



**Great Lakes
Research Center**
Michigan Technological University



Ride The Waves with



Center for
Science &
Environmental
Outreach
Michigan Tech University

Subject: Science, Social Studies

Grades: 8-12

Duration: 45-minute class period

Flint Watershed Land Use & Land Cover

Lesson Overview

This lesson involves the use of watershed mapping software (ArcGIS) to investigate characteristics of the Flint watershed, particularly the land use and land cover. Students will become familiar with the geography and some of the geological history of the Flint/Saginaw Bay area, as well as the concept of land uses and land cover, and how they affect watershed behavior.

Objectives

By the end of the lesson, students should be able to:

- define ‘watershed’.
- identify some common land uses.
- discuss how different land uses affect the Flint River and the watershed in general.

Preparation

Pull up the Flint Watershed Interactive Map on the overhead projector to present to the class. Have the students wait to pull up their interactive maps until they are instructed to do so.

Introduction

Begin with a question: “What do you think the Great Lakes looked like 50,000 years ago?”

50,000 years ago, the Great Lakes were likely under a massive sheet of ice. These ice sheets were sometimes as high as 6,000 feet! To put that into perspective, the highest roller coaster in the world is only 535 feet high. Glaciers dominated the region starting about 79,000 years ago, up until about 10,000 years ago.

Ask the students, “How do you think glaciers made the Great Lakes look like they do today?” Have them pull up their interactive maps at this time and investigate how the glaciers may have shaped the Great Lakes with a partner.

Before the glaciers arrived, the Great Lakes were actually part of a river system. When the giant ice sheets came down from Canada, they scraped out the bottom of these rivers, enlarging them into the shapes they take today.

Watersheds

Rivers and lakes are parts of something called a 'watershed'.

Ask the students what they think a watershed is.

A watershed is the area of land that contains rivers, lakes, basins, and all the water flowing in and/or out of those bodies of water. Every inland body of water you can think of is a part of a watershed.

Ask: "Without looking at your maps, what are some bodies of water near us?" (*Flint River, Saginaw Bay, Lake Huron, etc.*)

Now explain that the small green area on their map is the Flint Watershed, and ask the students to zoom in on the watershed and identify some bodies of water there.

You can see that there are several bodies of water in the Flint Watershed.

"What do you think affects these bodies of water?" (*precipitation, erosion, pollution, etc.*)

All of the bodies of water in the Flint Watershed interact with each other, and are each affected by natural events like precipitation and erosion, as well as human interference like pollution and restoration. The ways that humans use the land in a watershed are called 'land uses', and the different types of land are called 'land cover'.

Land Cover / Land Use

"What are some different types of land cover?" Have the students list them off, then write them on the board. (*forest, grassland, farmland, impervious, etc.*)

These types of land cover affect how the watershed responds to precipitation, which then affects how much runoff goes to bodies of water. For example, forested areas can hold more water than impervious pavement. Having many impervious surfaces in a watershed will lead to more runoff. ArcGIS, the mapping software that we've been using today, allows us to see these different land covers and land uses in the Flint Watershed.

Have the students turn on the NLCD layer to see land cover and land use.

"What do you think NLCD stands for?"

NLCD stands for the National Land Cover Database, and it stores information about land cover across the country. It is also responsible for the color labeling you see on this map. Each type of land cover is assigned a certain color. Today, we'll use the NLCD to find out what each color represents.

At this point, split the map into enough sections for each group, and have each group identify each type of land cover in their section of the map. Then the students will report their findings to the class in a PowerPoint presentation. Allow 15-20 minutes for the students to make their presentations. The students will include a prediction on how the land cover in their section affects the watershed. After all presentations have been made, recap all of the predictions with the group.

Now that we have all these predictions, let's put them together to make an overall prediction about the watershed. How do you think the land cover is going to affect the entire watershed?

Discuss for 5-10 minutes.