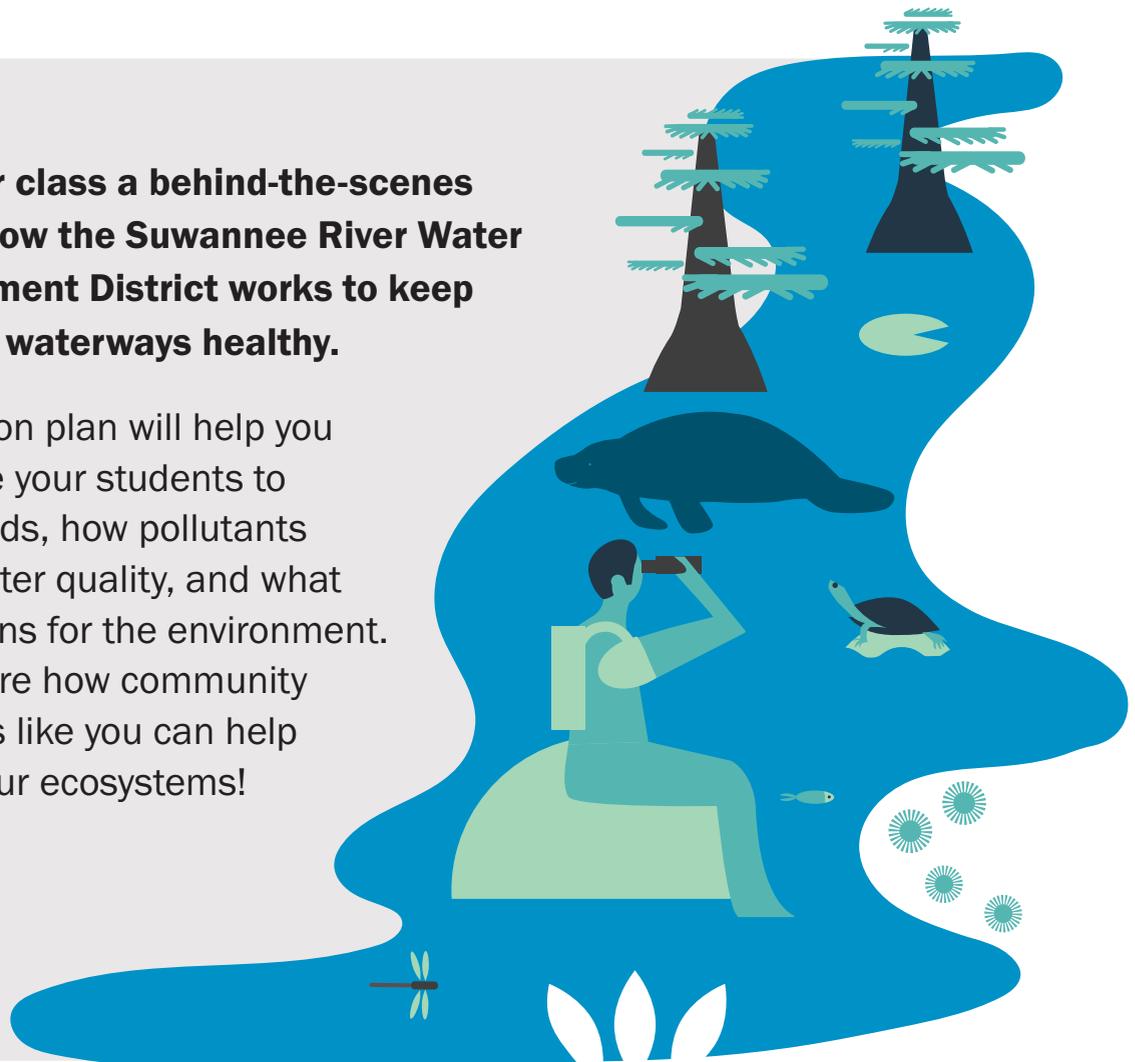SUWANNEE RIVER WATER MANAGEMENT DISTRICT

Wait, What's a Watershed?

Protecting Our Waters From Pollution

Give your class a behind-the-scenes look at how the Suwannee River Water Management District works to keep Florida's waterways healthy.

This lesson plan will help you introduce your students to watersheds, how pollutants affect water quality, and what that means for the environment. Plus, share how community members like you can help protect our ecosystems!
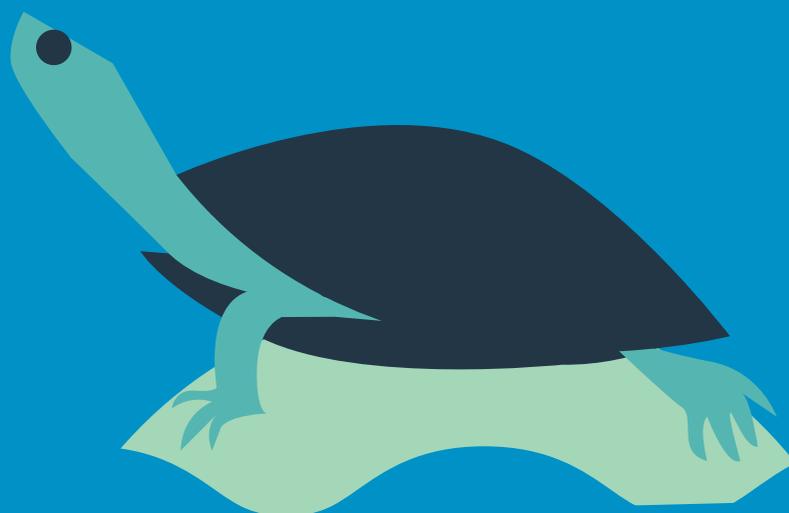
LESSON PLANS   **GRADES 1-8**

Click to Jump to the sections below

> **Lesson Plan – Grades 6-8**

> **Lesson Plan – Grades 3-5**
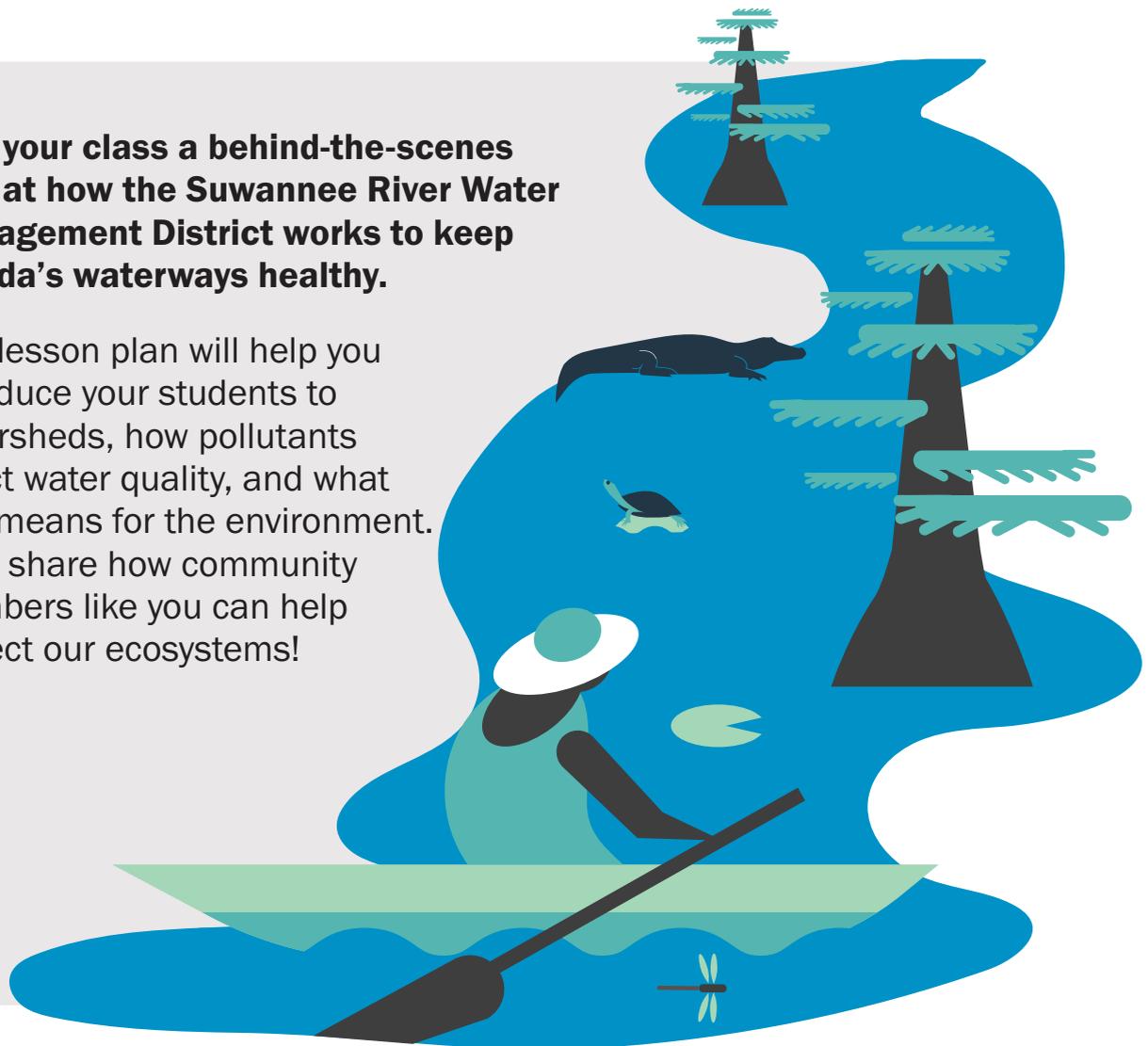
> **Lesson Plan – Grades 1-2**

