LEARNING ACTIVITY:

Rain and Soil

Grade Level: 5-10

Materials

- Access to a green space or schoolyard garden
- Ring infiltrometers (supplies needed: large metal coffee can or other clean metal can, ruler, marker)
- Water
- Graduated cylinder
- Stopwatch
- Tiller or garden spade

Soil Science Society of America

Source: Soil Science Society of America. Adapted with permission.

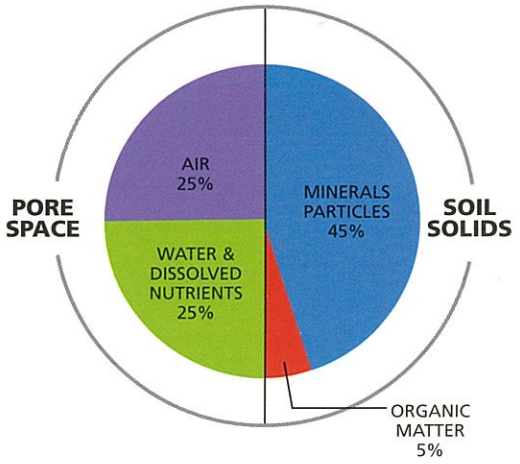
When it rains, much of the water drains directly into the ground. But why?

Soil is made up of four main components: minerals, organic matter, water, and air. Ideal percentages are shown in the figure, but in reality the percentages vary from location to location. Water moves through open spaces in soil known as "pores." More and larger pores allow water to move freely, whereas fewer and smaller pores restrict water movement. Restricted flow can cause water to pool at the surface, resulting in big muddy patches. It can also cause water to flow over the land surface, leading to erosion.

Compaction of soil can contribute to size and numbers of pores. Soil can become compacted many ways, and this can have long-term effects. For example, when American settlers traveled the Oregon Trail in their wagons in the 1800s, soil became so compacted that we still can see wheel ruts today. Try the following experiment and draw your own conclusions about compaction and pore size in soil.

Procedure

1. Create your own ring infiltrometer using the instructions found at www.soils4teachers.org/esw.
2. Locate two patches of soil or grass near (but not directly next to) each other: one people have walked on quite a bit, and one mostly undisturbed.
3. Sink your infiltrometers about a third of the way into the soil in each patch to the mark you made. (Try to not break up soil or grass much.)
4. At the first patch, fill the infiltrometer with water to your pre-marked line and start the stopwatch. Continue adding water to the line and measuring the amount added as you go. After two minutes, stop the stopwatch and note the time and total volume of water added.
5. Repeat the experiment at the other patch (or run the experiments simultaneously with two teams).
6. Calculate the infiltration rate (equations provided in link in Step 1) by dividing the depth of water that ran through by the time elapsed.



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Extension: Repeat the experiment by locating a third area that can be tilled. Till an area of soil uniformly using a tiller or garden spades without destroying medium-sized soil clods. Once the soil has been tilled to a "fluffy" consistency, stomp down on half of the tilled area to compact it.

Discussion

View slides of macropores and micropores (see link in Step 1). Discuss:

1. What factors affect water infiltration, storage, and runoff in soils?
2. How do surface soil aggregation, compaction, and porosity affect infiltration, storage, and runoff?
3. Based on what you've learned, what practices would you implement or avoid at your home or school?

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2	3	4	5	6
7 **Friendship Day**	8	9	10	11	12	13
14	15	16	17 **Did You Know?** Hurricane Camille (Category 5) Strikes Mississippi, Louisiana and Virginia, 1969	18	19	20 **Did You Know?** Florissant Fossil Beds National Monument, Renowned for Insect Fossils, Authorized 1969
21	22	23	24 **Did You Know?** Hurricane Andrew (Category 5) Hits Florida and Louisiana, 1992	25 **Did You Know?** Hurricane Katrina (Category 5) Strikes Florida, Later Louisiana, 2005	26	27 **Did You Know?** Colonel Edwin Drake Drills First U.S. Oil Well in Titusville, Pennsylvania, 1859
28	29	30	31			