

Exploring the Hillsborough River Watershed

Essential Question: What are the implications of water cycling on the Hillsborough River watershed?

Objective: Students will collect and analyze data related to the effects of the water cycle within the Hillsborough River's watershed following the field study.

Next Generation Sunshine State Standard(s):

SC.5.L.17.1

Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycle variations, animal behaviors and physical characteristics.

SC.6.E.7.2

Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.

SC.6.E.7.3

Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, humidity and precipitation.

SC.6.E.6.1

Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion and deposition.

SC.6.E.6.2

Recognize that there is a variety of different land forms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas and lakes and relate these landforms as they apply to Florida.

Next Generation Science Standard(s):

MS-ESS2-1

Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

MS-ESS2-2

Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS3-1

Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

MS-ESS3-5

Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

MS-ESS3-3

Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

MS-LS1-5

Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS2-2

Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

MS-LS2-5

Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

Materials: (one for each student)

- Students may use their notebooks to record prompts, responses and data
- Index cards
- If you wish for students to make their own journal, have each take 2 sheets of paper, fold in half, and staple across the middle for an 8-page journal. This leaves the front and back covers for decorating and 1 page for each of the 6 Nature's Classroom activities.

Set up and prep: Make copies of prompt/data sheet

Time needed: 50 minutes/one class period and three 15 minute review sessions for journal writing each day

Procedure:

1. During this class period, on the day prior to the field study, the teacher will review the following before beginning the water cycle lesson -
 - a. rules
 - b. behavior expectations
 - c. logistic information for tomorrow's trip
 - d. Assignments for each field activity. This may take the form of either a journal prompt or data collection.
2. Students will work in pairs or groups of four, depending on the class arrangement. There is no need to regroup the students for this portion.
3. Re-engage background knowledge of the water cycle by:
 - a. Having groups brainstorm how the water got into the Hillsborough River
 - b. Having groups brainstorm how water leaves the River and where it goes
 - c. Having groups brainstorm water's effects on components of the River Ecosystem such as top soil, pollutants on the ground, animal movement, aquatic life, animal species.
 - d. Reviewing previous lessons related to the watershed
4. Depending on the time available, these questions should be posed, and then discussed, as a class. This discussion (or discussions) will be the basis for observation during the field study, which will result in students designing a controlled lab based on their experience and a follow up question. Challenge students to listen and look for clues of things that are caused by water and directly affected by water at each of the activities during the field study.

Student Activity Assignments

Students will choose either a journal prompt to answer or collect one of the items from the data collection list for each activity.

Activity	Journal Prompt	Data Collection
River Exploration	How do river conditions affect wildlife?	# of birds/land animals # of aquatic animals water quality data
Animal Compounds	Explain the stories of how these animals arrived at Nature’s Classroom and why that is something we should know.	# (and, if possible) names of invasive species found in the compound
Uplands and Wetlands Hike	Explain the role of the water cycle in one biological community.	List and describe the different soil types and relative humidity readings observed. Describe evidence of erosion observed during the hike.
Shorelines Sampling	Why are you sampling the river?	Use collected data from shoreline sampling sheets.
Interpretive Center	What are some physical differences you notice between cold and warm blooded animals?	A list of the characteristics of cold blooded animals observed A list of the characteristics of warm blooded animals observed.
Orienteering	Explain how to use a compass and give examples from the study.	Record examples of erosion and/or deposition observed between the stations on each course.

Assessment:

- Successful response to journal prompts.
- Successful completion of data sheets.

Student Activity Assignment Sheet

Directions: Choose either a journal prompt to answer, or collect one of the items from the data collection list for each activity at Nature’s Classroom.

Activity	Journal Prompt	Data Collection
River Exploration	After participating in the River Exploration, in what ways do river conditions effect wildlife?	# of birds/land animals # of aquatic animals water quality data
Animal Compounds	After visiting the Animal Compounds, explain the stories of how these animals arrived at Nature’s Classroom. What scientific term or concept was the focus of the activity? What are the implications?	# (and, if possible) names of invasive species found in the compound
Uplands and Wetlands Hike	After participating in the hike, what was evidence of erosion and deposition? Explain the role of the water cycle using the evidence.	List and describe the different soil types and relative humidity readings observed. Describe evidence of erosion observed during the hike.
Shorelines Sampling	During Shoreline Sampling data was collected related. What was the importance of the data?	Use collected data from shoreline sampling sheets.
Interpretive Center	The Interpretive Center contained cold and warm blooded animals. Based on your observations from the activities, what are some physical differences you notice between cold and warm blooded animals?	A list of the characteristics of cold blooded animals observed A list of the characteristics of warm blooded animals observed.
Orienteering	Orienteering allowed you to use a compass and observe landmarks. Explain how you used the compass. As you reflect, provide information related to examples of erosion and deposition that you observed.	Record examples of erosion and/or deposition observed between the stations on each course.

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