Wait, What's a Watershed?

Protecting Our Waters From Pollution

Give your class a behind-the-scenes look at how the Suwannee River Water Management District works to keep Florida's waterways healthy.

This lesson plan will help you introduce your students to watersheds, how pollutants affect water quality, and what that means for the environment. Plus, share how community members like you can help protect our ecosystems!

LESSON PLAN: GRADES 6-8

1 **Key Ideas / Purpose**

- Students will be able to explain what a watershed is and how human actions affect the health of a watershed and the quality of water within the watershed.

2 **Objectives**

- Students will be able to explain the function of a watershed and describe ways that a water body can be contaminated. Water quality factors can impact the health of an entire ecosystem.

  Using real-world applications and hands-on activities, students will learn how to prevent water contamination and discuss human impacts on our environment.
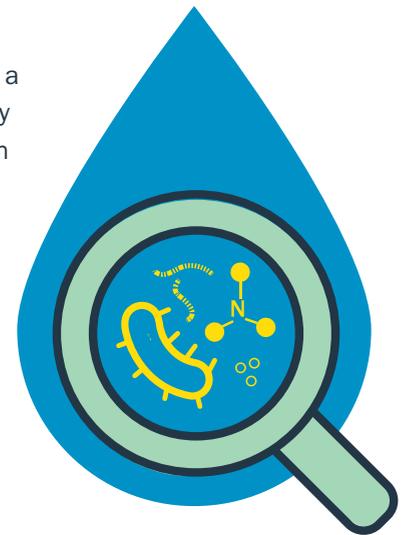
3 **Vocabulary**

1. contaminant
2. erosion
3. fertilizer
4. pesticides
5. photosynthesis
6. pollution
7. runoff
8. sedimentation
9. waste
10. watershed
11. wetland
12. evaporation
13. condensation
14. infiltration
15. evapotranspiration

4 Engage

Use these questions for either a bell-ringer or a Think-Pair-Share:

- How does water get to your home?
- How can a river or lake become polluted?
- What is pollution?
- What are some types of pollution?

5 Explore/ Explain

> Have students take the **"Pre-test of Florida Watersheds"** prior to watching the "Coastal Watersheds Model" video.

> Have students watch the "**Coastal Watersheds Model**" video (and complete the "**Coastal Watersheds Model Worksheet**" as they watch).

Reference the Answer Key for guided notes and discussion points.

6 Extend

> See the Activity Guide "**Create Your Own Watershed**" for directions. Students will test their model with a spray bottle filled with water.

> Perform a "**Station Learning Lab**" where students rotate to four different stations to gain more hands-on experience learning about water resources, photosynthesis and sedimentation, and positive and negative environmental impact (from human behavior).

7 Evaluate

> Students will take the post-test (same as pre-test) after watching the video and completing the activity.

8 Extensions

Learn more about what the Suwannee River Water Management District is doing to keep our rivers and springs clean.

- Visit the Suwannee River Water Management District website here.
    - ♦ Read our Water Quality 101 page here.
    - ♦ Learn more about what springs are, how we're protecting them, and how you can enjoy them here.
- Watch our "Who We Are" video here.
- Watch our "My Home, My Springs" video here.

SUNSHINE STATE STANDARDS

SC.6.N.1.1, SC.7.N.1.1, SC.8.N.1.1

Define a problem from the middle school 6–8 curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types (such as systematic observations or experiments), identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

SC.7.L.17.3

Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.
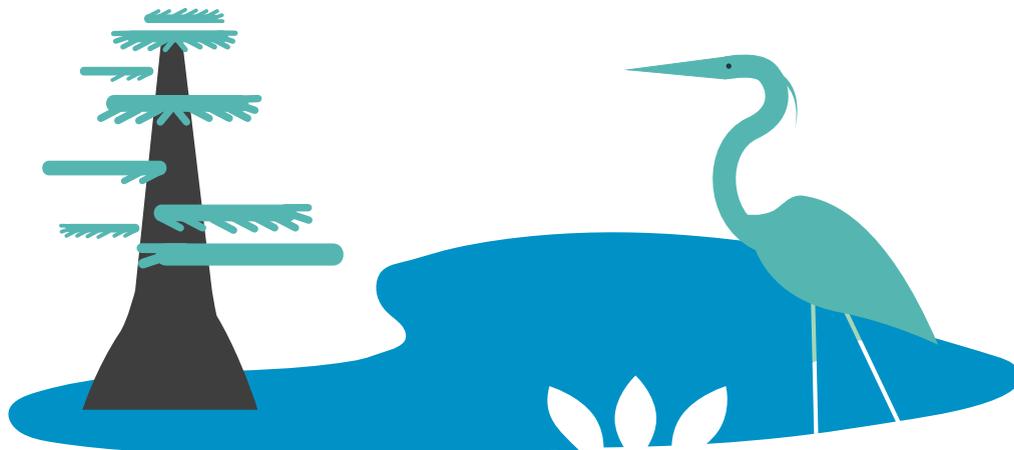
Wait, What's a Watershed?

Activities & Resources

Name_____ Date_____

True or False?
Pre- and Post-test of Florida Watersheds

	Question	T	F
1	Excess fertilizer is not a type of pollution because it helps plants grow and stay green.		
2	A wetland causes flooding and can destroy habitats.		
3	Houses, businesses, farms, and cars are all things that can be found in a watershed.		
4	A watershed is the area of land where water drains from the highest point to the lowest point to reach a water body.		
5	Water flows downhill.		
6	Berms and containment units are man-made structures that make watersheds worse.		
7	Picking up pet waste does not make a difference when it comes to preventing pollution in our waterways.		
8	Contaminated stormwater runoff does not affect the habitat for fish or oysters.		
9	One thing you can do to help keep our waterways clean is to plant Florida-friendly landscaping.		
10	Wetlands are natural environmental controls because they are habitats that can take in the pollutants and filter them out for us.		

