetlands are located (*along the Atlantic, Pacific, Alaskan, and Gulf coasts*). If desired, show students the map found at the link listed in the box below. Point out that the map shows coastal watersheds, which include tidal wetlands and can extend many miles inland.
- 3** Point out the flags to your students. Ask students to guess the "why" behind each flag's statement. Then challenge each student or pair of students to use the references to answer each "why?" in their science journals within a designated time frame. If desired, have students list their sources as well.
- 4** Once everyone has had time to research the statements, divide the class into small groups so students can share and compare their research.



Not all wetlands are alike.  
Why?

Tidal wetlands are difficult environments for most plants.  
Why?

Tidal marshes are not all alike in terms of water.  
Why?

### For more information on tidal wetlands, see

- <http://water.epa.gov/type/wetlands/marsh.cfm>
- <http://soils.ifas.ufl.edu/wetlandextension/types.htm>

### For a map that shows coastal watersheds in the United States, see

- [http://water.epa.gov/type/wetlands/images/newmap\\_large.jpg](http://water.epa.gov/type/wetlands/images/newmap_large.jpg)

## WHAT ARE WETLANDS?

# The "Why?" Game

## TIDAL WETLANDS IN THE UNITED STATES

### Extensions for Grades 2-3:

Display a map of Florida. Point out to students the expansive amount of coastline in Florida for tidal wetlands. Demonstrate for students how to use the map scale to measure the length of Florida's coastline. (*The Atlantic coastline measures approximately 550 miles, while the Gulf coast measures approximately 770 miles, for a total of 1,320 miles.*) Then, with student input, measure the coastline lengths of at least three other coastal states. Compare the measurements. (*Be sure students understand these are approximate measures only.*) For third graders, have them write and solve addition and subtraction word problems involving the lengths. *Common Core Standards/Florida Standards 2.NBT.A.4; 2.MD.A.4; 3.NBT.A.2*

### Extensions for Grades 6-8:

Ask students, "How might tidal wetlands be affected by major storms like hurricanes?" Then have them research famous US hurricanes Andrew (1992), Katrina (2005), or Sandy (2012) to find out how area wetlands hit by these storms were affected. Provide time for students to share and discuss their research. *Common Core Standards/Florida Standards RI.6.1-2; RI.7.1-2; RI.8.1-2; W.6.7; W.7.7; W.8.7*

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

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

Even wetlands have their own month! May is American Wetlands Month. Created in 1991 by the Environmental Protection Agency and its partners, this special observance celebrates the value of wetlands as a natural resource.



## WHAT ARE WETLANDS?

# WANTED: Wetlands Experts

## NON-TIDAL WETLANDS IN THE UNITED STATES

**SKILLS:** researching a topic, informative writing

**COMMON CORE STANDARDS/FLORIDA STANDARDS:** W.4.7; W.5.7; W.4.2; W.5.2

**NEXT GENERATION SUNSHINE STATE STANDARD:** SC.5.L.15.1

### MATERIALS:

copies of WANTED poster on page 6 (two per student group)  
crayons, markers, or colored pencils  
print and online resources on wetlands



### STEPS:

**1** Review what students know about tidal wetlands. Then have students predict what non-tidal wetlands are. (*Non-tidal wetlands are inland wetlands, most commonly found on floodplains along rivers and streams, in depressions surrounded by dry land, along the edges of lakes and ponds, and in other low-lying areas where the soil is saturated. Many lakes in Florida do not have wetlands because the lakes were made by people or the wetlands were filled for development.*) Have students justify their responses.

**2** Explain that non-tidal wetlands can be found all over the United States. In fact, they are in almost every county in the country. In 2009, estimates were that there were over 110 million square miles of wetlands in the lower 48 states. As a class, discuss where non-tidal wetlands might be located where you live. If there are no swamps or bogs specifically nearby, typically wetland areas line river areas or surround lakes, since these areas may flood regularly during certain seasons.

**3** Display a copy of the chart on the right that lists different types of non-tidal wetlands. Explain that there are significant differences between the different types of non-tidal wetlands.

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

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

### NON-TIDAL WETLANDS

- marshes
  - wet meadows
  - vernal pools
  - prairie potholes
  - playa lakes
- swamps
  - forested swamps (such as bottomland hardwoods swamps)
  - shrub swamps (such as mangrove swamps)
- bogs
- fens

## WHAT ARE WETLANDS?

# WANTED: Wetlands Experts

## NON-TIDAL WETLANDS IN THE UNITED STATES

- 4 Divide the class into pairs or groups of three. Assign each group any two of the wetland types on the chart. Direct students to research their wetlands to discover each one's main characteristics.
- 5 After students have completed their fact gathering, give each group two copies of the WANTED poster. Have each group complete and cut out a copy of the poster for each of its wetlands. Then have each student write a paragraph that compares and contrasts his group's two wetlands.
- 6 Display the finished posters on a bulletin board or classroom wall space under the title "WANTED: Wetlands Experts!" If desired, have students repeat the activity to investigate types of tidal wetlands.

