

Activity Theme: Water Pollution

Activity Type: Demonstration 

Grade 3

Runoff or Recharge?

Activity Overview: In this demonstration, the students will examine the ways in which water recharge rates could be influenced when using different materials such as sand, grass and paved surfaces.

Objectives:

Students should learn to:

- Describe the way in which water moves or recharges through soil and grass
- Identify sources of pollution caused by untreated runoff
- Identify sources which contribute to higher runoff rates (e.g., parking lots, paved play areas, shopping malls, streets)
- Predict the possible results of paving grassy areas

Materials:

- Grass (sod)
- Brick sand
- Wood frame representing asphalt
- Watering Cans
- Containers to catch Recharge/Runoff Water (4)
- Display unit (wooden frame with plastic containers)

Setup: Display will already be set up. Ensure all bins have proper material, add more soil if necessary. Someone from the Toronto and Region Conservation Authority will assist you with this.



Takedown: Empty all water from containers.

Safety: Do not let students climb on the display. Ensure they are careful when standing on the stools.

What will I be doing? (Procedure)

Before you start your presentation check with the teacher or chaperone that the entire group is present and ready to start.

*Remember that **doing** an experiment and **discovering** the answer is more powerful than watching and listening to someone, so try to involve as many children as possible.*

Say: “Welcome to Runoff or Recharge. Today we will be learning about how water moves and becomes polluted. Remember to keep our lakes and well water pollution-free because runoff from things like heavy rainfall can carry contaminants into the water.”

Say: “Runoff is rainwater that flows across land and downhill into streams, rivers, ponds and lakes. When this water seeps into the ground and becomes groundwater, we call this recharge.”

Show the trays filled with grass, sand, and pavement and let the students touch the materials in each tray. Encourage participation by asking which surface will allow recharge or runoff to occur.

Have students pour water from watering cans (simulated rain) over the three trays, one tray at a time. The water will land either in a “runoff” or a “recharge” labelled bin.

Ask: “Describe what is happening to the water in each tray. Which surface is best for recharge (letting the water seep in)?”

Encourage discussion about the runoff effect of pavement. Have the students think of all the things that can be on pavement (e.g. oil, gasoline, waste, etc).

Ask: “Where does this water go?” (Answer: to the nearest body of water or sewer)

Ask: “What would happen if there were more paved areas?” (Answer: more runoff, possibly more pollution & flooding)

Ask: “What would happen if there were more grassy areas?” (Answer: more recharge)

Ask: “Can you think of any ways that we can keep contaminants from getting into our water source?” (Example answers: do not leave garbage on the pavement, do not put paint or other chemicals into street catch basin/sewers etc)

*****THE RUNOFF WATER CAN BE REUSED MULTIPLE TIMES INSTEAD OF DUMPING IT OUT*****

Recall with the students what you have taught them in this activity.

Specifically remind them that:

- Urban areas have more runoff than natural areas.
- Keep our lakes and well water pollution-free because runoff from things like heavy rainfall can carry contaminants into the water.
- Water is cleaned when it travels through the soil particles.

Background Information:

What happens to water when it falls to the earth as rain, snow, sleet or hail?

- Water can land on a body of water such as an ocean, lake or river and essentially go with the flow
- Water can seep into the ground and travel downward through spaces between soil and rock and joins the groundwater body. This is known as **recharge**.
- Water that is not absorbed into the soil can flow across the land and hard surfaces (e.g., streets and parking lots) into rivers, lakes, streams, and eventually oceans; this is called **runoff**.

Runoff is water from rain or melting snow that does not soak into the ground. This is because roofs, roadways, driveways, sidewalks and parking lots are hard (**impermeable**) surfaces that do not allow water to seep into the ground. As runoff occurs it picks up different kind of material such as fertilizers, pesticides, road salt, oils, grease, animal wastes and litter, which it later deposits into our lakes and streams. In cities (areas with a lot of houses, malls, warehouses, and factories) generally more runoff is generated than in countryside areas. This is a problem for streams in urban areas because when it rains, they receive too much water which can lead to flooding. Hard surfaces also result in less recharge to the groundwater system.

Water that seeps deep into the ground is filtered through different kinds of soil which helps to remove undesirable material. Groundwater recharge is very important because groundwater supplies water to our streams, rivers, swamps, ponds and marshes.

Vocabulary:

Runoff – Rain water that flows across the land surface and downhill into streams, rivers, ponds and lakes

Impermeable – A layer of material through which water does not pass

Groundwater – Water that is found below the earth surface in spaces between soil particles

Recharge – Water seeping into the ground to become groundwater