True or False?
Pre- and Post-test of Florida Watersheds

ANSWER KEY

Question		T	F
1	Excess fertilizer is not a type of pollution because it helps plants grow and stay green.		F
2	A wetland causes flooding and can destroy habitats.		F
3	Houses, businesses, farms, and cars are all things that can be found in a watershed.	T	
4	A watershed is the area of land where water drains from the highest point to the lowest point to reach a water body.	T	
5	Water flows downhill.	T	
6	Berms and containment units are man-made structures that make watersheds worse.		F
7	Picking up pet waste does not make a difference when it comes to preventing pollution in our waterways.		F
8	Contaminated stormwater runoff does not affect the habitat for fish or oysters.		F
9	One thing you can do to help keep our waterways clean is to plant Florida-friendly landscaping.	T	
10	Wetlands are natural environmental controls because they are habitats that can take in the pollutants and filter them out for us.	T	

SUWANNEE RIVER WATER MANAGEMENT DISTRICT

Name_____ Date_____

Coastal Watersheds
Model Worksheet

1. **What does a coastal watershed model demonstrate?**

   _____

2. **What are some man-made structures you might find in a watershed?**

   _____

3. **List some of the sediments and/or contaminants that get washed off the land by rain and into our waterways.**

   _____

4. **Water flows_____ .**

5. **What are some natural, living things that can be affected by contaminated stormwater runoff?**

   _____

6. **After seeing how contaminated water can get, what recreational activities in bodies of water might you be hesitant to try?**

   _____

7. **What are two natural things that people can add to watersheds to make things better? How do these things help?**
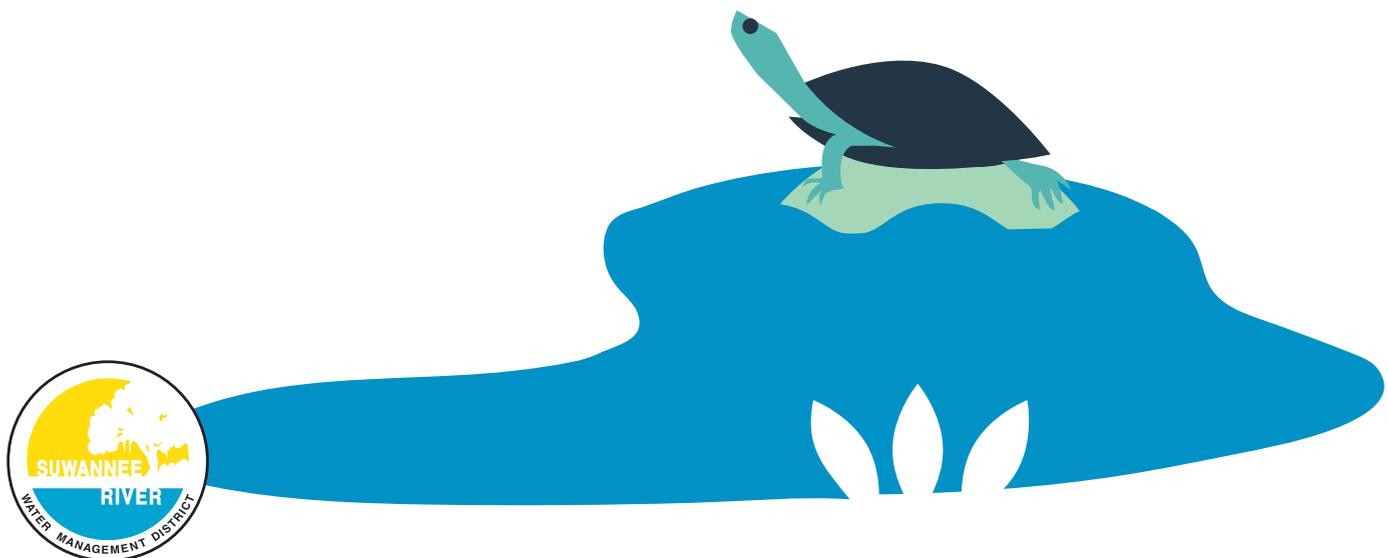
   _____

   _____

   _____

Worksheet *Continued*
Coastal Watersheds Model

8. What are two man-made things that people can add to watersheds to make things better? How do these things help?

_____

_____

_____

9. What are some simple things you can do in your watershed to make sure our waterways stay clean?

_____

_____

_____

_____

_____

_____

_____

Coastal Watersheds

1. **What does a coastal watershed model demonstrate?**
   It demonstrates how water falls on our land and, eventually, out into our oceans.

2. **What are some man-made structures you might find in a watershed?**
   Houses, businesses, farms, cars, machinery/equipment.

3. **List some of the sediments and/or contaminants that get washed off the land by rain and into our waterways.**
   Fertilizer, pesticides, animal waste, oil, litter/debris/trash, bacteria, metals.

4. **Water flows** Downhill.

5. **What are some natural, living things that can be affected by contaminated stormwater runoff?**
   Coral reef, oyster beds, fisheries, invertebrates, any aquatic organism with gills, etc.

6. **What recreational activities might you think twice about after seeing how contaminated the water can get from the watershed demonstration?**
   Playing or hunting for sharks' teeth in creeks, fishing, swimming in a lake or at the beach, drinking water from a stream.

7. **What are two natural things that people can add to watersheds to make things better? How do these things help?**
   People can plant native vegetation and preserve and enhance natural wetlands. Wetlands act as natural filters to remove contaminants and trap sediment. They also help reduce the impacts of flooding by acting as a sponge to absorb excess water.

8. **What are two man-made things that people can add to watersheds to make things better? How do these things help?**
   Berms and stormwater ponds. They trap sediment and contaminants so that they do not enter our natural waterways.

9. **What are some simple things you can do in your watershed to make sure our waterways stay clean?**
   Make sure that you always pick up after your pets so their waste doesn't get into our system. Excess nutrients from waste can lead to algal blooms and harm aquatic environments. You can also make sure to use Florida friendly plants in your garden because they are going to require less fertilizer and fewer pesticides, which means less pollution in our oceans! Florida friendly plants also create a habitat for pollinators that help keep Florida ecosystems healthy.
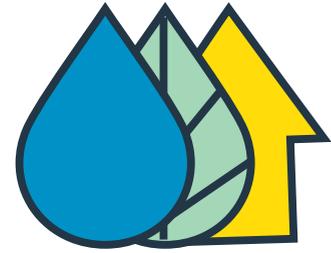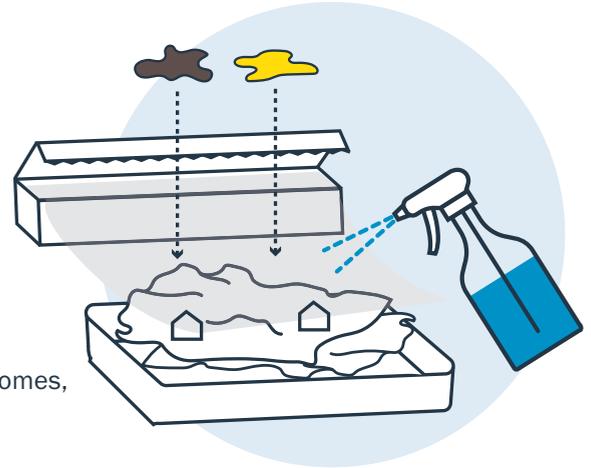
Activity

Create Your Own Watershed

Now that you know about watersheds, how about making one of your own? Depending on your flair for creativity, you can make your watershed a simple or complex system.

1 Learning Goals

> **To teach the function of watersheds**

> **To stimulate thought about the role watersheds play in the world**

2 Materials Needed

○ large aluminum cake pan

○ several pieces of crumpled paper

○ large sheet of aluminum foil or plastic wrap

○ variety of colored powders (cocoa, fruit drinks, etc.)

○ clear water

○ spray bottle

○ small model pieces to represent homes, trees, cars, farm animals, etc.

3 Activity

1. To set up the activity, crumple several pieces of newspaper or other paper. Place paper in cake pan to represent different elevation levels of land. Cover the paper with aluminum foil or plastic wrap. Position small model pieces as desired.

2. Use a spray bottle to spray clear water at the highest elevation. Observe results.

3. Add small amounts of colored powders to various places to represent different types of pollutants. For instance, cocoa powder may represent soil erosion, green fruit drink mix powder may represent fertilizer, etc.

4. Again, use the spray bottle to spray water at the highest elevation. Observe results.

4 Discussion

1. What happened the first time you sprayed clear water in your watershed model?

2. What happened to the pollutants when you sprayed water again?

3. What could be done to reduce the amount of pollutants affecting your watershed?

4. How does your watershed compare with watershed models made by other classmates?

Materials & Lab Set Up
Station Learning Lab

1   Materials Needed

○ cardstock or laminate

○ two aluminum pans/trays

○ rocks

○ two water bottles

○ colored powders (dirt, cocoa, pudding, fruit drinks, etc.)