### Extensions for Grades 2-3:

Display a map of the area where you live, such as a county map. Call on students to use a highlighter to trace or color any water areas shown on the map. Then discuss whether these areas might be non-tidal wetlands, and why or why not. Discuss how tidal wetlands compare to non-tidal wetlands. *Common Core Standards/Florida Standards SL.2.2; SL.3.2*

### Extensions for Grades 6-8:

Have students research the benefits of non-tidal wetlands and the challenges scientists and concerned citizens face when trying to protect these wetlands. Then have each student write a letter in which she gives her opinion about whether a fictional non-tidal wetland should be developed or protected. Remind students to support their positions with facts and details. *Common Core Standards/Florida Standards W.6.1; W.7.1; W.8.1; Next Generation Sunshine State Standards SC.8.N.4.1; SC.8.N.4.2*



To Whom It May Concern:

I have been researching the non-tidal wetlands. I have learned that ~~~~~

~~~~~  
~~~~~  
~~~~~  
~~~~~  
~~~~~  
~~~~~  
~~~~~

#### For more information on non-tidal wetlands, check out these resources:

- [http://water.epa.gov/type/wetlands/types\\_index.cfm](http://water.epa.gov/type/wetlands/types_index.cfm)
- <http://soils.ifas.ufl.edu/wetlandextension/types.htm>
- <http://www.eoearth.org/view/article/154870/>
- <http://nature.nps.gov/water/wetlands/aboutwetlands.cfm#types>

# WANTED

(illustration)

**Wetland:** \_\_\_\_\_

**Description of soil, water, and vegetation found there:** \_\_\_\_\_

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**Examples of vegetation found there:** \_\_\_\_\_

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**Examples of wildlife found there:** \_\_\_\_\_

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**Where are they found in the US?** \_\_\_\_\_

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## WHERE ARE WETLANDS?

# Here's Your Top Ten!

## WETLANDS AROUND THE WORLD

**SKILLS:** map skills, researching a topic

**COMMON CORE STANDARDS/FLORIDA STANDARDS:** W.4.7–8; W.5.7–8; SL.4.4; SL.5.4

**MATERIALS:**

- student copies of the chart on page 9
- world map
- colored sticky dots or flag-style sticky notes
- paper and pencil

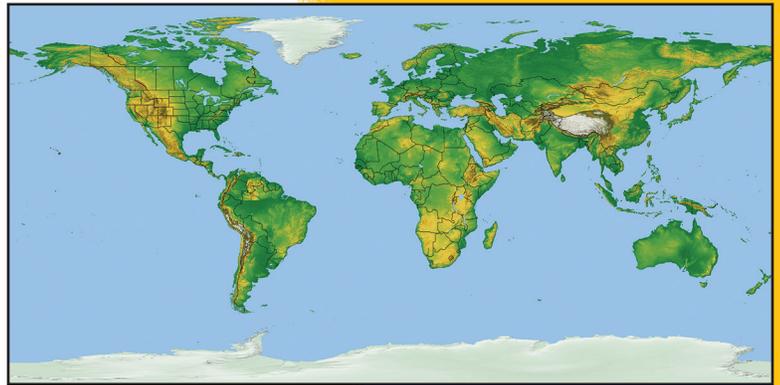
**STEPS:**

**1** Display a world map. Explain that wetlands are not only found in Florida and the United States. There are wetlands around the world, and all of them play an important role in a healthy Earth. Review with students the role wetlands play in helping our planet. *(For example, they filter water, slow soil erosion, trap sediments, provide habitats for a wide variety of plant and animal species, help protect against floods, offer recreation areas, and contribute to local economies.)*

**2** Give each student a copy of the chart on page 9. Depending on the level of your students, do the following for each wetland listed:

- Ask a student to come to the map and locate first the continent and then the country in which the wetland is found. Help him place a sticky flag on the country, using the latitude and longitude coordinates to assist him in placing it in the wetland's location.
- Ask a student to come to the map and use the latitude and longitude coordinates on the chart to flag the wetland.

**3** Look at the flagged map and ask students how the wetlands are similar geographically (*many are located relatively near the equator*). Point out to students that though these wetlands are all near the equator, that isn't the most important similarity. More importantly, each marked wetland has something in its area to hold the water, such as the area's topography and a river system. Have students discuss the information in the chart and identify other characteristics the listed wetlands have in common.



| Wetland                                                               | Continent     | Location                                            | Importance                                                                                                        |
|-----------------------------------------------------------------------|---------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Camargue                                                              | Europe        | southeast France<br>43°N, 4°E                       | Lakes and marshes; important bird habitat                                                                         |
| Watur National Park                                                   | Asia          | Papua province, Indonesia<br>7°S, 143°E             | Lakes and marshes; habitat for rare animal and bird species                                                       |
| Simangaliso Wetland Park (previously Greater St. Lucia Wetlands Park) | Africa        | KwaZulu-Natal province, South Africa<br>29°S, 30°E  | Beaches, sand dunes, and coral reefs; home to exotic animals                                                      |
