

Construct a Watershed

Activity Time: Approximately 1 Hour and 30 Minutes

TEACHERS: Read "Peel's Watersheds" on page 21 of The Peel Water Story book.

Objectives:

In this experiment, students see firsthand the basic properties of a watershed such as how water flows from higher elevations to lower elevations, and how watersheds are formed. Through the development of their own watershed, students will understand how decisions to locate buildings, parking lots and roads in areas of the watershed directly affect water movement and quantity. In addition, they will investigate how the disposal of harmful contaminants can have serious consequences not only on the health of the watershed but on the health of humans as well.

Introduction:

Take the students outside to the designated "watershed activity area" and place them in groups of four. Inform them that they all have new jobs as city planners. They have been hired to develop this new area in front of them for the city.

Materials:

- plastic tubing (culverts)
- sponges (wetlands)
- tin foil (roads)
- plastic wrap (parking lots)
- coffee filter (agriculture land)
- plastic cups (buildings)
- pipe cleaners (trees)
- sand area, or large sand basin, or basin with paper and plastic
- a trowel to dig with
- list of demands from the Mayor and Council
- cups of water
- red drink crystals
- spray bottles with water

Procedure:

1. Each group is given a sand plot (with clay mixture) approximately 1 metre by 1 metre. By manipulating the sand the group is to create a watershed where the water will flow from a higher elevation to a lower elevation. Have the group develop the three parts of the watershed (headwaters, middle, and mouth) with as many channels as they wish. When they are done, spray water onto the "headwaters" to see if the water flows through their watershed. Students should recognize this watershed as one that may have been built by nature.

Alternatives

a. Provide groups with large tray with sand to construct the watershed.

b. A portable watershed can be created using a basin, crumpled newspaper to provide topography and a plastic garbage bag as the surface. (This option eliminates the study of water infiltration but surface water flows can be demonstrated and experienced.)

2. Give each group a bag with the following articles:

- plastic tubing (culverts)
- sponges (wetlands)
- tin foil (roads)
- plastic wrap (parking lots)
- coffee filter (agriculture land)
- plastic cups (buildings)
- pipe cleaners (trees)
- spray bottles with water

3. As planners of the city, the students are given a list of demands from the Mayor who has compiled requests from the citizens. Students should use the articles given to them to build their watershed according to the plan. Students may place buildings, wetlands, shopping malls, etc. anywhere they like in their watershed. The following requests for the new area are as follows:

- a new hospital with one parking lot for emergencies and one for visitors
- a school with a parking lot located by an active stream for education
- the preservation of two wetlands
- a new subdivision with 10 new houses
- a small lake with a beach
- 2 acres of farmland
- a new shopping mall with six parking lots

N.B. Remind the students that the city gets their drinking water from Lake Ontario so water must flow into the lake to replenish it. Remind them that farmland requires irrigation and that the beach needs a water body.

Giving Them Extra Information

-Remind the students about the benefits of wetlands and their capability to store water and release it during times of drought.

-Remind them about the benefits of trees and their role in slowing water flow and trapping it. (Try these other Peel Water Story activities: Erosion Game, and The Solution to Pollution).

4. When the students are finished, they will face the ultimate test - water in their watershed! Spray water onto the headwaters of their watershed and watch as it makes its way down in elevation. Does the water make it to all the essential places in the city? If not, where did it go? Perform this test on each watershed with all the students watching to benefit from different design ideas. The watersheds that are

well designed should be set aside for the last test - introduction of a contaminant into the watershed.

5. Choose one student's watershed that works well. Pour a glass of red kool-aid into the headwaters and explain a sewage leak has found its way into the headwaters. Watch as the kool-aid makes its way into every aspect of the watershed.

Debrief:

Was it difficult to design the city within the watershed?

What are some of the things that caused trouble in the watershed?

How can these things be improved?

What was the result of having a contaminant enter the watershed?

(Try these other Peel Water Story activities: Erosion Game, and The Solution to Pollution).

Source: Adapted from U.S.A. Environmental Protection Agency's "Build Your Own Watershed".

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Address: 10 Peel Centre Drive, Brampton, Ontario L6T 4B9