○ water

2   Before Conducting the Lab

Print and cut out the instructions for each station and pictures provided. Reinforce the cutouts with cardstock or laminate. Make duplicate stations if you prefer smaller groups of students.

3   Lab Set Up

Set up stations according to the following directions. Student instructions are provided to place at each station.

Optional items to represent the outdoors (green outdoor carpet for grass, animal figurines, etc.) could be added to enhance visual appeal.

Station 1:
Two trays should be set up as instructed here. Tape the population picture provided to both trays on the front exterior of the trays.

1. Fill Tray #1 about halfway with rocks. Then add water to come up about one inch from bottom of tray.

2. Tray #2 will be arranged the same way, but add enough water to cover the rocks.

Station 2:
Place two bottles of water at the station and label Bottle #1 and Bottle #2.

1. Bottle #1 should be clean water from the tap.

2. Bottle #2 should be dirty water. Add dirt, cocoa, pudding, fruit drinks, etc.

Station 3 + Station 4:
Only student instructions are needed.

4   Directions

1. Divide students into four groups. If you made duplicate stations, divide students into eight groups.

2. Model each station briefly and explain student expectations at each station.

3. Rotate groups from station to station clockwise until each group has completed all stations. **Stations are designed to be approximately five minutes in length.** A timer is helpful for students.

Learning Lab: Station 1
Water Resources

Tray #1 has limited water resources as a result of a drought. Fertilized lawns have also been overwatered.

Tray #2 has a healthy water supply.

1. Compare the trays. Use complete sentences to compare what you see and how you think the amount of water resources available will affect the population dependent upon it.

_____

_____

_____

_____

_____

_____

2. Contrast the trays. Describe the impact of the population on the resources available. Use the following words in your answer: *population, limited, runoff, pollution* and *watershed.*

_____

_____

_____

_____

_____

_____

Discuss everyday actions that you and your families can take to conserve water. Turn off the tap when you brush your teeth, take a shorter shower, check for leaky faucets or pipes, avoid watering plants during the heat of the day, etc.

Station 1

Population Cut-Out

Learning Lab: Station 2
Photosynthesis and Sedimentation

Water bottle #1 represents good quality water while water bottle #2 represents water affected by stormwater runoff and sedimentation. Answer the following questions in complete sentences:

3. Plants need sunlight for photosynthesis to occur. Which water sample do you think would hinder the process of photosynthesis? Why?

_____

_____

_____

_____

_____

_____

4. How important is water quality? Why?

_____

_____

_____

_____

_____

_____

Learning Lab: Station 3
Environmental Costs

5. Reflect on the two pictures provided. Using complete sentences, explain what negative impacts the following situation causes on the surrounding water resources and population.

Situation: Clean water in springs vs litter in and around a body of water.

VS

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

Learning Lab: Station **4**

What will you do?

Answer the following questions in complete sentences:

6. Name two human actions that are harmful to water quality. _____

_____

_____

_____

_____

_____

7. Name two actions YOU can do in and around your home to help protect water quality.

_____

_____

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_____

_____

_____

Station Learning Lab

Station 1 — Water Resources

Tray #1 has limited water resources as a result of a drought. Fertilized lawns have also been overwatered.

1. **Compare the trays. Use complete sentences to compare what you see and how you think the amount of water resources available will affect the population dependent upon it.**

   Tray #1 has lower water levels indicating that the population uses more water. Tray #2 has more water available indicating the population conserves water resources.

2. **Contrast the trays. Describe the impact of the population on the resources available. Use the following words in your answer: population, limited, runoff, pollution and watershed.**

   The population of tray #1 has a limited supply of water in the watershed possibly caused by the population's overuse of water. Pollution from stormwater runoff could also contribute to the water supply and quality of water.

Station 2 — Photosynthesis and Sedimentation

Water bottle #1 represents good quality water, while water bottle #2 represents water affected by stormwater runoff and sedimentation. Answer the following questions in complete sentences:

3. **Plants need sunlight for photosynthesis to occur. Which water sample do you think would hinder the process of photosynthesis? Why?**

   Bottle #2 would hinder photosynthesis from occurring because the sediments floating in the water and the poor water quality would prevent light from reaching aquatic plants under the surface. Plants need sunlight for photosynthesis to occur.

4. **How important is water quality? Why?**

   Water quality is important because there is a limited supply of water on Earth. If humans don't protect the quality of water we have, there will be even less available to us and the ecosystems that depend on it.

Station 3 — Environmental Cost

Reflect on the two pictures provided. Using complete sentences, explain what negative impacts the following situation causes on the surrounding water resources and population:

5. Answers may include destroying aquatic habitat, killing fish and aquatic plants, and contaminating recreational or drinking water. Also, aesthetics (preference of living next to a clean lake vs. a contaminated one).

Coastal Watersheds

Station 4 — What will you do?

Answer the following questions in complete sentences:

6. Name two human actions that are harmful to water quality.

Possible answers include: littering, overfertilizing lawns, gas and oil spills from cars and boats, pet waste, wasting water.

7. Name two actions YOU can do in and around your home to protect water quality.

Pick up litter and pet waste, encourage family and friends to fix oil leaks, not overfertilize, etc.

SUWANNEE RIVER WATER MANAGEMENT DISTRICT

Protecting Our Waters from Pollution

Pollution, conservation, and healthy ecosystems are big concepts, but this lesson plan is here to help you get started!

Use this content to introduce your students to Florida's water systems and how things like fertilizers and pesticides can be harmful when people use them too much. Plus, give them an inside look at how groups like the Suwannee River Water Management District help keep our water clean and make sure there's enough for both people and nature to enjoy!
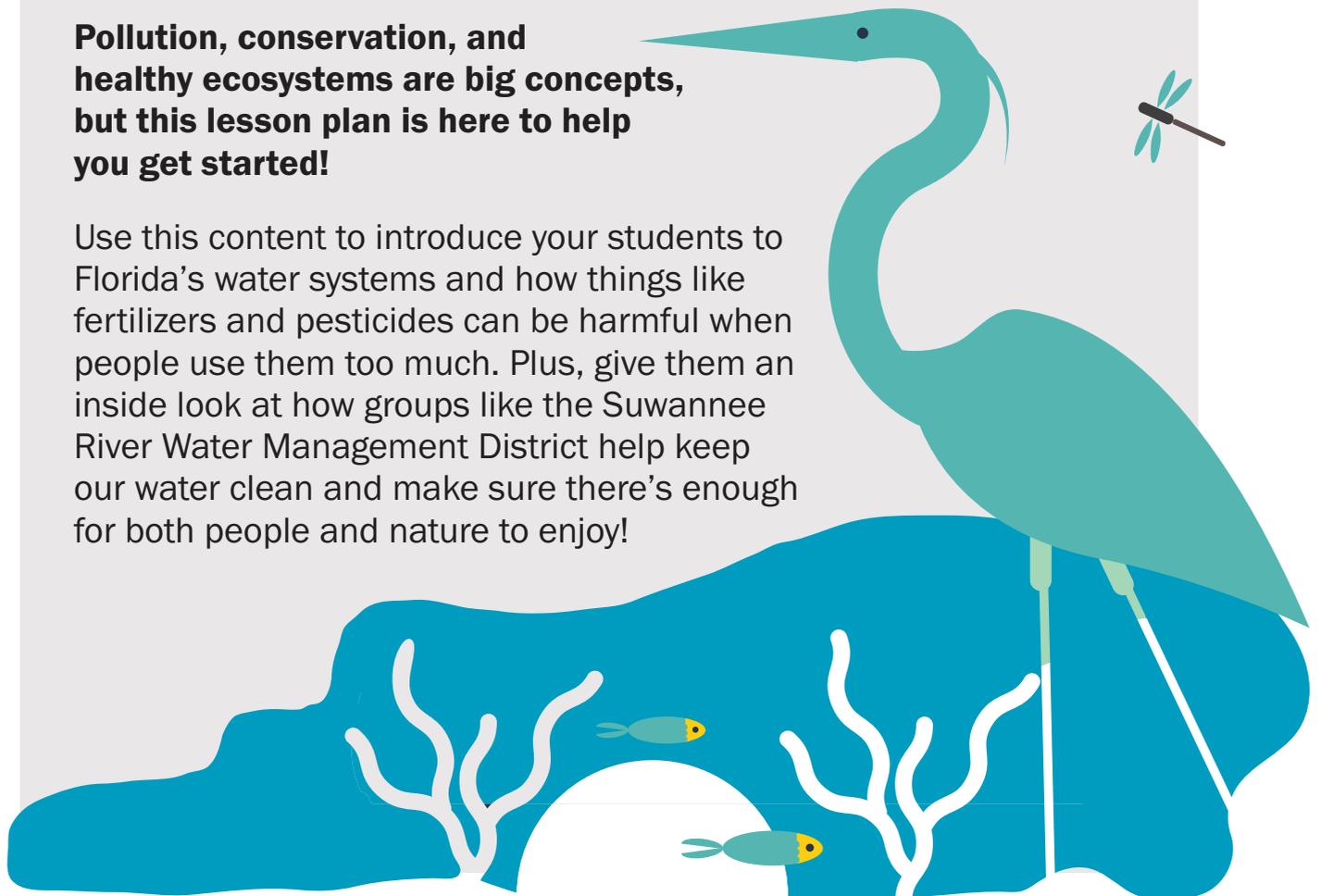
LESSON PLAN: GRADES 3-5

