

**Lesson Title: Garbage Bag Watershed**

**Ohio Standards Connection:**

**Standard(s):** Earth Science

**Benchmark(s):** (grades 3-5) B. Summarize the processes that shape Earth's surface and describe evidence of those processes.  
C. Describe Earth's resources including rocks, soil, water, air animals and plants and the ways in which they can be conserved.

**Indicator(s):**

**Grade(4)** 8. Describe how wind, water and ice shape and reshape Earth's land surface by eroding rock and soil in some areas and depositing them in other areas producing characteristic landforms (e.g., dunes, deltas, glacial moraines).

**Grade(5)** 6. Investigate ways Earth's renewable resources (e.g., fresh water, air, wildlife and trees) can be maintained.

**Benchmark(s):** (grades 6-8) C. Describe the interactions of matter and energy throughout the lithosphere, hydrosphere and atmosphere (e.g. water cycle, weather and pollution).

**Indicator(s):**

**Grade(7)** 1. Explain the biogeochemical cycles which move materials between the lithosphere (land), hydrosphere (water) and atmosphere (air).

2. Explain that Earth's capacity to absorb and recycle materials naturally (e.g., smoke, smog and sewage) change the environmental quality depending on the length of time involved (e.g., global warming).

**Lesson Summary:** Students will build a watershed model to determine where rain and snow melt flows and demonstrate sources of pollution.

**Estimated Duration:** class period

**Background:** Watersheds come in all shapes and sizes. Landforms and built structures in your watershed determine how and where water (rain and snowmelt) flow off the land.

**Instructional Procedures:**

1. Cover a section of a table (about a 3'x3' area) with several layers of newspaper.
2. Arrange cans and/or containers to form hills and mountains.
3. Cover the cans with a towel to simulate a more natural topography.
4. Cut open the trash bag and use it to cover the towel. Adjust to show hills and valleys, a ravine (for the stream) and a flat area or areas to simulate wetlands, ponds and lakes.
5. Use permanent markers to define different land uses in your watershed either with words or illustrations (or pictures cut out of magazines-place them inside of

- plastic zip lock bags). Possible land uses can include farmland, parks, roads, shopping centers, residential areas, golf courses, construction sites, landfills, industrial sites, etc.
6. Use the spray bottle to generate “rain”. Students can provide a weather forecast and make sound effects like thunder, wind and rain. Point out and discuss drainage patterns. Can you see a stream or lake forming?
  7. Sprinkle or drip “pollutants” onto the watershed in the appropriate places to simulate the following non-point sources of pollution:
    - Fertilizers and pesticides (explain the difference between the two)-powdered drink mix
    - Eroding soil from a construction site –cocoa
    - Road salt spill-table salt
    - Household chemicals-food color
    - Automotive fluids, used motor oil-molasses or syrup
    - Detergent from factory or car washing-detergent
  8. Create a second storm event to explore rain’s role in transporting pollutants in your watershed and discuss the problems associated with the storm water runoff and its pollutants.
  9. Discuss possible solutions to the pollution problems. What are the advantages and disadvantages of development in your watershed? What kinds of practices could be put in place to prevent pollution from making its way to our waterways?

Assessment: Have students design a second watershed, pointing out changes they made and practices they implemented to reduce the environmental impact of non-point source pollutants on the community and its ecosystems.

**Materials and Resources:** newspaper, 3-5 empty soup, coffee or vegetable cans or cottage cheese containers; hand towel or dish towel; white or light colored large kitchen trash bag; permanent markers; spray bottle; paper towels; simulated pollutants (powdered drink mixes cocoa, table salt, food color, detergent, molasses, syrup).

**Vocabulary:** Non-point source pollution- pollution that occurs when rainwater or melted snow carries sediment, organic materials, nutrients, or toxins into rivers or other waterways, lakes or groundwater supplies.

Adapted from Garbage bag Watershed Activity developed by Jan Bush, Education Coordinator, Lake County Soil and Water Conservation District, 1992.