St. Johns River Water Management District

VIDEO LESSON PLAN

www.sjrwmd.com/education/teacher/#lesson-plans

Watersheds: Our neighborhoods and beyond

Background:

The St. Johns River Water Management District covers 12,283 square miles, about 7.8 million acres, or 21 percent of Florida. The main water body in the District is the northerly flowing St. Johns River, from which the District gets its name. The St. Johns River is the longest river entirely in the state.

Watersheds are the areas of land that drain rainfall and water into a larger water body, in particular larger river basins. Not all rainfall ends up in the larger water bodies, some goes underground into the aquifer.

The St. Johns River is divided into three watersheds (also known as drainage basins). Because the river flows north, the upper basin is the area to the south that forms its marshy headwaters in Indian River and Brevard counties. The middle basin is the area in central Florida where the river widens, forming lakes Harney, Jesup, Monroe and George. The lower basin is the area in northeast Florida from Putnam County to the river's mouth in Duval County, where the river empties into the Atlantic Ocean. Major tributaries, or smaller streams and rivers that flow into the St. Johns River include the Wekiva River, the Econlockhatchee River and the Ocklawaha River.

Many human activities unintentionally add nitrogen and phosphorus or other pollutants to surface waters. Over many decades, urban development, farming, industry and man-made pollutants — such as partially treated sewage from our homes and businesses — have been pumped into waterways for disposal, causing a decline in the health of our rivers and streams. In some basin water bodies, the natural flow of water has been altered for roads, flood control, aesthetics, erosion control and water level maintenance. These alterations limit the ability of the waterways to naturally cleanse themselves.

The District, various agencies, other government entities and stakeholder groups are working together to reduce the pollution threats to Florida's waterways. Each individual can also help protect these waterways.

VIDEO LESSON PLAN • Watersheds: Our neighborhoods and beyond

Vocabulary words:

- contaminant
- fertilizer
- turbidity
- nonpoint source pollution
- pesticide
- storm drain
- erosion
- litter
- model
- oxygen
- point source pollution
- watershed

Pre-assessment:

Pass out copies of the student page. Instruct students to fill out all of the boxes in the column titled "What you already know about this word." 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.

Engage: (3–5 minutes)

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?

Explore/Explain: (20 minutes)

Watch the video "Watersheds: Our Neighborhoods and Beyond" and instruct students to write down what they hear and learn about the vocabulary words.

Next Generation 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.

Florida Standards

FLSS.ELA-Literacy.SL.4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

Extend:

- Make your own watershed — See the "Create a Paper Watershed" activity (in this packet). Check out https://youtu.be/XdcryWa-zoM to see an educator walk you through this activity.
- Visit websites for additional information:
  - The U.S. Environmental Protection Agency page on watersheds — "Healthy Watersheds Protection" https://www.epa.gov/hwp
  - U.S. Geological Survey page on watershed research — "Science in Your Watershed" https://water.usgs.gov/wsc/index.html

Evaluate/Post-assessment: (5 minutes)

Instruct students to choose three or four of the vocabulary words and write down all the new things they learned about the word.

Create a paper watershed

Materials

- Sheet of cardboard
- Plain white paper (notebook or copier paper sheets)
- Scotch tape
- Colored markers
- Small spray bottle with water

Procedure

1. **Take a sheet of paper and crumple it up into a wad.**
   The looser the wad, the better for this activity.

2. **Uncrumple the paper and set it on the sheet of cardboard.**
   Tape the edges of the paper onto the cardboard base leaving at least an inch of cardboard exposed around the perimeter.

3. **Select a dark-colored felt marker, other than blue, and gently shade the tops of the "hills" or "mountain" ridges and divides.**
   Carefully follow ridges as far as they go and to the edge of the tape if necessary.

4. **Select a blue marker and carefully draw where you think the rivers and lakes would be in their valleys.**
   It is easiest to start at the bottom of a valley and follow it uphill, or start from the side of a hill or mountain and pretend to be a drop of water slowly moving downhill.

5. **Take a spray bottle and simulate rain by misting the paper watershed while it is flat on a counter.**
   Observe the water seep downhill over and through the paper. You can make different effects by how wet you make the paper.

6. **Let the paper watersheds dry.**
   This may take 30 minutes or more.

