

Erosion/Flood Town

Activity Time: 90 minutes (x2)

TEACHERS: Read "Floods, Fires and Waterworks in Brampton" on page 60-61 of Peel Water Story book.

Objectives:

In this activity, students follow the interactive story of Erosion/Flood Town, a town in a community much like their own, which at one point flourished. Students re-create the story of uncontrolled development and careless management of agricultural land through their own model simulations. Students see first-hand the devastating effects of uncontrolled stormwater and erosion, and how to reverse its impacts. Students then apply the new-found knowledge to their local community and evaluate local soil protection practices.

Introduction:

Tell the students that together you are going to create a place known as Erosion Town. Tell them that this is their opportunity to design a town the way they want. Ask them the following questions:

- 1) How many people live in Erosion Town?
- 2) What do they live in?
- 3) What sort of transportation do they use?
- 4) What is their main type of industry (what do they build/create)?
- 5) What kinds of stores do they have there?
- 6) What animals live in Erosion Town?
- 7) What are the people's favourite things to do?
- 8) Do they do any outdoor activities?
- 9) What do they mostly eat there?
- 10) Who is the Mayor of Erosion Town?

Write down these answers and formulate how you are going to use them in your story. Give the students a lot of freedom with the answers and go with it. However, keep them focused in the sense of location (Erosion Town is located here in Ontario and subject to the same weather we have), and all choices of activities, food, houses, etc must be reasonable.

Materials:

- A large cake pan
- A spray bottle of water
- A bowl of soil
- Two squares of plastic wrap
- Watershed map of their local community
- Masking tape
- Paper cups
- A large handful of vegetative litter
- Two small sponges
- Cotton balls
- Plastic bottle caps

Procedure:

1. Divide students into groups and give each the following items:

- a large cake pan or tray (watershed)
- 3 paper cups (two for rain, one for soil building)
- a spray bottle of water (rain)
- a large handful of vegetative litter (leaves, grass, twigs, etc... to act as natural ground cover)
- a container of soil/sand/clay
- two small sponges (wetlands)
- two squares of plastic wrap (parking lots)
- cotton balls (trees and shrubs)
- plastic bottle caps (buildings)
- masking tape

Ask the students to place the cake pan/tray under a book to simulate a watershed slope where water runs from the higher elevation to the lower elevation. Ask them to build the watershed according to the story and listen for their next step from the story. They must start by placing the soil in the container and forming a river channel in the soil.

2. Erosion Town - The Story

Using the students' prompts from the introduction, create an improvisational story about Erosion Town and its struggle against erosion and flooding. Start by building the natural landscape as it would have appeared before people began changing the watershed.

A) Have the students build a watershed. Include:

- Wetlands
- Lakes
- Forests
- Meadows

Have the students "rain" on their watershed. Observe and record what happened to the river and the surrounding land.

B) Have students modify their watershed for use by people in modern communities. Include in the story some of the following issues:

- The disappearance of wetlands (remove the sponges)
- Soil conservation techniques i.e. establishment of shelterbelts or tree buffers around agricultural land (surround open areas with trees (i.e. cotton balls))
- Shape the soil so that you reduce the slope to the river.
- Contour plow the fields (use a fork to make furrows across the slope of the agricultural fields, parallel to the water course)
- Stormwater management ponds and how they might effect erosion and flooding

For every step in the story, have the students perform the activity on their models. For example, if in the story buildings are constructed in clusters have the students place their buildings (plastic pop caps) in their watershed pan in a cluster formation. If the story has the town allowing leaf litter to rest on the ground as a prevention to erosion, have the students place their leaf litter inside their watershed pan. Cause it to rain often in Erosion Town, maybe even too much! Have the students observe and record what happens to the soil and the level of water in the watershed.

3. After the students have cleaned up their models, take them outside to investigate the local community. Provide each student with a watershed map of the local community including land uses. (Teachers and students can create and print their own local maps using the Peel Water Story website's G.I.S. page: www.peelwaterstory.ca) In groups of four, ask the students to visit the markers on the map and evaluate the soil protection and water quality at that sight.

Evaluation:

- Is the land use in this area contributing to erosion? (i.e. non-porous parking lots, too much pavement for no reason?)
- Are there any signs of soil erosion? What are they?
- If there is an agricultural area, is it protected by a shelterbelt?
- What is the water quality like in the stream, pond, or ditch nearby? Is it cloudy, clear? Is the shoreline easily defined? Is there any life in the water?
- Are there enough trees and shrubs in the area to protect the soil from erosion?
- Is the soil easily removed by hand or is it covered by leaf litter?

Have the students gather together when finished their research to offer recommendations on how to improve their soil protection and/or water quality.

Debrief:

How important is it to protect soil from erosion?

Is it easy to see the signs of erosion now that you know what you are looking for?

What are the effects of human-designed structures (e.g. buildings, parking lots) on erosion?

Are flood control and erosion related? How?

Source: Adapted from the Groundwater Foundation's "Erosion".

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