

Reports

2019

Investigating the Functions of Wetlands

Chesapeake Bay National Estuarine Research Reserve in Virginia

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Watershed Activity Set

Grade Level: 2-5

Subject Area: Life Science

Virginia Standards of Learning:

2.1a,j,l; 2.5a; 2.7
3.1j,l; 3.6; 3.9; 3.10
4.1l; 4.5d,f; 4.6a; 4.9a
5.1j; 5.6c; 5.7f,g;

Objectives:

Students will:

- Construct a simple model of a watershed
- Understand the concept of a watershed
- Understand how human activities on land are connected to waterways

Summary:

This lesson plan contains 3 activities which can be used together or separately. The first activity demonstrates the overall concept of a watershed by having students build a simple model, the second connects watersheds with habitats and pollution - asking students to design their own watershed. The third module examines more closely human activities and their impacts on watersheds using an Enviroscape™ model.

Vocabulary: watershed, pollution, marine debris, water quality, sedimentation

Materials (broken down by activity):

A. Paper Watershed

- Pieces of white computer paper or scratch paper (enough for each student to have one)
- Washable markers (enough for each student to have one) *Important:* These markers **must** be washable. Other markers will not work
- Spray Bottle
- Water
- Map of the Chesapeake Bay watershed

B. Paper Plate Watershed

- Clay
- Pieces of white computer paper or scratch paper (enough for each student to have one)
- Aluminum foil (enough for each student to cover their plate with)

C. Enviroscape™

- Koolaid (various colors)
- Enviroscape model and associated pieces (available for loan by local Soil and Water Conservation Districts)
- Spray bottle
- Water
- Sponge
- Optional: Oats, vegetable oil

Procedure:

Introduction

1. Before beginning this demonstration ask the students if they know what a watershed is. A watershed is an area of land in which all of the water (rivers, streams, rain water, etc.) drains into a common body of water. Discuss the concept of a watershed with your students. You can use a map of the Chesapeake Bay watershed to refer to, and you can use the PowerPoint slide provided on the included thumb drive to help with the discussion.

Activities

A. The Paper Watershed (15 minutes)

1. Have each student crumple up their piece of paper into a tight ball. We suggest using paper that has already been used as you just need one clean side.
2. Students should undo the ball and slightly flatten the piece of paper. The paper should not be completely flat, and there should be some ridges and valleys across the crumpled paper. This piece of paper represents a watershed. The ridges on the paper represent mountains, and the valleys between ridges represent the streams and rivers that usually occur in the valleys between mountains.
3. Students should use the washable marker to color thick lines along the tops of the ridges – only along the tops of the ridges/mountains. The marker they are putting on their watershed can represent any type of material we might put on our land: fertilizer we use on our lawns and gardens, pet waste we do not pick up, farm animal waste, oil that leaks from our car, etc.
4. Use the spray bottle to “make it rain” within the students’ watershed. Spray a small amount of water over the watershed and watch the color from the marker lines run downhill and collect in the valleys of the watershed.

Wrap Up

Discuss with students what will happen to material that ran off the land and into the valleys. What is in those valleys between mountains? (*Rivers.*) Where do those rivers lead? (*Larger bodies of water.*) If we are to imagine that our paper watershed was the Chesapeake Bay watershed, where would all of that material that washed off the land eventually end up? (*The Chesapeake Bay.*)

B. The Paper Plate Watershed (15-20 minutes)

1. Have students take their paper, and crumple it into a paper ball, but tell them to make sure their ball is not too compact
2. Have students place their paper ball onto a paper plate, and cover the whole thing with a piece of aluminum foil. The foil should cover all edges of the plate, and the plate should have some contours of mountains and valleys from covering up the mound of paper underneath.
3. Give students clay to build objects that may be found on their watershed (buildings, cars, trees, etc). Give them time to design their own watershed, and as they are doing so, walk around and ask questions such as: What kind of habitats are in their watershed? Do people live in any of it? Encourage them to have a natural habitat, and a more man-made portion, or ask that they build one solution to pollution within their model.
4. Students can use cocoa powder or Kool-Aid and a little water to model a watershed similar to the paper watershed in section A.

Wrap up

Ask students to share about their watersheds. What sort of pollution issues do they think might impact their watersheds? How are their natural habitats impacted?

C. The Enviroscape™ (25 minutes)

1. Before class set up:
 - a. Set up the Enviroscape™, placing each of the houses, factories, etc. at the appropriate locations. Fill a few shaker containers with varying colors of Kool-aid in order to represent different pollution sources. Additionally, you may want to have additional items on hand such as oil to represent fuel or oats to represent garbage.
 - b. Ensure that your ocean has its plug in, and then fill up the basin so that the oceans and estuaries are filled with water.
2. When ready, have students come and observe. Go through each of the different locations and ask students if they have any possible ideas about what types of pollution may come from that area. (*examples- fertilizers and pesticides from farms; industrial chemicals from factories; trash from people's homes etc.*)
3. As you go through each location, sprinkle some of your material and explain to them that this will represent the pollution of that area.
4. Have a student volunteer to be the rain, and instruct them to use the spray bottle to rain all over the Enviroscape™. Have other students watch as runoff brings these pollutants from their respective locations down into the estuaries and eventually the ocean.
5. Add sponges to the areas marked “wetland”, and ask students what they notice about the role of wetlands in filtering water before it ends up in our waterways (*something along the lines of its absorbing pollution*).

Wrap up

Ask the students to relate what they just observed to environmental issues affecting the Chesapeake Bay, such as poor water clarity, toxins in the water, etc. Excess nutrients run off the land and into the Bay where they can cause many serious issues such as algae blooms. Sediment runs off the land when we remove vegetation that would normally trap it and prevent erosion. This sediment can affect the water clarity in the Bay. Chemicals and pollutants run off the land and enter the Bay via our local waterways.

For all activities make sure students understand:

That a watershed is a direct link between human activities and waterways. People that live hundreds of miles away from waterways like the Chesapeake Bay still have the ability to affect them, and that no matter where you live you have a watershed address. That is one reason why improving the condition of the Chesapeake Bay is so difficult and complex. It is not just the people that live immediately around the Bay that need to alter their actions to help restore the Bay, but everyone who lives within the Chesapeake Bay watershed – which is about 17 million people!