CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.

Protecting Southwest Florida's unique natural environment and quality of life ... now and forever.

Wetland Explorers
Pre and Post-Program Activities

Grade Level: 3-5

Next Generation Sunshine State Standards

- SC.3.L.14.2; SC.3.L.15; SC.3.L.17
- SC.4.N.1.3; SC.4.L.17.4
- SC.5.E.7.2; SC.5.L.15.1

Program Overview

Become a scientist and explore a working filter marsh. Collect aquatic species for identification, use research instruments to measure water quality, and engage in scientific inquiry activities in the Conservancy STEM Lab. Then explore the Dalton Discovery Center and meet live aquatic creatures up close.

Learning Objectives Students will be able to:

1. Recognize and identify the importance of Florida's aquatic ecosystems.
2. Understand and explain that all waterways are connected.
3. Identify ways that humans can impact the environment.

Pre-Program Activity 1: Aquatic Adaptations

Duration of Activity: 45 minutes

Materials: computer lab or library

Directions: Have the students work individually or in groups to research three different marine animals. They will identify one adaptation for each animal and the function of that adaptation. Make a chart to record the results. Review with the students the definitions for both adaptation and function. Have students share their findings with the class.

Adaptation: Characteristics or behaviors that help an animal survive in its environment.

Animal	Adaptation	Function
Example: sea turtle	flippers	swimming
1.		
2.		
3.		

Function: How the adaptation helps the animal survive.

Discussion:

- Discuss the results of the student research.
- Compare and contrast how different animals have adapted to life in an aquatic environment.
- Ask students if they found different types of adaptations that serve the same function. Example: Fish have fins for swimming but sea turtles have flippers. What do these adaptations have in common, how are they different?

Pre-Program Activity 2: Exploring pH

Duration of Activity: 1 hour

Students will conduct an experiment to become familiar with the concept of pH.

Materials: 12 plastic containers, 2 teaspoons, lemon juice, baking soda, water and pH test strips (can be purchased online or at any pet store), reference chart

Set Up:

1. Fill up each plastic container with regular tap water.
2. In four of the containers add 1 teaspoon lemon juice and stir (this will make the water acidic).
3. In another four of the containers add 1 teaspoon baking soda and stir (this will make the water basic).
4. Label the regular water containers as Sample 1, the lemon mixtures as Sample 2 and the baking soda mixtures as Sample 3.
5. Set up four stations; each station should include one container with just water, one container with the lemon juice mixture, one container with the baking soda mixture, and three pH testing strips.