| Mekong Delta                                                          | Asia          | southern Vietnam<br>10°N, 107°E                     | Region where the Mekong River empties to the ocean; rice fields and other economic benefits                       |
| Kakadu National Park                                                  | Australia     | Northern Territory<br>13°S, 132°E                   | Rivers; floods each year, joining other waterways; habitat for fresh and saltwater crocodiles and migratory birds |
| Kerala backwaters                                                     | Asia          | Kerala state in southern India<br>10°N, 76°E        | Lagoons, lakes, canals, and rivers; habitat for wildlife and houseboat tourism                                    |
| Everglades                                                            | North America | southern Florida in the United States<br>25°N, 81°W | Extends from Lake Okechobee to Florida bay; habitat for wildlife, including the American alligator                |
| Okavango Delta                                                        | Africa        | Botswana<br>19°S, 23°E                              | Great inland waterway; habitat for exotic wildlife, including large mammals such as hippo and elephant            |
| The Sundarbans                                                        | Asia          | Bangladesh and West Bengal in India<br>22°N, 89°E   | Largest mangrove belt in world; habitat for exotic wildlife, including Bengal tigers                              |
| The Pantanal                                                          | South America | Western Brazil, Bolivia, and Paraguay<br>18°S, 57°W | World's largest wetland; famous for wildlife                                                                      |

## WHAT ARE WETLANDS?

# Here's Your Top Ten!

## WETLANDS AROUND THE WORLD

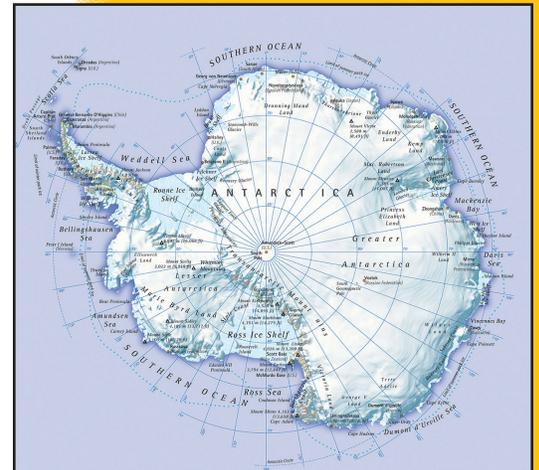
**4** To extend the activity, divide students into pairs. Assign one wetland area from the chart to each pair. Direct the pair to research to find ten interesting facts about its wetland. After students write their facts, challenge them to organize them into a top ten list that counts backward from 10 to 1, with 1 being the most interesting fact of all. Provide time for each group to share its top ten list with the class.

### Extensions for Grades 2-3:

Have students use a world map to locate the continent of Antarctica. Show pictures of this frozen land. Explain that it is the coldest, highest, and driest continent on Earth. Then have each student turn to a partner and discuss whether he thinks this area supports a wetland, and why or why not. *(Though most experts believe there are no wetlands in Antarctica, some think there may be a network of rivers and enormous lakes underneath the ice.)* Discuss students' thoughts as a class; then have each student write a paragraph that supports his opinion. *Common Core Standards/Florida Standards SL.2.1; SL.3.1; W.2.1; W.3.1; Next Generation Science Standard 2-LS4-1; Next Generation Sunshine State Standards SC.2.N.1.6; SC.3.N.1.4; SC.3.N.1.5*

### Extensions for Grades 6-8:

Define a *coral reef* (a reef made up of mostly coral and other organic matter that has consolidated into limestone) and a *rain forest* (a dense evergreen forest that has an annual rainfall of 406 centimeters or more). Have partners or small groups of students discuss whether these areas qualify as wetlands, and why or why not. As a class, have a short debate about the topic. Then divide the class in half: one half to research coral reefs and the other to research rain forests. After students have finished researching, have them continue with the class debate. Reinforce the idea that science information is always changing. *Common Core Standards/Florida Standards W.6.7; W.7.7; W.8.7; SL.6.4; SL.7.4; SL.8.4; Next Generation Science Standards MS-LS2-5; Next Generation Sunshine State Standards SC.6.N.1.4; SC.6.N.2.2; SC.7.N.1.6; SC.7.N.1.7; SC.8.N.1.3; SC.8.N.1.6*



**For more information on wetlands around the world, check out these resources:**

- <http://ramsar.wetlands.org/>
- <http://www.touropia.com/important-wetlands-in-the-world/>

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

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

# TEN MAJOR WETLANDS AROUND THE WORLD

| Wetland                                                                | Continent     | Location                                            | Importance                                                                                                        |
|------------------------------------------------------------------------|---------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
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| Mekong Delta                                                           | Asia          | southern Vietnam<br>10°N; 107°E                     | Region where the Mekong River empties to the ocean; rice fields and other economic benefits                       |
