Teacher's Guide

Withlacoochee River Watershed Virtual Excursion

Southwest Florida Water Management District

Lesson Time: One block or class period (55 minutes)

Subject/Grade Level: Environmental Science and Biology Grades 9–12

Lesson Objective: Using context clues and relevant facts in the virtual excursion, students will describe the ecology and geology of the Withlacoochee River watershed. Using real-world applications and hands-on activities, students will learn about the importance of preserving natural environments.

Next Generation Sunshine State Standards:

SC.912.L.17.8:	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, nonnative species.
SC.912.L.17.12:	Discuss the political, social and environmental consequences of sustainable use of land.
SC.912.L.17.16:	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.17:	Assess the effectiveness of innovative methods of protecting the environment.
SC.912.L.17.18:	Describe how human population size and resource use relate to environmental quality.
SC.912.L.17.20:	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.N.1.1:	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science.
LA.910.1.6.1:	Students will use new vocabulary presented to them directly.
LA.910.5.2.1-2:	Students will use appropriate listening strategies and oral communication for active class discussions.

Common Core State Standards:

Grades 9–10

LACC.910.WHST.1.1e	Text Types and Purposes
LACC.910.RST.1.1	Key Ideas and Details
LACC.910.RST.1.2	Key Ideas and Details
LACC.910.RST.2.4	Craft and Structure

Grades 11–12

LACC.1112.WHST.1.1e	Text Types and Purposes
LACC.1112.RST.1.2	Key Ideas and Details
LACC.1112.RST.2.4	Craft and Structure
LACC.1112.RST.2.6	Craft and Structure

Lesson Plan and Activities

Southwest Florida Water Management District

Vocabulary:

Watershed:	an area of land that water flows across as it moves toward a common body of water, such as a stream, river, or coast
Karst terrain:	the land surface produced by water dissolving bedrock; characterized by sinkholes and caverns
Spring:	places where groundwater flows out of a natural opening in the earth's surface
Aquifer:	a spongelike layer of underground rock that can hold and release water
Salt marsh:	flat coastal areas of land that are flooded and drained of salt water brought in by the tides
Ecosystem:	a biological community of interacting organisms and their physical environment
Umbrella species:	a species that needs a diverse habitat over a large geographical area, protecting these species will indirectly protect other species in the same area
Threatened species:	any species which are vulnerable to becoming endangered
Endangered species:	a species that is seriously at risk of extinction

Engage:

(15 minutes) Students will take the pretest included before beginning this lesson. Then, review the vocabulary terms and ask the following questions aloud to activate prior knowledge.

- Describe the environment of a typical river in Florida.
- Have you gone swimming in a spring before? What is different about swimming in a spring verses swimming at a beach or a lake?
- What do you know about species of bears and birds in Florida?
- What is the cause and effect of animals being threatened or endangered?

Explore/Explain:

(20 minutes) Pass out the student worksheet and ask students to go to *WaterMatters.org/Watersheds*, scroll to the bottom of the webpage and click on the Withlacoochee River Watershed Excursion. Instruct students to click on the links to move through the virtual tour while completing the worksheet.

After students finish the tour, watch the short video on the "Watershed Initiative" tab as a class and guide your students through the pause and discuss portion of the student worksheet. Pause the video at the suggested times provided on the student worksheet and reflect on the answers.

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Lesson Plan and Activities *continued from page 2*

Extend: (5 minutes) If time allows, consider using "Think-Pair-Share" and pair students with one another to share their answers. Then ask each pair to share one of their answers with the class.

Evaluate: (10 minutes) Students will take the posttest (same as pretest) after reviewing the excursion and completing the worksheet to measure student learning gains.

Additional links:

- Visit *WaterMatters.org/Education/Resources* to view all seven virtual watershed excursions and the coordinating teacher's guides. At this site, you can also view the Florida Watershed's video (11 minutes) and teacher's guide among other resources.
- Take the Watershed Pledge with your class at *WaterMatters.org/Conservation/Pledge*.

Pre- and Post-Assessment
Withlacoochee River Watershed Virtual Excursion

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Lesson time: 10 minutes

True or False

___1) Acidic rainwater can dissolve the aquifer.

___2) A salt marsh remains flooded with salt water.

___3) A spring is a coastal region where salt and fresh water mix.

___4) A watershed is comprised of all of the bodies of water in an area.

___5) It is much more affordable to conserve and protect our water than to treat it later on.

___6) The Florida black bear is an umbrella species, which is a species that needs a diverse habitat and can indirectly impact other species in the area.