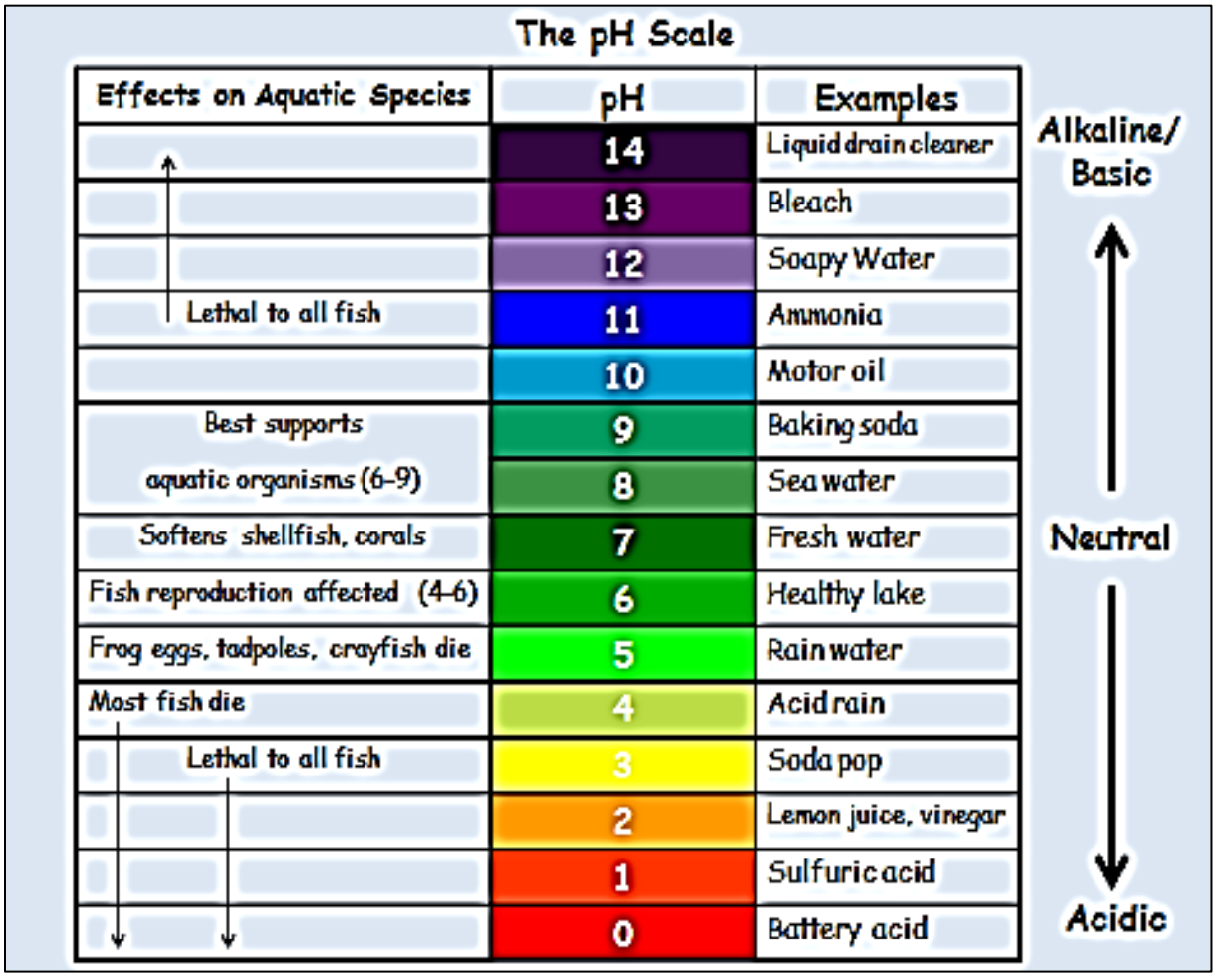
Background:

pH measures percent Hydrogen ions in a solution. The pH scale ranges from 0 – 14. A measure of 0 – 6 indicates the solution is acidic. 7 is neutral. A measure of 8 – 14 indicates the solution is a base. A strong base (pH 14, 13, 12, 11, etc.) can be as corrosive as a strong acid (pH 0, 1, 2, 3, etc.). Most natural lakes, streams, and ponds have a pH between 6 and 8. A neutral pH is what is needed for a body of water to support most plant and animal life. When pH goes below 6 (or below 5), undesirable mosses and plankton begin to invade the water, using up much of the oxygen in the water. Then many fish and other animals cannot live there. pH does not change due to temperature changes. pH of a water body can change due to pollution from the air or storm-water runoff.

Directions:

1. Divide the class into four groups and assign them to one of the four stations.
2. Pass out the pH scale below to each group to be used as a reference.

3. Instruct the students to use one pH test strip for each sample and to dip one end in the mixture.
4. Have the students use the reference chart (below) to determine the pH of each sample.
5. As a class, discuss the pH that each group got for their samples (they may vary slightly but they should all be relatively close).
6. Discuss with the students what they think was added to each sample to make it more basic or acidic.
7. The lemon mixture should be acidic, the regular water should be neutral and the baking soda should be basic.
8. Discuss with students using the second chart the effects pH has on the organisms that live in a body of water with a very high or low pH.

