

# EPA ENVIRONMENTAL EDUCATION

## BUILD YOUR OWN WATERSHED

**GRADE LEVEL:** 8 – 12

**BACKGROUND:** The land we live on is divided into watersheds. A watershed is a land area whose runoff drains into any river, stream, lake, or ocean. Small watersheds, such as the watershed for the creek behind your house, or the watershed for the pond down the road, drain into small bodies of water, and cover small land areas. The runoff from small watersheds join together, and their combined areas become a new, larger watershed. Large watersheds, such as the Mississippi Basin and the Chesapeake Bay watershed, drain into large bodies of water, and cover immense land areas. Despite their differences in sizes, all watersheds share common properties. They all perform the same function of transporting water over the Earth's surface. The watersheds encompass suburban lawns, parking lots and city streets. Water seeps down through the soil to aquifers, which are underground rivers that slowly move water below watersheds to outlet points at springs, rivers, lakes, and oceans.

Many human activities have an effect on watersheds. Construction projects like dams can limit the flow of water; construction of roads and buildings can divert and even increase the flow of water. Agricultural fertilizers can run off of crop fields and inadvertently fertilize harmful microorganisms in rivers and lakes, having an adverse effect on water quality and marine life. The irresponsible disposal of household and industrial chemicals can be harmful because these chemicals travel through the watershed, poisoning life and damaging natural ecosystems.

Watersheds can also have an effect on humans. Many communities use rivers and streams as their source of drinking water. Water treatment prepares this water for human consumption, but if the water is laden with chemicals and microorganisms, it can be difficult to treat effectively. Floods are one of the major events in a watershed. Homes built on flood plains, low lying areas adjacent to rivers, are susceptible to flooding conditions when heavy precipitation exceeds the watershed's capacity to absorb water. Rivers, streams, and lakes overflow, threaten human lives, and damage or destroy roads, buildings, and flood control measures. Watersheds can also become dry, causing water shortages for those who depend on their lakes and rivers for drinking water.

It is clear that humans have a close relationship with watersheds. The responsible planning of watershed use and development is important to ensure that the ecosystems sustained by the watersheds are not destroyed, and to protect the health and safety of our communities.

**NOTE:** Prior to the demonstration, the teacher should engage the students in activities involving identification of a local watershed. Maps can be used to facilitate this activity, and a field trip to a local river or pond can serve to demonstrate the concept of a watershed. Ask students to identify where the water is coming from. How far does the watershed extend? For a small stream, the answer may be several hundred feet; but for a lake or river, the watershed may be much larger. Visit EPA's "Surf Your Watershed" for local watershed information (<http://www.epa.gov/surf/iwi>).

**OBJECTIVE:** This experiment illustrates the basic properties of a watershed: how water flows from higher elevations to lower elevations, and how watersheds are interconnected. The students will understand how the placement of buildings, roads, and parking lots can be important to watershed runoff, and how careless use and disposal of harmful contaminants can have a serious effect on downstream watershed denizens.

**MATERIALS NEEDED:**

- 1 large tupperware container (about 1.5'W x 3'L x 1'H)
- 2 lbs. of modeling clay
- 3 lbs. of sand (any type of sand will do)