1 Key Ideas / Purpose

- Students will gain an overview of pollutants that impact our waterways and how individuals can reduce these impacts.

- Using a hands-on model to illustrate concepts, students will work with their teacher to understand watersheds and different forms of water pollution.

2 Objectives

- Visualize the connection of the words with our waterways.

- Understand the definition of pollution.

- Begin to understand how water pollution occurs and how to prevent it.

- Learn the difference between point and nonpoint pollution sources; learn ways to reduce both.
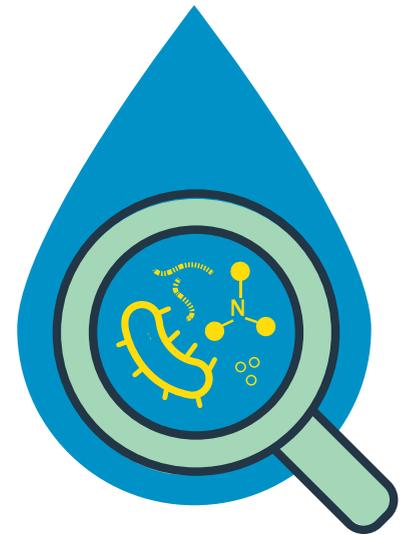
3 Vocabulary

1. condensation
2. contaminant
3. erosion
4. evaporation
5. evapotranspiration
6. fertilizer
7. infiltration
8. litter
9. model
10. nonpoint source pollution
11. oxygen
12. pesticide
13. point source pollution
14. storm drain
15. turbidity
16. watershed

4 Engage

Tell the students they are going to learn more about watersheds and water pollution. Ask them the following questions:

• When you hear the words "water pollution", describe what your mind sees: what colors, what objects, what motions?

• Is pollution something you can always see, smell, or touch?

• What is pollution?

• How does it affect our ecosystems?

5 Explore/Explain

> Distribute the "**Watersheds and Water Pollution Student Vocabulary Worksheet**" and have students complete the "What you already know about this word" column for each vocabulary word.

> Watch the video **"Watersheds: Our Neighborhoods and Beyond"** video and instruct students to write down what they hear and learn about the vocabulary words in the "What new things/ideas you found out about this word" column. Students should write in their own words as this will help them learn how to use these words. Warn them that the video goes fast, so they need to pay close attention. Pause the video every few minutes to allow students time to write.

6 Extend

> See the Activity Guide "**Create Your Own Watershed**" for directions. Students will test their model with a spray bottle filled with water.

7 Evaluate

> Students will complete the "**Watersheds Evaluation Worksheet**" after watching the video and completing the activity.

8 Extensions

Learn more about what the Suwannee River Water Management District is doing to keep our rivers and springs clean.

• Visit the Suwannee River Water Management District website here.

  ♦ Read our Water Quality 101 page here.

  ♦ Learn more about what springs are, how we're protecting them, and how you can enjoy them here.

• Watch our "Who We Are" video here.

• Watch our "My Home, My Springs" video here.

9 SUNSHINE STATE STANDARDS

SC.3.N.3.2, SC.4.N.3.2
Recognize that scientists use models to help understand and explain how things work.

SC.3.N.3.3, SC 4.N.3.3
Recognize that all models are approximations of natural phenomena; as such, they do not perfectly account for all observations.

SC.3.N.3.2, SC.4.N.3.1
Explain that models can be three-dimensional, two-dimensional, an explanation in your mind, or a computer model.

SC.3.N.3.2, SC.4.E.6.6
Identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).

SC.4.P.8.2
Identify properties and common uses of water in each of its states.

SC.5.N.1.1
Define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations, experiments requiring the identification of variables, collecting and organizing data, interpreting data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
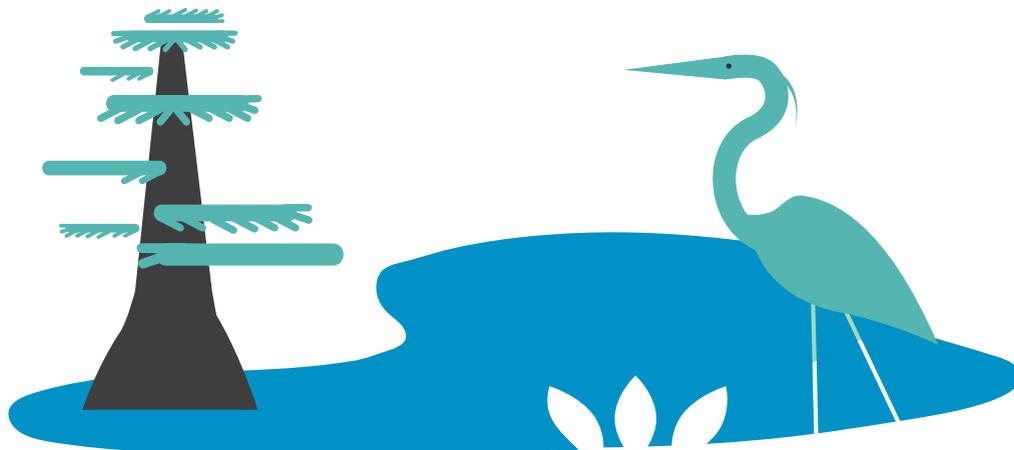
Protecting Our Waters from Pollution

Activities & Resources

Watersheds and Water Pollution
Student Vocabulary Worksheet

Vocabulary word	What you already know about this word	What new things/ideas you found out about this word
Watershed		
Point source pollution		
Nonpoint source pollution		
Storm Drain		
Pesticide		
Fertilizer		
Contaminant		
Erosion		
Litter		
Turbidity		
Oxygen		
Model		

Watersheds and Water Pollution
Student Vocabulary Worksheet
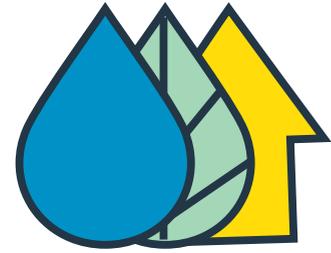
ANSWER KEY

Vocabulary word	What new things/ideas you found out about this word
Watershed	an area of land where all water drains from the highest to the lowest areas
Point source pollution	point source pollution is water pollution that comes from one single place, like a pipe
Nonpoint source pollution	nonpoint source pollution comes from other places like our pets, lawn or farm chemicals and other contaminants
Storm Drain	a drain built to carry away excess water in times of heavy rain
Pesticide	chemicals that keep bugs from destroying plants
Fertilizer	nutrients that help plants grow
Contaminant	a polluting or poisonous substance that makes something impure
Erosion	when wind and water carry large amounts of soil into the waterways
Litter	trash, such as paper, cans, and bottles, that are left lying in an open or public place
Turbidity	the cloudiness of water
Oxygen	life-supporting component of the air and water; what all humans, pets, plants, and other animals need to survive
Model	a representation of a person or thing, typically on a smaller scale than the original. Models can be three-dimensional, two-dimensional, an explanation in your mind, or a computer model.

