

# How Much Water Runs off?

## Be a Stormwater Sleuth!

You can be a Stormwater Sleuth by becoming aware of how much water can run off of your school parking lot or your home's roof during a one inch rain. And by learning where stormwater from your home or school runs off to and how it gets there. Also, become aware of what pollutants it might take with it to streams, rivers and lakes; then learn how you can make a difference and help keep water clean.

## Background Information

A rain gauge is a simple tool to measure rainfall. Once you know the amount of rainfall from a storm, you can figure out about how much water runs off of a parking lot or the roof of your school or home. When you realize how much runoff hard surfaces can shed during a storm, you begin to understand why impervious surfaces are important. Impervious surfaces are hard surfaces that don't allow water to soak in. Roofs, parking lots, driveways, and streets are usually impervious - water can't soak in but instead runs off. In a city or town, the runoff probably goes into a storm drain to be carried by pipes to a nearby stream. A large amount of runoff can damage a stream by eroding the banks and washing away things like insects and fish eggs. Runoff is often polluted with things it has picked up on its way to the storm drain such as fertilizer, road salt, dirt, pet waste, and leaves. So the stream gets polluted as well.



**Stormwater running off of a parking lot.**

## Instructions

1. Find a large open area where you can place a rain gauge. Try to stay several feet away from trees and buildings. If it is placed in the ground and could be stepped on or tripped over, place a marker flag nearby. Or mount the rain gauge on a post.
2. Choose a large, hard surface such as a building or parking lot you will use as your impervious surface. You will figure out about how much runoff comes from this surface. You will need to know the area of this parking lot or building.



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### Instructions (continued)

3. You can estimate the area using a GIS/mapping app on a tablet or smart phone. Or, if the surface you choose has a simple shape, you can measure it with a tape measure and figure the area. The area of your surface should be in units of square feet.

4. Now, wait for it to rain. When it stops raining, check and record the level of the water in the rain gauge.

5. You need to convert the rain depth from inches to feet by dividing by 12. For example: 2 inches of rain / 12 = 0.167 feet

6. Next, multiply the rain depth (feet) by the area of your surface (square feet). Your answer will be in units of cubic feet which is a volume measurement. For example: 0.167 feet x 5000 square feet = 835 cubic feet.

6. Your answer will be an estimate of the amount of water that fell on the roof or parking lot and we can use that as an estimate of the amount that ran off. (For example, some rainfall will remain on a flat roof and some will cling to a sloped roof, but that amount is small compared to how much runs off.) The number you calculated is an estimate of the number of cubic feet of water that came off the roof or parking lot. To make it easier to think about, change cubic feet to gallons. We all know what a gallon milk jug looks like.

7. There are 7.48 gallons in a cubic foot. So multiply your answer by 7.48 to get the number of gallons of stormwater that ran off. For example: 7.48 x 835 cubic feet = 6245.8 gallons. That's a lot of milk jugs!

8. You can repeat this exercise using the amount of rainfall that falls in your neighborhood during one year. Then, if you used a school roof or parking lot as the hard surface, repeat the exercise using your house or apartment roof or your driveway.



*A stream in poor condition.*

#### **Did you know?**

Large amounts of runoff can cause stream erosion and harm plants and animals that live in the stream. Natural prairies and forests don't produce much runoff, so the streams there are usually healthier than streams in cities.

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### Discussion Questions

1. Where does the runoff from the parking lot or roof go?
2. How does the runoff get to the stream/lake?
3. How would large amounts of stormwater entering a stream from a storm drainage pipe affect fish, frogs, and plants? If the water is polluted, how does that affect the things living in the stream?
4. What can you do to help prevent stormwater runoff pollution?
5. How can we reduce the amount of stormwater runoff that ends up in streams? (If you need a hint, Stormwater Sleuth and Running Rain have some ideas in their comic book.)
6. Think about this statement: The more impervious surfaces there are in an area, the fewer plants and animals will live in the stream. Do you agree or disagree? Why?

### Stormwater Sleuth Examines Careers



**Stormwater Engineer**

**Watershed Ecologist**

**Meteorologist**

**Civil Engineer**

**Surveyor**

**Concrete Installer**

**Land Developer**

**Environmental Educator**

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