



Where did the water go?

- OBJECTIVES:**
1. Define and describe each step of the water cycle (prior knowledge).
 2. Define and describe a watershed and catchment basin.
 3. Design and build a model watershed based on real-world water flow patterns.
 4. Demonstrate an understanding of the role of a civil engineer in watershed planning and management.
 5. Identify non-point sources of pollution; track them to storm drains and waterways.

OVERVIEW:

This activity allows students to explore how water moves through watersheds. When it rains or the snow melts it either becomes ground water or runoff when the ground gets saturated. Watersheds are land areas from which surface runoff drains into streams, lakes, reservoirs, and other bodies of water. Ground water is water that permeates the ground and can remain there for thousands of years.

STANDARDS ADDRESSED:

NGSS 4-ESS2-1: Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

NGSS 4-ESS2-2: Analyze and interpret data from maps to describe patterns of Earth's features.

MATERIALS (RE-PURPOSED IF POSSIBLE):

- Large classroom garbage can
- Large sheet of newsprint
- Used newspapers or other packaging materials
- Scissors
- Tape
- Spray bottle with fine-heavy mist nozzle
- Water soluble markers
- Science tables or picnic tables outdoors
- Access to Google Earth or local watershed map (DEP)

ACTIVITY STEPS:

1. Students view their location on Google Earth and discuss the concept of watersheds and show where the water bodies (rivers, lakes, and reservoirs) are included in the watershed area. Students make observations about what they see on the map.
2. Using a rose compass, have students identify the water sources to the watershed and track the direction the water would flow based on the topography of the landforms (East to West downhill).
3. How would the weather, climate, and season affect the amount of water? How would the running water affect the landforms it travels over (erosion)?
4. Why is a healthy watershed essential to all living things in the area? Who are the stakeholders and environmental stewards? How does human activity in rural and urban areas impact the water quality?
5. Student groups will design on scale their own watershed model incorporating the following:
 - Natural areas: rivers, forests, wetlands
 - Agricultural areas: farms with animals and crops
 - Industrial areas: factories or mines
 - Residential areas: houses, apartment buildings, parks, schools
 - Infrastructure areas: roads, water and sewage treatment plants, landfills, power generation plants.
6. Build the watershed model.
 - a. Students will draw the outline all of the elements making up their watershed on the large piece of newsprint paper.
 - b. Using washable markers, students will color in the different areas using a color code.
 - c. Drape the newsprint on the unturned garbage can and packaging materials to form the desired topography and landforms. Secure in place with tape.

ASSESSMENT:

1. Have students use their watershed model to predict what will happen when it rains.
2. Using the fine mister on the spray bottle, students will simulate rain over their watershed model and record their observations. What happened to the colors? Does water collect in certain areas?
3. Students will repeat after using specific colored markers to represent pollution using a heavier spray and more water. Where did the pollution go? What happens to the roads, farms, and landfills?
4. Students will compare their predictions in step 1 to their observations.

CLASS DISCUSSION:

Discuss watershed management and planning. How do cities get their portable water? What is the role of human activity in maintaining pristine watershed and catchment basins?