Subjects:

- ♦ **Science**
- ♦ **Social Studies**
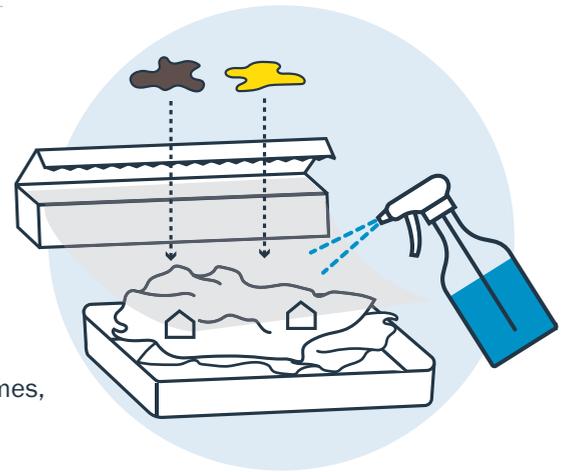
Activity

Create Your Own Watershed

Now that you know about watersheds, how about making one of your own? Depending on your flair for creativity, you can make your watershed a simple or complex system.

1 Learning Goals

> **To teach the function of watersheds**

> **To stimulate thought about the role watersheds play in the world**

2 Materials Needed

- ○ large aluminum cake pan
- ○ several pieces of crumpled paper
- ○ large sheet of aluminum foil or plastic wrap
- ○ variety of colored powders (cocoa, fruit drinks, etc.)
- ○ clear water
- ○ spray bottle
- ○ small model pieces to represent homes, trees, cars, farm animals, etc.

3 Activity

1. To set up the activity, crumple several pieces of newspaper or other paper. Place paper in cake pan to represent different elevation levels of land. Cover the paper with aluminum foil or plastic wrap. Position small model pieces as desired.

2. Use a spray bottle to spray clear water at the highest elevation. Observe results.

3. Add small amounts of colored powders to various places to represent different types of pollutants. For instance, cocoa powder may represent soil erosion, green fruit drink mix powder may represent fertilizer, etc.

4. Again, use the spray bottle to spray water at the highest elevation. Observe results.

4 Discussion

1. What happened the first time you sprayed clear water in your watershed model?

2. What happened to the pollutants when you sprayed water again?

3. What could be done to reduce the amount of pollutants affecting your watershed?

4. How does your watershed compare with watershed models made by other classmates?

Watersheds
Evaluation Worksheet

1. **What is a watershed?**

   _____

2. **Who lives in a watershed?**

   _____

3. **Give an example of a watershed in your area.**

   _____

   _____

4. **What types of pollution can you find in a watershed?**

   _____

   _____

5. **What are contaminants?**

   _____

   _____

6. **What is a model?**

   _____

   _____

   _____

   _____

Watersheds Evaluation Worksheet
Continued

7. **What carries soil into the storm drains?**

   _____

   _____

8. **What is the purpose of fertilizer?**

   _____

   _____

9. **What is point source and nonpoint source pollution?**

   _____

   _____

10. **Can you find the name of the watershed in which your school is located?**

   _____

   _____

Watersheds Evaluation Worksheet

1. **What is a watershed?**
   An area of land where all water drains from the highest to the lowest areas.

2. **Who lives in a watershed?**
   Everyone!

3. **Give an example of a watershed in your area.**
   Suwannee River, Ichetucknee Springs, Falling Creek.

4. **What types of pollution can you find in a watershed?**
   Fertilizer, pesticides, oil from cars and tractors, grass clippings, pet/animal waste, trash/litter.

5. **What are contaminants?**
   Polluting or poisonous substances that make soil or water impure.

6. **What is a model?**
   A three-dimensional, two-dimensional, or computer-based representation of a person or thing, typically on a smaller scale than the original.

7. **What carries soil into the storm drains?**
   Rain and wind.

8. **What is the purpose of fertilizer?**
   It gives nutrients to plants to help them grow.

9. **What is point source and nonpoint source pollution?**
   - point source pollution is water pollution that comes from one single place, like a pipe
   - nonpoint source pollution comes from other places like our pets, lawn or farm chemicals and other contaminants

10. **Can you find the name of the watershed in which your school is located?**
    *This answer will vary depending on the teacher/school location.

SUWANNEE RIVER WATER MANAGEMENT DISTRICT

The Story of Frannie The Fish

Frannie loves to tell her story!
Follow the instructions below to make Frannie's story come to life! Fish, like Frannie, need cool, clear water to live in. One sunny, summer day, Frannie decided to go on an adventure!
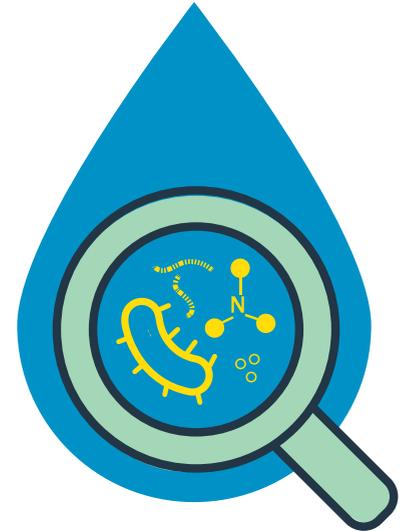
Learn about water pollution and how it can affect a clear stream and eventually make it unhealthy for wildlife such as Frannie. The story begins on a day when Frannie left her shady, cool pool and headed downstream.

LESSON PLAN: GRADES 1-2

1 Topics Covered

- Surface water
- Wildlife
- Water quality
- Contamination
- Pollution prevention

2 Objectives

Students will:

- Learn about fish habitat, water quality, and how pollution can affect the health of fish and other wildlife.
- Learn ways they can help reduce potential contamination risks.

3 Vocabulary

1. contaminant
2. sediment
3. manure or pet waste
4. fertilizer
5. litter
6. motor oil
7. pesticide
8. leaking storage tank
9. industrial/construction waste

4 Items Needed

- **Frannie:** a fishing lure - one that looks like a fish, with hooks removed, preferably a weighted or sinking lure that is colorful. Frannie is on a fishing line suspended in a gallon jug or fish bowl of clear water.

- Gallon jug, fish bowl, or small fish aquarium

- Gravel for the bottom of the bowl/aquarium (optional)

- Fishing line

- Pencil or ruler placed on the top of the jar to hold Frannie suspended halfway in the jar, underwater

- 8 small containers to hold contaminants. See list below of items needed for the contaminants.
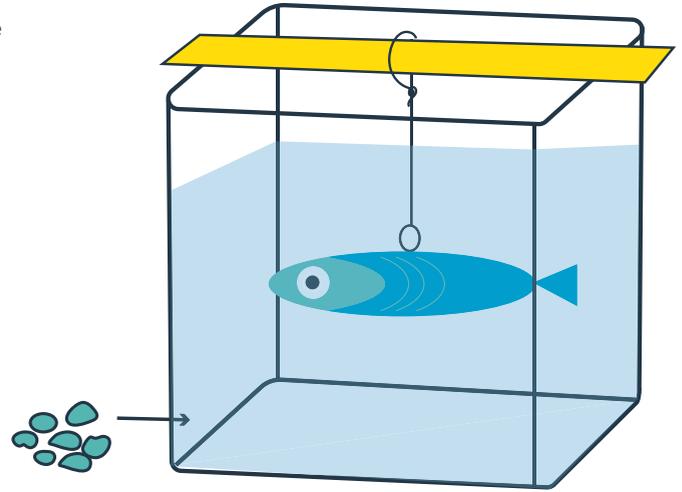
5 Items Needed For Contaminants

> Sediment - Potting soil, sand, or gravel mix

> Manure/Pet Waste - Raisins, dry beans, or chocolate-puff cereal

> Fertilizer - Green powdered drink mix

> Litter - Torn paper and plastic bits

> Motor Oil – Vegetable oil or baby oil

> Pesticide - Baking soda or salt mixed with instant coffee or tea

> Leaking Storage Tank - Film canister or similar small container with a cracked/open lid with red/blue food dye and water

> Industrial/Construction Waste - Liquid dish soap, hand soap, or lotion, and nails or screws.

