Save The Bay 3/23/20

When Rain Hits the Land

What is groundwater? What is runoff? How are they different?
How does water cause erosion?
Why is water absorption important?

Objective

Students will be able to identify what land surfaces cause run off and which allow water to soak into the ground. Students will learn why it is important that rain water be allowed to percolate into the soil, and what happens when it becomes run off instead.

Preparation

You'll want students to work in small groups (3-4), so make sure you have enough materials for each group. Decide what variables you'll need to keep constant e.g. amount of water, when to start time etc. You'll also want to find at least 4 different surfaces to test on. Have one student packet per group ready.

Delivery

Tell students they'll be conducting "percolation" tests around the schoolyard. Students will be poring water into a can on top of different land surfaces and timing how long it takes for the water to percolate through. Make sure every student in the group has a job. Lead a discussion with students using the focus questions provided. Set boundaries and time limits.

Debrief

Why is absorbing rain water important? What happens when rain water falls on **impervious** surfaces?

> This water becomes **runoff** and, if gathered over a large area, can increase in energy and speed increasing **erosion** effects on waterways. Runoff also picks up pollution along its path to natural waterways that lead to the Bay.

Why is absorbing rain water important? What happens to water that percolates through soil or green land surfaces?

> When water is absorbed into the soil a couple things happen. First, the water does not immediately flow away and build up, and this reduces erosion in waterways. Second, when water **percolates** through soil and plants it is being filtered reducing the amount of pollution that gets into our waterways. Lastly, the water that filters down through the soil will remain longer as **groundwater** that can be used by plants and humans.

How does water flow around and through your school? Where are the places water is absorbed? Where are the places water becomes runoff? What type of surface do you have the most of?

Theme

Human Impact, Watersheds

Age

4th, 5th, 6th

Duration

45-60 mins

Materials

Metal can/Yoghurt Bin with the bottom taken off
Measuring Cup
Stop Watch

Standards

NGSS:
EP&C's: P2-CA,C, D P4-CA, B, C

Vocab

Erosion: the process of slowly breaking down earth by wind water or ice
Groundwater: water held underground in the soil or in pores in rock
Runoff: unabsorbed water drained away from a surface of land
Impervious: not allowing fluid to pass through
Percolate: slowly filter through

When Rain Hits the Land

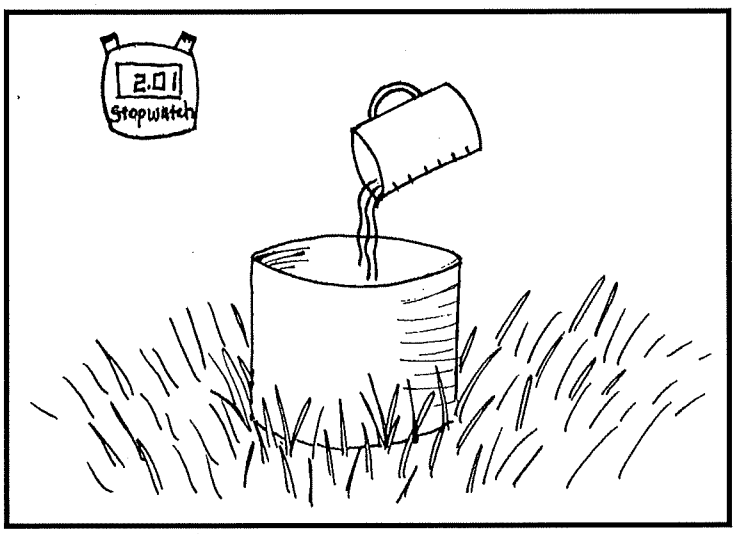
Experimenting with Runoff

Student Pages

Part II

INTRODUCTION

When rain hits the land, water either soaks into the ground to become groundwater, or runs off the land to become runoff. In this activity, your group will do a percolation test on various land surfaces around your school. A percolation test measures how long it takes for water to soak into the ground. This test will help you determine whether water that falls on your schoolyard becomes groundwater, runoff, or both.



Sharón Friedner

MATERIALS

- Metal can (or other cylinder) with two open ends
- Pitcher or empty jug for pouring water
- Beaker or measuring cup
- Stop watch
- Data chart (included)

PROCEDURE

1. Read through this procedure and answer questions 1, 2 and 3 before beginning your experiment.

2. Find various land surfaces around your schoolyard: grass, gravel, packed dirt, loose dirt, pavement etc. Record these in your data chart.

3. Place the cylinder on a land surface. If possible, twist the percolation cylinder into the ground slightly so that water will not flow out the edges.

4. Measure an amount of water and pour it into the cylinder. Record amount of water in your data chart.

5. With a stopwatch, time how long it takes for all the water to soak into the ground. Record this in your data chart.

6. Repeat steps 3-5 for each land surface.

1. In this experiment you will be pouring water into a can that is placed on a land surface and recording the amount of time that it takes for the water to soak into the ground. List the things that you think should be kept constant in this experiment.

_____

_____

_____

_____

2. Before you go outside, decide who will be responsible for each task. You will need a timer, a recorder, someone to twist the percolation can into the ground, someone to pour the water, and at least one person to observe the water as it seeps into the ground or runs along the surface. After the first test, switch jobs so everyone gets a chance to do everything.

Timer: _____

Recorder: _____

Can twister: _____

Water pourer: _____

Observer: _____

3. Decide the following things before you go outside:

How much water will you pour at each location? _____

At what point will you begin timing? _____

_____

4. Summarize and explain the results of your "perc" test. Which surfaces soaked up water quickly? Which did not absorb water? Based on what you learned about land surfaces during this activity, describe the runoff that you think would occur around your school after a big rainstorm.

Percolation Data Chart

Land Surface/ Location	Amount of Water Poured	Time for water to soak in	Observations

When Rain Hits the Land

Experimenting with Runoff

Student Pages

Part III:

INTRODUCTION

In this section, you will illustrate the land uses around you by making a map that shows where different types of land surfaces are located around your school.

MATERIALS

- Sheet of large paper or posterboard
- Markers, pens, colored pencils
- Other art supplies, as needed

PROCEDURE

1. Decide within your group how you will show different land surfaces on your map. In the space below, draw a key for your map that indicates the different land surfaces that you will be marking. The key will make your map easy to understand!

2. Use a large sheet of paper to draw your schoolyard.

3. Add your key to the schoolyard map when you are finished.

4. List the different land surfaces that you found in your schoolyard in the table below. Beside each one, decide whether water would more likely "run off" or "soak in" when it hits the surface.

Land Use	Runoff or Soak In?

5. In general, how do you think your schoolyard rates as far as land uses? For example are there more parking lots than fields? What things might you change to reduce runoff? Write these on the back of this piece of paper.