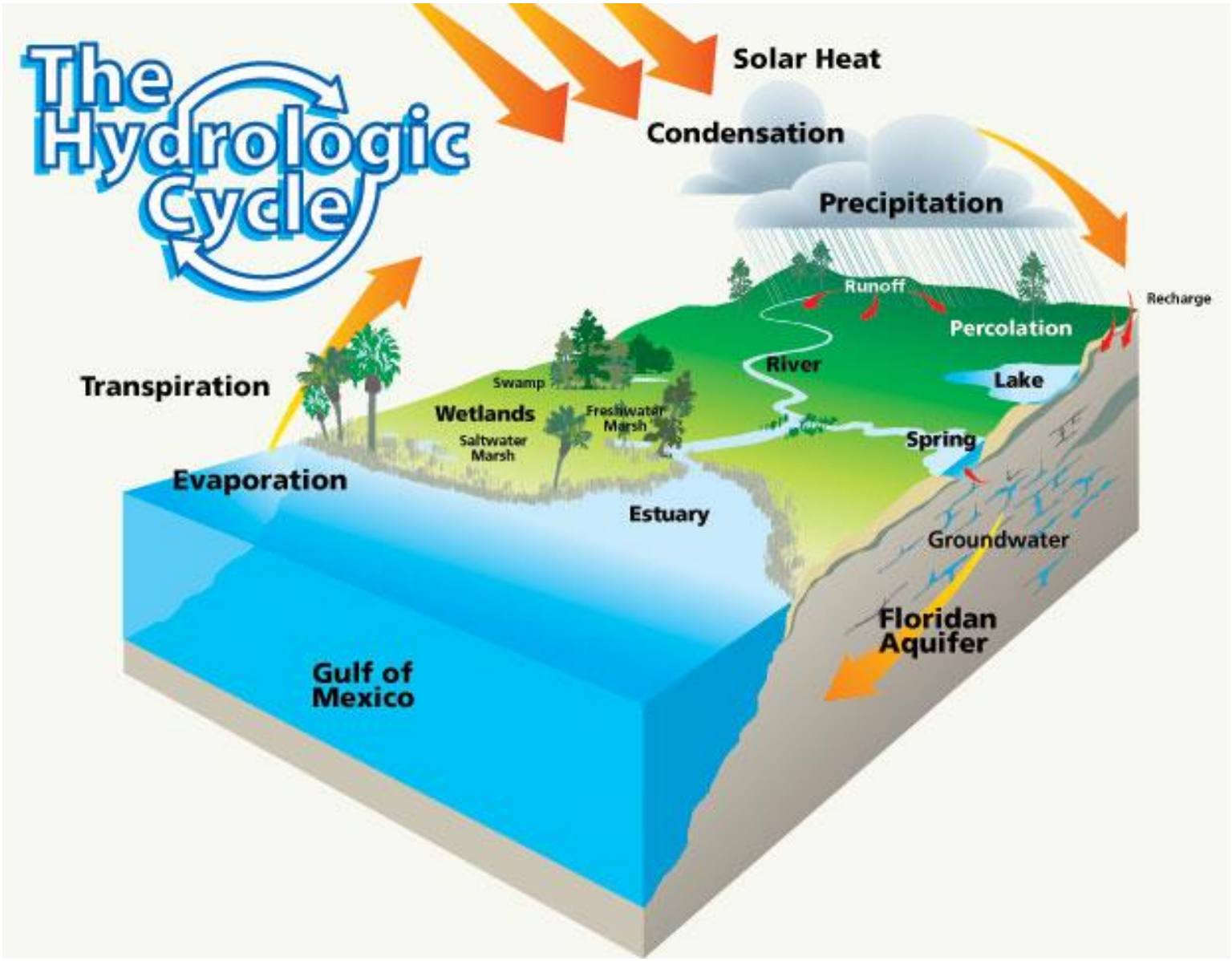


<u>Post-Program Activity 1</u>: The Water Cycle

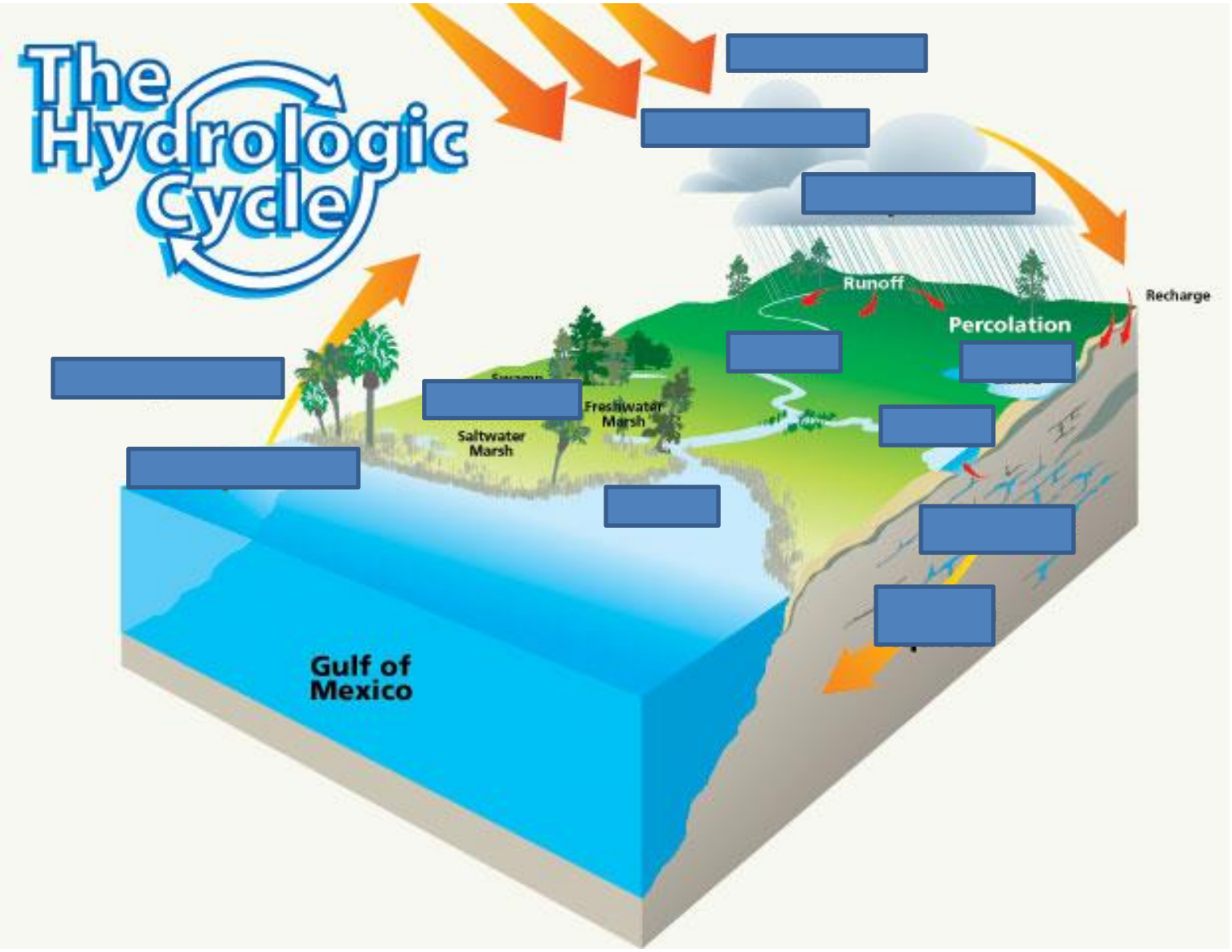
Duration of Activity: 1 hour

Directions: Review the Florida water cycle by having students fill in the blank spaces using the word bank provided. Each word will only be used once.

Teacher Answer Key:



Student Worksheet:



Word Bank

Evaporation	Florida Aquifer	Estuary	Transpiration
Wetlands	Groundwater	Condensation	Lake
Solar Heat	River	Precipitation	Spring

Post-Program Activity 2: What Are Wetlands?

Duration of Activity: 1 hour

Materials: map of United States or computer & projector, computer lab or research books on wetlands, Tidal Wetlands Worksheet (provided)

Background: Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year. Water saturation largely determines how the soil develops and the types of plant and animal communities living in and on the soil. Wetlands may support both aquatic and terrestrial species. Wetlands vary widely because of regional and local differences in soils, topography, climate, hydrology, water chemistry, vegetation and other factors, including human disturbance. Wetlands are found from the tundra to the tropics and on every continent except Antarctica.