6 Engage

> Introduce Frannie. Use as much humor and animation as possible. Make Frannie the same age as your audience and get the students to appreciate how bored Frannie is stuck up in the headwaters of a clean, cold stream. Explain how she wants to go on an "adventure." Ask students if Frannie should go exploring, etc. Make her into a lively, adventurous fish. Talk about Frannie's home. Use a local river or stream as Frannie's home to make the story more real to the students. The students will love Frannie and be motivated to keep her home clean!

> **Sample Intro:** *"This is my friend Frannie. Can everyone say hi to Frannie? Today, I am going to help tell Frannie's story. She doesn't talk very loudly and sometimes the words are hard to understand through the water. Frannie is 7 years old, and sometimes she gets bored in her home, the Suwannee River. Do you ever get bored and wish you could go someplace else? Well, Frannie thought she should go on an adventure. Let's go along with Frannie on her adventure."*

7 Explore/Explain

> (Teacher Reference: https://youtu.be/XSsXawXeXUA)

> Begin Frannie's Adventure! "Frannie leaves her shady, cool pool and heads downstream on her adventure."

1. "After a little while, Frannie notices that the sun is shining and the stream is no longer as cool and dark. She looks out of the water and sees that all the trees have been cut down to build houses and sediment (soil) from the banks is washing into the water."

Add first item to bowl - sediment: Ask a volunteer to sprinkle some sediment over the water and allow it to settle over Frannie.

Topics to discuss: Do you like to get sand in your gills...nose? Fish breathe through gills. The sandy grit from the soil can hurt fish gills. The sediment can also cover rocks where fish lay their eggs, making it difficult for new fish to hatch.

'Look out, Frannie!' (The students can repeat this every time something "bad" happens to Frannie.)

2. "After a while Frannie pokes her nose out of the water and do you know what she sees? Big black and brown animals coming down to visit her. Cows. As they walk into the water, they stir up mud and leave some smelly 'presents.'"

Add second item to bowl – manure (substitute for pet waste if you'd rather use dogs as an example): Ask a volunteer to pour in the raisins and let them sink.

Topics to discuss: Animal waste can be harmful to aquatic life. It uses up oxygen and releases pollutants (like nutrients, phosphorous, and ammonia) in the water. Fish like Frannie are not able to survive without enough oxygen and cannot survive with the added pollutants in the water.

'Look out, Frannie!'

3. "Frannie continues to swim downstream. She swims by a home with a very green yard. This homeowner did not read the instructions and applied too much fertilizer."

Add third item to bowl - fertilizer: Ask a volunteer to sprinkle green powdered drink mix into the bowl.

Topics to discuss: Did you know, fertilizers can wash off the grass from rain or watering and run off into the stream if too much is used? Fertilizer is food for plants. It is often given to plants so they can grow bigger and faster. Fertilizer will also make plants and algae in the water grow. Too much algae in the water can be bad for fish like Frannie.

'Look out, Frannie!'

4. Downstream Frannie passes a picnic site. Someone left their trash behind. Right then, a big gust of wind comes and pushes most of the trash right into the stream. Frannie doesn't like this mess at all! Frannie tries to push the litter out of the stream, but she can't get it all with her little flippers."

Add fourth item to bowl - litter: Ask a volunteer to add the litter into the bowl with Frannie.

Topics to discuss: What is a more responsible action you would do instead of leaving trash behind?

'Look out, Frannie!'

5. "She continues to swim downstream – determined to continue her adventure. Frannie hears a lot of commotion up on the bank of the stream. She peeks out of the water and sees an overturned oil truck. Some of the oil from the truck has spilled into the stream!"

Add fifth item to bowl - oil: Ask a volunteer to pour in the vegetable oil.

Topics to discuss: Oil can harm wildlife like Frannie by coating her scales and clogging her gills, if this happens she would have trouble breathing. Oil can also coat Frannie's food.

'Look out, Frannie!'

6. "Frannie passes a leaky, rusty old barrel. An unknown substance is leaking out. An old factory dumped the tank into the river many years ago. But now the barrel is leaking."

Add sixth item to bowl - leaky storage tank: Ask a volunteer to add the small container with a cracked lid, filled with colored water to the bowl.

'Look out, Frannie!'

7. "Frannie swims as quickly as she can away from the leaky storage tank. Yuck! The land nearby has recently been sprayed for bugs. Some of the spray, called pesticides, has gotten into the stream."

Add seventh item to bowl - pesticide: Ask a volunteer to add the baking soda and instant tea mix.

Topics to discuss: Pesticides help protect our food from bugs, but if too much is applied it can kill the bugs that Frannie likes to snack on.

'Look out, Frannie!'

8. "Frannie keeps on swimming and almost runs into a big chunk of metal that is in the stream!"

Add eighth item to bowl – industrial/construction waste: Ask a volunteer to add the dish soap and nails.

'Look out, Frannie!'

"Frannie is exhausted from her wild day. She is ready to go back home to her cool, clear water!"

Topics to Discuss: Fish, especially Frannie and her other aquatic friends, like cool, clean water to live and play in. They like vegetation along the bank to shade the water and keep it cool. The cooler the water, the more oxygen for her to breathe. Plus, insects and leaves from vegetation fall into the water providing food for Frannie and her friends.

9. With a small fishing net, strainer or hands, invite the children to help "clean up" Frannie's home river by removing as much of the "pollution" as possible to keep her healthy and happy!

Topics to discuss: Pollution is easier to prevent than clean up, but cleaning up trash and pollution can help the environment and the animals that live there!

8 **Extend**

> Have students complete the coloring sheets (see next two pages).
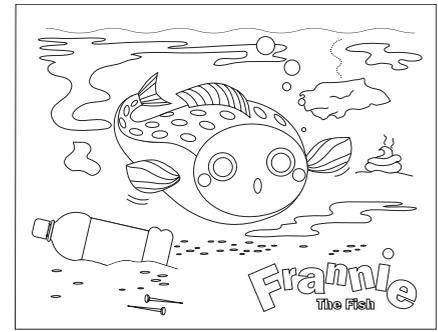
9 **Evaluate**

> Have a discussion with the students. "What can you do to help keep Frannie's home and all water clean?"

10 **Extensions**

Learn more about what the Suwannee River Water Management District is doing to keep our rivers and springs clean.

- Visit the Suwannee River Water Management District website here.
  - ♦ Read our Water Quality 101 page here.
  - ♦ Learn more about what springs are, how we're protecting them, and how you can enjoy them here.
- Watch our "Who We Are" video here.
- Watch our "My Home, My Springs" video here.

11 **SUNSHINE STATE STANDARDS**

SC.1.L.17.1
Through observation, recognize that all plants and animals, including humans, need the basic necessities of air, water, food, and space.

SC.2.L.17.1
Compare and contrast the basic needs that all living things, including humans, have for survival.

A. Plants and animals, including humans, interact with and depend upon each other and their environment to satisfy their basic needs.