___7) Human activity can impact the ecosystem of a river.

___8) The Withlacoochee River watershed is made up of several water bodies that lead to the Gulf of Mexico.

___9) The scrub-jay is an endangered species in the Withlacoochee River watershed.

___10) Human activity changed the original flow of the Withlacoochee River.

Student Worksheet
Withlacoochee River Watershed Virtual Excursion

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Name _____ **Period** _____

Directions: Read the excursion's Intro webpage and follow the labeled tabs at the top of the excursion. Fill in the blanks on this worksheet as you complete the tour.

Introduction

The Withlacoochee River is **(1)** _____ miles long and winds through eight counties before discharging into the **(2)**_____. The Indian name Withlacoochee means **(3)**_____ _____.

Map

A watershed is an area of land that water flows across as it moves toward a **(4)** _____ _____**.** *Scroll over the map to see photos throughout the watershed.* When rainwater drains to the lowest point in a watershed, it carries with it **(5)**_____ _____.

Where the River Begins

Four rivers emerge from the Green Swamp, which is located between **(6)**_____ _____**.** This area has the ability to store **(7)** _____ and slow floodwaters. The Withlacoochee River is unique because it is one of only two rivers in the state that flow **(8)**_____. The river discharges into the **(9)**_____.

Geology

Florida's landscape is made of **(10)**_____ landforms. This type of terrain is produced when bedrock, mostly made of **(11)** _____**,** dissolves over time as **(12)**_____ _____ passes through it. Springs are very common in this landform. A spring is a natural opening where **(13)** _____ _____.

Lakes and Tributaries

Lake Panasoffkee is unique because the aquifer is directly exposed at the **(14)**_____ _____. Tsala Apopka has several control structures that manage the lake levels for **(15)**_____. The Inglis Dam on Lake Rousseau was originally used to support the **(16)**_____ industry. This is one of the many man-made alterations that changed the **(17)**_____ of the river.

Student Worksheet

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Ecology

The Withlacoochee River watershed is made of a variety of natural communities. The river empties into the Withlacoochee Bay in a **(18)** _____. This is an area of coastal land that is flooded with and drained of salt water with the tides.

Click on the black bear link: The Florida black bear is the largest native mammal in Florida and can weigh up to **(19)**_____ pounds. They are an **(20)**_____ species. This means they share a diverse habitat with other protected species.

Click on the scrub-jay link: The Florida scrub-jay is a **(21)**_____ species whose population has been reduced because of increased **(22)**_____ and _____.

History

During the 2nd Seminole War, steamers were used to transport materials and men on the river. Then the 1800's brought industries to the area including **(23)** _____, _____ and _____ . The river naturally experiences high and low conditions due to

(24) _____.

Recreation Tab

There are many opportunities for recreation in the watershed because nearly (25) _____ of the watershed is conservation lands.

Watershed Initiative

Watch this video as a class and pause at each question to answer and discuss:

Pause and Discuss at 0:50 — How many square miles is this watershed?

_____

Pause and Discuss at 1:35 — What is the purpose of the Withlacoochee River Watershed Initiative?

_____

_____

Pause and Discuss at 4:10 — What is the Southwest Florida Water Management District measuring along the river?

_____

_____

Teacher Answer Key

Pre-/Post Assessment Answer Key

1) True	T
2) False	F
3) False	F
4) False	F
5) True	T
6) True	T
7) True	T
8) True	T
9) False	F
10) True	T

Student Worksheet Answer Key

(1) 160
(2) Gulf of Mexico
(3) Little Big Water
(4) Common body of water
(5) Pollutants and contaminates
(6) Tampa and Orlando
(7) Surface water
(8) Northward
(9) Gulf of Mexico
(10) Karst
(11) Limestone
(12) Acidic rainwater
(13) Water flows directly from the aquifer to the earth's surface
(14) Lake's bottom
(15) Water conservation and flood protection
(16) Phosphate
(17) Original flow
(18) Salt marsh
(19) 450
(20) Umbrella
(21) Threatened
(22) Development and agriculture
(23) Phosphate, timber and produce
(24) Fluctuations in rainfall
(25) 30 percent

Teacher Answer Key

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Watershed Initiative

Pause and Discuss at 0:50 — How many square miles is this watershed?

2,000 square miles

Pause and Discuss at 1:35 — What is the purpose of the Withlacoochee River Watershed Initiative?

An effort designed to understand the dynamics of the river and its watershed and to identify how alterations may have affected the river system, which helps to identify better ways to manage the river.

Pause and Discuss at 4:10 — What is the Southwest Florida Water Management District measuring along the river?

They are mapping out the entire river, recording more than 70,000 bottom elevations and making a model to study how the water has fluctuated over time.