Vocabulary words with definitions:

Vocabulary Word	What new things/ideas you learned about this word?
Contaminant	An impurity in air, soil or water that can cause harm to human health or the environment.
Erosion	The process of eroding or being eroded by wind, water or other natural agents.
Fertilizer	Adding a chemical substance to enrich the soil for better plant growth.
Litter	Trash, such as paper, cans and bottles, that is left lying in an open or public place.
Turbidity	Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles that are generally invisible to the naked eye, similar to smoke in air.
Model	A three-dimensional representation of a person or thing or of a proposed structure, typically on a smaller scale than the original.
Nonpoint source pollution	Refers to diffuse contamination (or pollution) of water or air that does not originate from a single discrete source. This type of pollution is often the cumulative effect of small amounts of contaminants gathered from a large area.
Oxygen	A colorless, odorless reactive gas and the life-supporting component of the air.
Pesticide	A chemical preparation for the control of specific organisms.
Point source pollution	Any contaminant that enters the environment from an easily identified and confined place. Examples include smokestacks, discharge pipes, and drainage ditches.
Storm drain	A drain built to carry away excess water in times of heavy rain. Also called storm sewer.
Watershed	An area or ridge of land that separates waters flowing to different rivers, basins or seas.

Answers to questions:

Directions: Answer the following questions using information you learned watching the video.

1. What is a watershed?

   A watershed is an area of land that drains or "sheds" water into a specific water body. Every body of water has a watershed. Watersheds drain rainfall and snowmelt into streams and rivers. These smaller bodies of water flow into larger ones, including lakes, bays and oceans.

2. Who lives in a watershed?

   Everyone lives in a watershed! The water in your backyard drains over or under the ground to a small creek or pond and is a part of its watershed.

3. How can you tell where the geographical boundaries of a watershed are?

   Watersheds are separated from each other by high points, such as hills or slopes.

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

   People can affect the environment's health when they pollute a watershed. Pollutants are materials that can harm plants, animals or humans. These materials may be discharged directly into a water body or washed off the land and into water bodies. Some can also seep into the soil and groundwater.

5. What are contaminants?

   Examples of contaminants or pollutants include soil from construction sites, waste from septic systems, fertilizers, pesticides and chemicals such as mercury, lead and arsenic. Road salt, soil and animal waste can also pollute if washed into a water body. Sources of pollution include atmospheric deposition (acid rain), runoff from paved roads and driveways, lawns, eroding streambanks, oil spills, landfills, industries and farm fields.

6. What is a model?

   A model is a three-dimensional representation of a person or thing or of a proposed structure, typically on a smaller scale than the original.

7. What carries soil into the storm drains?

   Rain and snow flow over streets, parking lots and roofs collecting soil, excess nutrients and pollutants before entering into a storm drain or water body. Because stormwater flows over hard surfaces directly into storm drain, there is no opportunity for soil and plants or a water treatment facility to filter out pollutants.

8. What is the purpose of fertilizer?

   Fertilizers supplement essential nutrients in the soil needed by all plants for quick growth.

9. What is point source and nonpoint source pollution?

   Point source pollution — any contaminant that enters the environment from an easily identified and confined place. Examples include smokestacks, discharge pipes and drainage ditches.

Nonpoint source pollution — refers to diffuse contamination (or pollution) of water or air that does not originate from a single discrete source. This type of pollution is often the cumulative effect of small amounts of contaminants gathered from a large area.

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

You can find your watershed by using SJRWMD_watersheds_map
https://www.sjrwmd.com/static/about/SJRWMD_watersheds_map.pdf

Or you can use the USGS tool to locate your watershed.

Science in Your Watershed: Locate Your Watershed By HUC - Mapping Interface (usgs.gov)
https://water.usgs.gov/wsc/map_index.html

WATERSHEDS: Our neighborhoods and beyond

Name: _____ Date: _____

Directions: Answer the following questions using information you learned watching the video.

1. What is a watershed?

_____

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2. Who lives in a watershed?

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3. How can you tell where the geographical boundaries of a watershed are?

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

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5. What are contaminants?

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6. What is a model?

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?
(See www.sjrwmd.com/maps.html)

WATERSHEDS: Our neighborhoods and beyond

Name: _____ Date: _____

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