B. Both human activities and natural events can have major impacts on the environment.

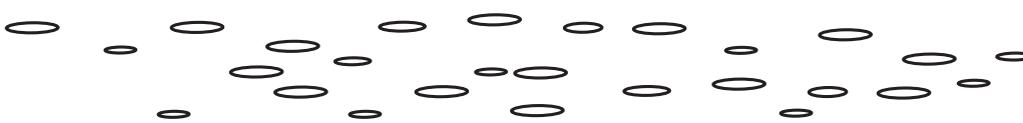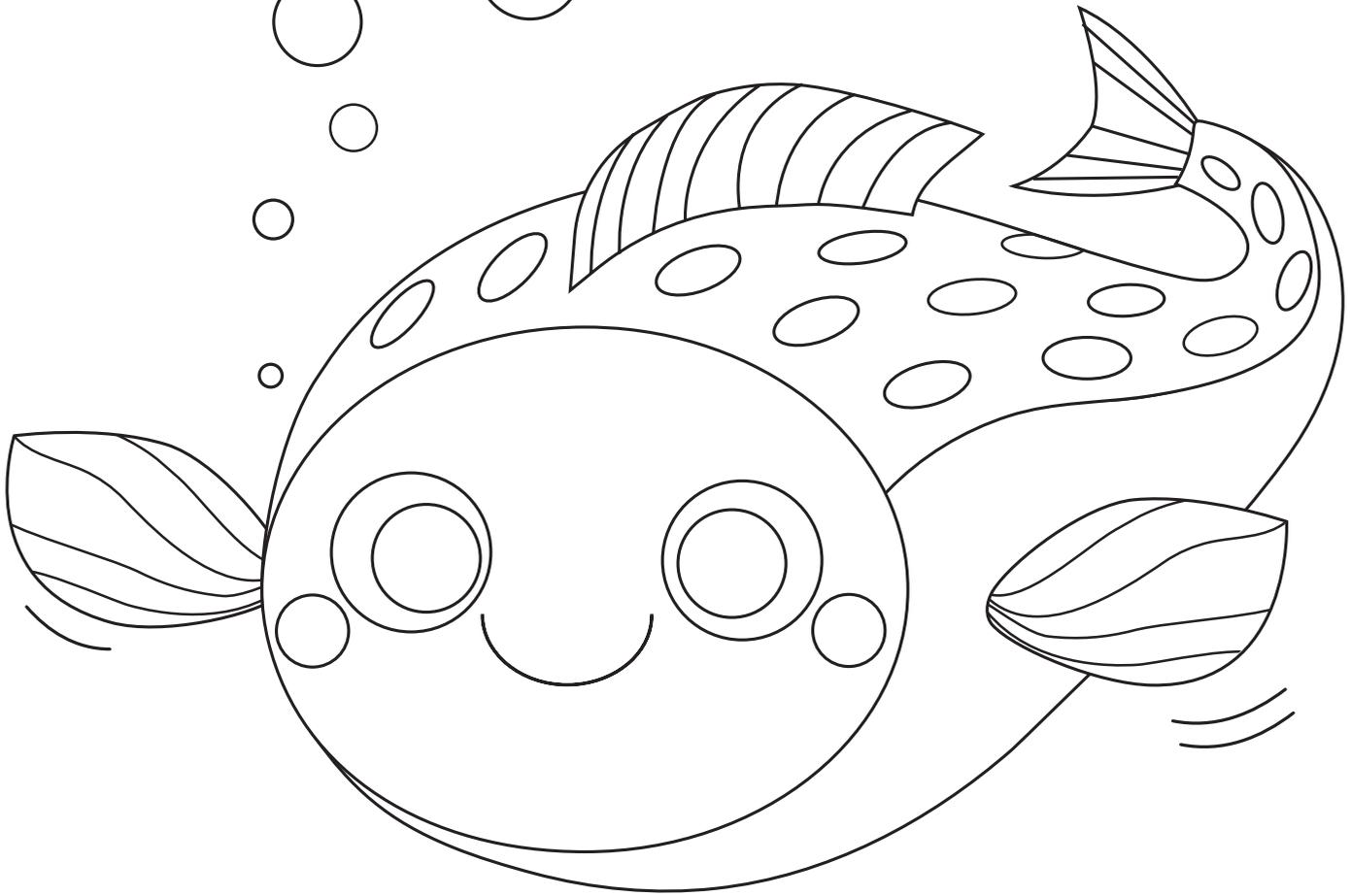**C.** Energy flows from the sun through producers to consumers.

SC.2.L.17.2
Recognize and explain that living things are found all over Earth, but each is only able to live in habitats that meet its basic needs.
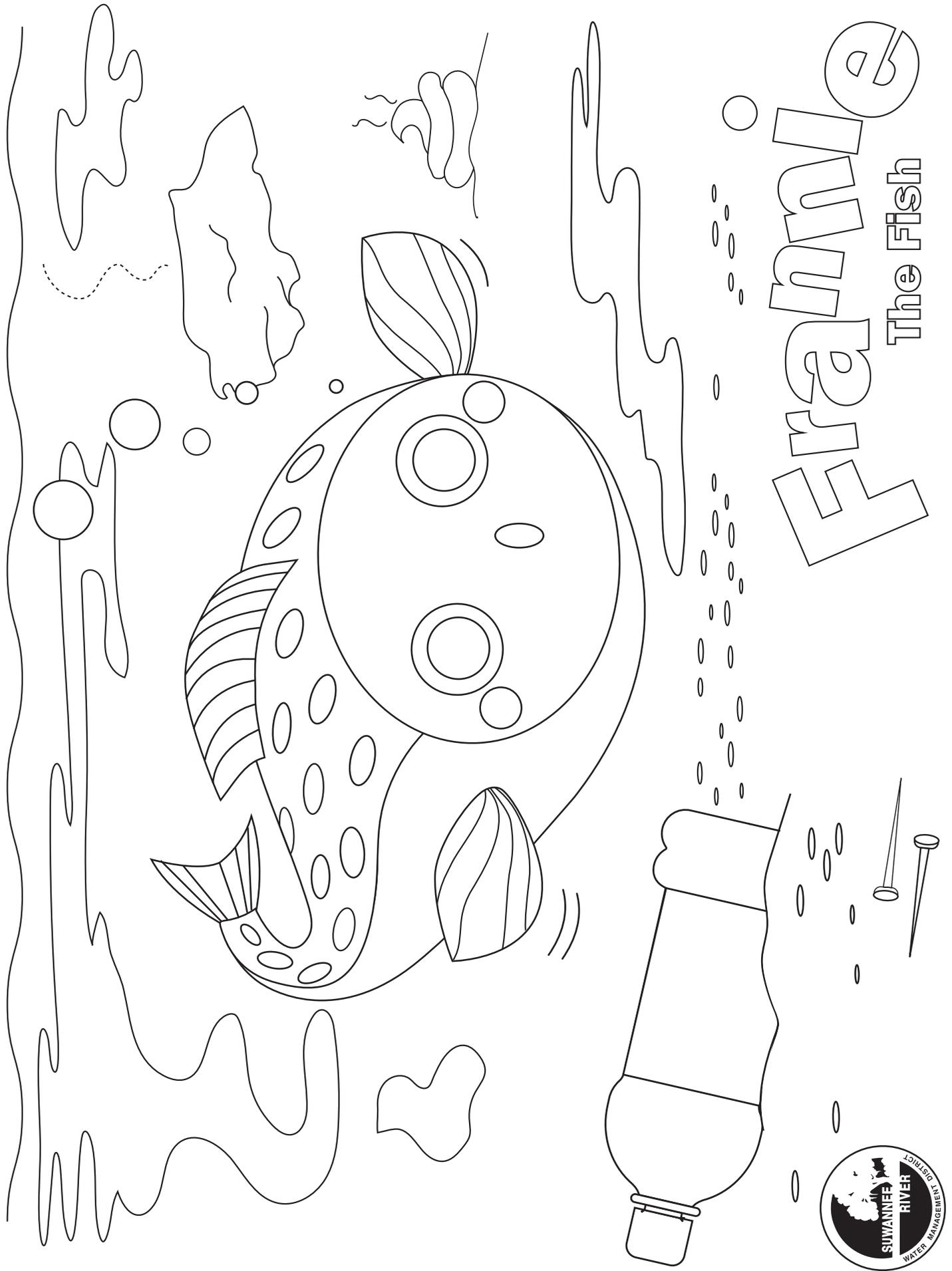
A. Plants and animals, including humans, interact with and depend upon each other and their environment to satisfy their basic needs.

B. Both human activities and natural events can have major impacts on the environment.

C. Energy flows from the sun through producers to consumers.

Frannie The Fish

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