FRIENDS OF THE MISSISSIPPI RIVER

OUTDOOR ACTIVITY: WATERSHEDS

2020
Friends of the Mississippi River engages people to protect, restore, and enhance the Mississippi River and its watershed in the Twin Cities region. This in-person classroom lesson has been adapted for homeschooling and remote teaching. This lesson also has a corresponding video and presentation that can be found on the FMR website (https://fmr.org/events-online-education-watersheds101), and other educator resources can be found on our Online Environmental Education with FMR Facebook Group (https://www.facebook.com/groups/202957270996905/?source_id=81498431082).

The United States Geological Survey (USGS) describes the water cycle as "the existence and movement of water on, in, and above the Earth." In this lesson, we are going to explore the part of the water cycle that mostly takes place on land, specifically surface and ground water.

In Minnesota, we have plenty of experience with surface water; our 10,000 lakes and the Mississippi River are examples of surface water.

Groundwater is usually not found in big underground lakes and rivers, but it is most commonly located in the tiny spaces between sand and rocks underground. These spaces can be filled with air near the surface of the ground, but if you dig deeper, below a point called a "water table," the spaces are filled with water. The water table is the point at which the spaces filled with air end and the spaces filled with water begin.

How does a water droplet make its way from a raincloud or our sinks at home to become surface water or groundwater? One way is for water droplets to soak through permeable surfaces. A permeable surface absorbs
water or allows water to soak into it, like a sponge or the soil in a garden. Infiltration is the process of water soaking into the soil. During infiltration, the soil acts as a filter for the water, kind of like the water filters we use at home to clean out or catch any tiny contaminants that might be in the water that comes out of our faucets.

Another part of a water droplet’s journey to becoming groundwater or surface water is to move on top of impermeable surfaces. An impermeable surface describes things that are hard and do not absorb water, like driveways, roads, and roofs. When water moves across an impermeable surface it is called runoff, and it often picks up things that are resting on top of that surface, like gasoline spilled by motor vehicles on roadways and trash left on a sidewalk.

The way the land is shaped also impacts the way water flows through different parts of the water cycle on land. The USGS defines a watershed as "an area of land that drains all streams and rainfall" into the same place. Watersheds can be really big, like the Mississippi River, or really small, like a footprint.

As an example, picture a bathtub with the shower on. Some of the water lands in the bathtub, but some water lands on the sides of the bathtub, and some water might even get outside the bathtub if there isn’t a shower curtain in place. All of the water that lands on the sides of the tub drains into the tub and then into the drain, which we will call the main drain. The top of the walls of the bathtub, which are the highest points the bathtub, are the borders of our bathtub watershed. All of the water that lands outside of the bathtub walls will make puddles on the floor and not end up in the main drain. In nature, the borders of watersheds can also the highest points in a landscape, like hills and mountains.

In this lesson, we will explore how water flows through watersheds and impacts our surface and ground water by making our own mini landscapes and relating it to the real-world watersheds around us.
MAP YOUR WATERSHED

Please take the CDC recommendations seriously and only go outside if you feel comfortable doing so and can stay six or more feet away from others. Please also wash your hands as soon as you return to your home and always let an adult know about your plans to be outside.

MATERIALS

• Paper
  • Clipboard, book, or anything hard you can use to support your paper while you are outside
  • Something to write with
1. Imagine that you are a drop of water landing on the roof of a building (this could be your apartment building, house, garage, or store down the street). Stand so you are looking at that building, then draw it on your piece of paper in one corner. This is the start of your map.
DIRECTIONS

2. Safely walk around the building to find out what happens to the drop of water after it falls on the roof of the building. How does it get down to the ground? What do you think might be in the water at this point, or do you think it is clean?

3. On your paper, draw the drop’s path down to the ground. Add symbols of what you think might be in the water.

4. Notice where the water goes after it gets to the ground. Does your water flow onto a hard (impermeable) surface, onto a lawn or into a garden (permeable surface)? Draw this on your map.
5a. If your drop landed on a **permeable surface**, go to question 5b. If your drop landed on an **impermeable surface**:

• Where do you think your water drop goes from here? Does it go down a driveway? Perhaps onto the sidewalk or into the street? What do you think is in the water now?

• Follow the path the water drop takes without walking into the street. Draw this on your map and add symbols to represent what the water drop might have picked up on its journey.

• Did your water drop go down a storm drain? This isn’t the end of the story! Your water drop most likely travels in the storm water system under the street until it empties into the Mississippi River. If you happen to be close to the river you could walk over to look at it with an adult. If you are near University Avenue in St. Paul, the water that enters the storm drains ends up watering the trees that line the street.

• Draw your water going down a drain and traveling to where you think it might go.
5b. If your drop landed on a permeable surface:

• Did your drop land on a grass lawn? There is a high chance that your water drop will still travel onto a sidewalk and into the street, as most grass lawns have short root structures and the soil is hard. Go back to question 5a. to follow the path that water takes on impermeable surfaces.

• If your water drop landed in a garden or on a lawn with native prairie plants, then there is more of a chance your drop soaked into the ground. These plants usually have deeper root structures and less compacted soil that allows for water drops to slowly travel down through the soil into an aquifer, your nearby lake or river. If it did make it to a lake, river or aquifer by filtering through the soil, your rain drop is now very clean because the microbes and soil particles helped to capture pollutants!

• Draw your water moving through the soil and where you think it might go.
REPORTING

Write about what happened in your water drop. Do you think there are more impermeable or permeable surfaces in your neighborhood?

Let us know what you found on our Online Environmental Education with FMR Facebook group, we would love to see it!
https://www.facebook.com/groups/202957270996905/