Two general categories of wetlands are recognized: coastal or tidal wetlands and inland or non-tidal wetlands. Tidal wetlands in the United States, as their name suggests, are found along the Atlantic, Pacific, Alaskan and Gulf coasts. They are closely linked to our nation's estuaries where sea water mixes with fresh water to form an environment of varying salinities. The salt water and the fluctuating water levels (due to tidal action) combine to create a rather difficult environment for most plants. Consequently, many shallow coastal areas are unvegetated mud flats or sand flats. Some plants, however, have successfully adapted to this environment. Certain grasses and grasslike plants that adapt to the saline conditions form the tidal salt marshes that are found along the Atlantic, Gulf, and Pacific coasts. Mangrove swamps, with salt-loving shrubs or trees, are common in tropical climates, such as in southern Florida and Puerto Rico. Some tidal freshwater wetlands form beyond the upper edges of tidal salt marshes where the influence of salt water ends.

Non-Tidal wetlands are most common on floodplains along rivers and streams (riparian wetlands), in isolated depressions surrounded by dry land (for example, playas, basins and "potholes"), along the margins of lakes and ponds, and in other low-lying areas where the groundwater intercepts the soil surface or where

precipitation sufficiently saturates the soil (vernal pools and bogs). Inland wetlands include marshes and wet meadows dominated by herbaceous plants, swamps dominated by shrubs, and wooded swamps dominated by trees.

Directions:

1. **Review what students know about wetlands.** See 'Background' info above.

2. **Display a map of the United States.**
   Ask students to predict where they think tidal wetlands are located. Have a few students come up to the map and use a sticky note to show where they think tidal wetlands would be located. As a class, have students discuss if they think these locations are correct. US tidal wetlands are located along the Atlantic, Pacific, Alaskan and Gulf Coasts so the sticky notes should be in these locations. If they are not, explain this to students and have students move them to the appropriate areas.

3. **Print out the attached Wetlands Worksheet and give to each student.**
   Have students work individually or as a pair and research the questions on the Wetlands Worksheet. This may need to be done in a computer lab or with various books on wetlands. The following websites are good places for students to conduct their research.

   This research should only take 15-20 mins.

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

4. **Compare research.**
   Once students have completed their research, have students share and compare their research as a class.

(see below for Student Worksheet)

Tidal Wetlands!

Name: _____

1. All wetlands are tidal wetlands. True or False? Explain.

2. Not all wetlands are alike. How can wetlands differ from one another?

3. Water levels in tidal wetlands shift back and forth. Why?

4. Why are tidal wetlands difficult environments for most plants?

5. What are some plants that can be found in tidal wetlands?

6. Tidal marshes are not all alike in terms of water. What makes them different?

7. Why is it important to protect tidal wetlands?

8. Why are we experiencing a loss of tidal wetlands today?

ANSWER KEY: Tidal Wetlands!

1. All wetlands are tidal wetlands. True or False? Explain.
   False. There are two general types of wetlands: tidal, or coastal, wetlands and non-tidal, or inland, wetlands.

2. Not all wetlands are alike. How can wetlands differ from one another?
   Wetlands vary depending on differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors, such as degree of human disturbance.

3. 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.

4. Why are tidal wetlands difficult environments for most plants?
   The varying salinities and fluctuating water levels create a difficult environment for most plants to grow.

5. What are some plants that can be found in tidal wetlands?
   Some plants have adapted to the tidal wetland environment. Tidal wetlands are predominantly covered by the tall form of Smooth Cordgrass (*Spartina alterniflora*). The saline marsh is covered by water only sporadically and is characterized by Short Smooth Cordgrass, Spike Grass and Saltmeadow Rush (*Juncus gerardii*).

6. Tidal marshes are not all alike in terms of water. What makes them different?
   Some tidal marshes are freshwater marshes, some are somewhat salty, and some are more salty.

7. Why is it important to protect tidal wetlands?

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

8. Why are we experiencing a loss of tidal wetlands today?

   Coastal development and pollution threaten tidal wetlands. Fortunately, most states have enacted special laws to protect tidal marshes, but diligence is needed to assure that these protective measures are actively enforced.