| Kakadu National Park                                                   | Australia     | Northern Territory<br>13°S; 132°E                   | Rivers; floods each year, joining other waterways; habitat for fresh and saltwater crocodiles and migratory birds |
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| The Pantanal                                                           | South America | Western Brazil, Bolivia, and Paraguay<br>18°S; 57°W | World's largest wetland; famous for wildlife                                                                      |



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**Note to the teacher:** Use with “Here’s Your Top Ten!” on page 7.

# A VISIT TO A BOTTOMLAND HARDWOOD SWAMP

There are many types of swamps. One type is the bottomland hardwood (or forested) swamp, and it's an important one! Bottomland hardwood swamps are found along meandering rivers and streams in the southeast and south central United States. In these regions, broad floodplains stretch away from rivers and streams for many miles. Bottomland hardwood swamps are essential ecosystems that provide relief from potentially severe flooding. How do they do this? They do it by storing floodwaters before those waters can destroy communities downstream.

Even though many bottomland hardwood swamps are at least partially flooded for much of the year, they are important and full of life. Made up of various species of gum, oak, or bald cypress trees, these swamps do more than fight flooding. They also filter water and improve water quality. They catch excess sediment and process organic waste.

Bottomland hardwood swamps are nutrient-rich ecosystems for many animals. Amphibians and reptiles live there. Migratory songbirds count on them as resting places and feeding grounds. Other types of birds found in bottomland hardwood swamps include blue herons, wood storks, red-headed woodpeckers, and warblers. In forested swamps across the southeast, you are likely to find black bears, squirrels, skunks, foxes, and beavers too.



Blue heron



Beaver

**DIRECTIONS:** Read the article. Then, on your own paper, draw the chart shown. Fill it in to show the main idea for each paragraph above and the text details that support it.

| Main Idea    | Supporting Details from the Text |
|--------------|----------------------------------|
| Paragraph 1: |                                  |
| Paragraph 2: |                                  |
| Paragraph 3: |                                  |

**Bonus:** Pretend someone has proposed that a nearby bottomland hardwood swamp be destroyed to make way for a new hotel. Why might some people in your community be against this proposal? Use details from the text to support your answer.



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Common Core Standards/Florida Standards RI.4.2; RI.5.2  
Next Generation Science Standards 4-LS1-1; 5-LS2-1

**Note to the teacher:** Grades 2–3 students can research animals that live in bottomland hardwood swamps, drawing illustrations and adding captions that give facts about the animals. *Common Core Standards/Florida Standards W.2.7; W.3.7; Next Generation Science Standard 2-LS4-1.* Grades 6–8 students can research to find out how human activities have damaged or destroyed forested swamps and what efforts are being made to protect and restore them. *Common Core Standards/Florida Standards W.6.7; W.7.7; W.8.7; Next Generation Science Standards MS-ESS3-3, 4; MS-LS2-4*

## A VISIT TO A BOTTOMLAND HARDWOOD SWAMP

### ANSWER KEY

Student answers may vary.

| Main Idea                                                                               | Supporting Details from the Text |
|-----------------------------------------------------------------------------------------|----------------------------------|
| Paragraph 1: A bottomland hardwood swamp is a type of swamp and an important ecosystem. | Details will vary.               |
|                                                                                         |                                  |
|                                                                                         |                                  |
| Paragraph 2: Bottomland hardwood swamps are important for several reasons.              | Details will vary.               |
|                                                                                         |                                  |
|                                                                                         |                                  |
| Paragraph 3: Many animals call a bottomland hardwood swamp home.                        | Details will vary.               |
|                                                                                         |                                  |
