



Watershed Model Activity

Materials: 2 Plastic picnic table covers or tarps (\$2.50 each at Osco's Drugstore)
5 Spray bottles, filled halfway with water
Plastic bags, newspapers, assorted items to create landscape
Pollutants: brown cake sprinkles (dog waste), cocoa powder (dirt), green food coloring or cake sprinkles (fertilizer), red food coloring (toxic waste), cooking spray or oil or honey (oil from cars on pavement or machinery), dish soap or baking soda (detergents from laundry and car wash soapy water)
Optional: string, thin sponges, green felt, small plastic fences
Paper towels for cleaning up any spills!

Directions:

1. Lay one tarp flat on ground and throw plastic bags, newspapers and assorted trash items onto tarp.
2. Ask participants to stand around edge of tarp with toes on edge of tarp, hand trash to different people and a spray bottle to every fifth person. Participants may kneel if in the front row or encourage people to stand in rows so everyone can see.
3. Have participants "fluff" bags and newspaper and throw onto the tarp towards the middle. Arrange any items around the center, away from edges of tarp.
4. Ask three volunteers to open second tarp and cover items in middle of tarp, lying tarp on top. Arrange second tarp so it is directly over bottom tarp. Push down on top tarp where there are gaps between the materials, creating "topography."
5. Ask participants to imagine this is their community. If there are any "peaks" or "hills," ask the students to identify these land features; unfortunately, this may be a landfill in some communities.
6. Ask those individuals with spray bottles to make it "rain," directing them to spray towards the middle of the tarp. [I usually put three of the spray bottles on stream and the remaining two on spray.] After water begins to run down the hills and collect in depressions in the landscape, stop the rain and ask the participants to report on what they are observing.
7. Ask participants to identify the bodies of the water they see on the tarp as streams, wetlands, lakes, rivers, etc. in their community. Ask the participants if a drop of water falls on one side of a particular hill where it goes, and if it falls on the other side of a hill, where it goes. This visual observation is demonstrating how a watershed is delineated, using topography and gravity to determine where water eventually flows to when it falls on the land. Ask participants to identify a "watershed," defined as an area of land that drains the rainwater (or snowmelt) into one location such as a stream, lake, or wetland. Any pollutants from streets, fields and lawns will eventually drain into those streams, lakes or wetlands when rain falls or snow melts, and those pollutants can be identified as nonpoint source pollutants (U.S.EPA Office of Water, What's Up with our Nation's Waters?, May 2001).

Optional: Place string on top of tarp to illustrate municipality boundaries, ask participants if the watershed boundaries and runoff reflect these boundaries. Discuss the importance of watershed management between municipalities.

8. Add two drops of red food coloring to one of the tarps and have it rain again with all spray bottles, students may observe this air pollutant (acid rain) as it mixes with the fresh or clean water on the watershed. Stop raining.
9. Beginning with chocolate cake sprinkles, demonstrate nonpoint and point source pollutants that individuals may find in their watershed.
 - Brown cake sprinkles = dog waste
Ask the students who has a dog and tell a short story of how this individual is on a walk with their dog and of course there is dog waste as a result – what if the owner does not pick up the dog waste? Let the sprinkles remain on tarp.
 - Cocoa powder = loose dirt
Choose another section of the tarp and sprinkle some cocoa powder, explaining to participants that this part of the watershed used to be a forest but it was recently clear-cut and all the trees were removed, exposing what (loose soil that is carried with rainwater and snowmelt as runoff into nearby bodies of water)?
 - Green food coloring or green cake sprinkles = fertilizer
Identify a third section of the watershed (near the dog trail area) where there are many nice homes that have very green grass. Ask participants what sort of chemicals are used for green grass, discussing over application of fertilizer will oftentimes not improve the growth of the grass or shrubs and may enter the storm drain as runoff.
Fertilizers are also applied to golf courses and public and private parks and gardens.
 - Red food coloring = toxic waste
Discuss a family who finds a container of hazardous waste in their garage and want to get rid of it in a hurry so they dump it down the storm drain in front of their house. Use only a few drops of food coloring for adequate effect.
 - Cooking spray or oil or honey or soy sauce = oil from cars or machinery
Ask whom drove to the location and drop oil or honey along an imagined road, discussing how car owners were not properly maintaining their cars and oil is leaking.
 - Dish soap, Alka-Seltzer or baking soda = detergents
Identify a few homes where people are washing their cars in front of their homes on the driveway, letting the soapy water run down the driveway into the storm drain.
 - Other nonpoint and point source pollutants – feel free to add!
10. Here comes the rain! Ask participants to identify what they see happening to the pollutants in the watershed, how do they mix with the bodies of freshwater, what pollutants are remaining, what will happen to the remaining pollutants still on the land and in the water?

11. Discuss approaches or techniques those human beings responsible for the different pollutants could have done differently. How could you educate people about these pollutants and runoff affecting water quality in your watershed? Possible best management practices or watershed management techniques that could be discussed:

- Pick up dog waste and put in compost, trash can or decomposing waste bags
- Plant tree saplings, shrubs or ground cover in areas where there is exposed soil
- Apply fertilizer according to container directions, try organic gardening or growing
- Contact your Environmental Protection Agency for Hazardous Waste Household Pick-Up Days or Waste Collection Programs
- Keep your car maintained and watch for oil spots on your garage floor
- Wash your car at a facility that recycles wastewater or sends it directly to a treatment facility
- Wetlands reconstruction or protection (benefits illustrated by placing felt or sponges in areas next to bodies of water that have runoff entering)
- Keep animals out of waterways (fences)

12. Ask volunteers to pick up four corners and one in the middle of each side to pick up corners of top tarp, making sure wastewater remains in the middle. Wash down the sink or toilet with extra water.

Vocabulary Terms or Topics to Include

- Topography • Rainfall • Bodies of water (groundwater-fed springs) • Runoff •
- Elevation • Watershed • Acid rain – air pollution • Nonpoint and point source pollution •
- Watershed management • Best Management Practices •