|                                                                                         |                                  |

**For more information on bottomland hardwood swamps, check out these resources:**

- <http://water.epa.gov/type/wetlands/bottomland.cfm>
- <http://water.epa.gov/type/wetlands/swamp.cfm#shrub>
- <http://www.earthgauge.net/2013/southern-bottomland-hardwood-swamps>
- <http://www.eoearth.org/view/article/150746/>

# A VISIT TO A BOG

**October 14**

The morning is bright, and the air is crisp. I ask my mom if we can go for a hike at Gordon Lake. This lake is surrounded by woods, and there is a "bog walk" leading up to the lake. A bog is a special type of wetland. It is distinctive because of its spongy peat deposits. Peat is plant matter that has partially decomposed. A bog also has acidic waters and a floor that is covered by a thick layer of sphagnum moss. This plant grows close together almost always in wet areas with acidic soil. The moss usually grows in a thick clump. It absorbs water like a sponge. This area gets all or most of its water from precipitation instead of from groundwater, runoff, or streams. The ground is especially mushy after it rains and in spring when the snow melts. Because of these conditions, the bogs don't have high levels of nutrients that plants need.

As we enter the nature area, we step onto the boardwalk to begin our tour. A local Boy Scout troop built the boardwalk so that the bog would not be damaged from people walking all over it. Plus I don't have to worry about the spongy soil sucking at my shoes and pulling them off! Soon, I come to another boardwalk, which takes me to a pond. The pond water is not deep. But the spongy, mossy soil at the bottom of the pond is deep and quite acidic.

Many plants have adapted to live in the special conditions in bogs. As I continue onward, I come across blueberry and huckleberry bushes. These plants thrive in acidic soil. If I look closely, I can see pitcher plants. Pitcher plants grow in the sphagnum moss. They are amazing because they can "capture" bugs! Bugs that fall into the plant's enclosure drown in the fluid inside. Then they are digested by the plant. There is always something new to look at on a bog walk!



**Bonus:** On the back of this page, rewrite each false statement so that it is true.

**Directions:** Read this journal entry about one person's trip to a bog. Then color a circle to show whether the sentence is true or false.

TRUE FALSE

- |                       |                       |                                                                            |
|-----------------------|-----------------------|----------------------------------------------------------------------------|
| <input type="radio"/> | <input type="radio"/> | 1. A bog has high levels of the nutrients that most plants need.           |
| <input type="radio"/> | <input type="radio"/> | 2. The water in a bog is acidic, but the soil is not.                      |
| <input type="radio"/> | <input type="radio"/> | 3. Pitcher plants "eat" insects.                                           |
| <input type="radio"/> | <input type="radio"/> | 4. Sphagnum moss grows in thin patches.                                    |
| <input type="radio"/> | <input type="radio"/> | 5. Peat is plant matter that has partially broken down.                    |
| <input type="radio"/> | <input type="radio"/> | 6. Bogs receive most of their water from runoff, groundwater, and streams. |

Common Core Standards/Florida Standards RI.4.1; RI.5.1; Next Generation Science Standards 4-LS1-1; 5-LS2-1; Next Generation Sunshine State Standards SC.4.L.17.4; SC.5.L.17.1



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**Note to the teacher:** Have grades 2–3 students research the pitcher plant and other bog plants. Then have them use index cards and colored pencils to create trading cards on the different plants. *Common Core Standards/Florida Standards W.2.7; W.3.7; Next Generation Science Standards 2-LS4-1; Next Generation Sunshine State Standards SC.2.L.17.2* Have students in grades 6–8 research and draw diagrams of a food chain or web found in bogs. *Common Core Standards/Florida Standards W.6.7; W.7.7; W.8.7; Next Generation Science Standard MS-LS2-3; Next Generation Sunshine State Standard SC.7.L.17.2*

## A VISIT TO A BOG

### ANSWER KEY

Student answers may vary.

1. False
2. False
3. True
4. False
5. True
6. False

Bonus: Answers may vary.

1. A bog does not have high levels of the nutrients that most plants need.
2. The water and the soil in a bog are acidic.
4. Sphagnum moss grows in thick clumps.
6. Bogs receive most of their water from precipitation.

**For more information on bogs, check out these resources:**

- <http://water.epa.gov/type/wetlands/bog.cfm>
- <http://www.britannica.com/EBchecked/topic/71376/bog>
- <http://www.nhptv.org/natureworks/nwep7f.htm>
- <http://www.carnivorous--plants.com/pitcher-plant.html>