Activity-52: The percolation rate of soil

Questions to begin with:

Have you wondered how a dried Bore well in your house will start collecting water after several months when no one is actually pouring water in it?

A bore well is only 6-12 inches wide, the amount of rain in that area is not sufficient to charge it back. How did it get charged?

Concept:

When water is poured onto dry soil, some amount is struck to soil particles and remain so. The remaining water flows downwards or seeps through it.

Aim:

The goal of this experiment is to find out how much water seeps through soil in a particular time interval.

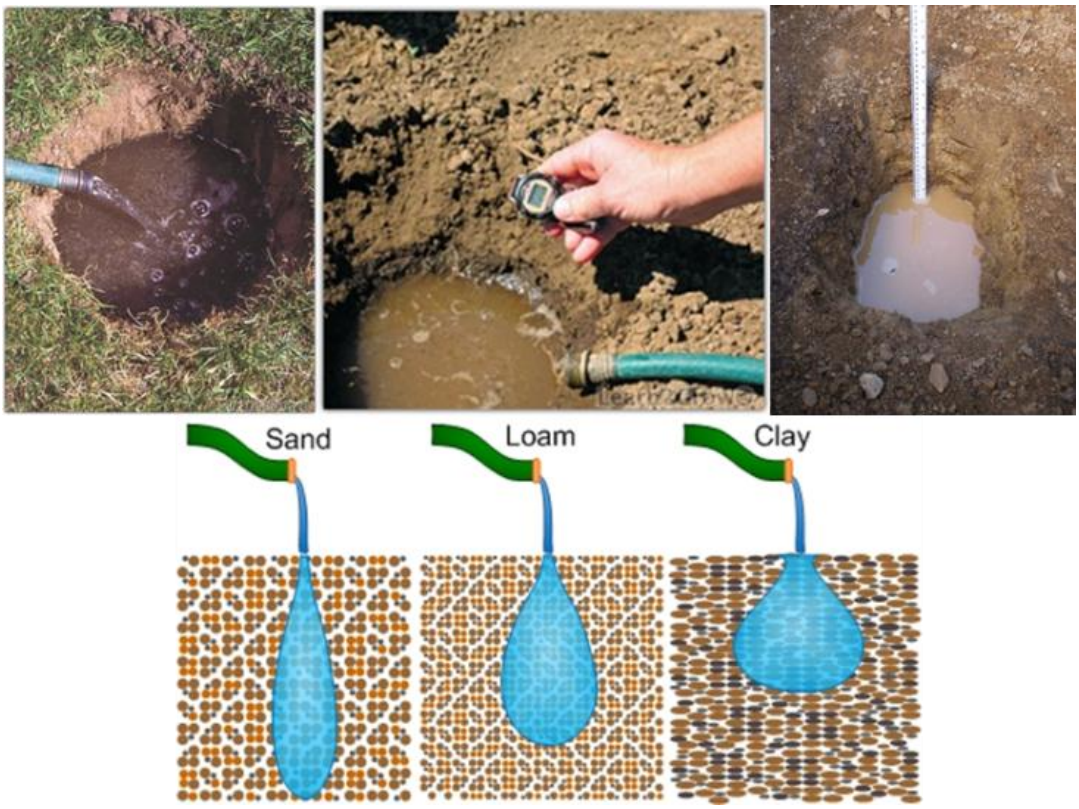
Pre-requisites:

Collect soil from the following sources:

Soil with no plants growing in it.	Soil with very large trees.
Soil with herbs.	Soil with shrubs.
Soil with only grass.	Soil surrounding lakes or ponds.
Soil ½ foot to 1 foot deep	Soil at several feet depth. (From near construction site.)

Requirements:

Take a PVC pipe (not more than 1 inch in diameter) of ½ feet in length, 1 foot in length, 1 ½ feet in length, a funnel, beaker, digital balance, a measuring cylinder and a disposable spoon.



Procedure:

Perform the experiments in 2 different sets.

Set-1: Using soil as it occurs naturally.

Take a clean dry beaker (100 ml volume is sufficient) and place a small funnel in it lined with filter paper.

Nota Bene: Filter paper usage: This is used to prevent the water from directly jarring into the beaker along the walls of the funnel.

Start your stop clock keep adding small quantities of water; 5-10 ml with an interval of 5 minutes between consecutive additions. While adding water, make sure you are able to wet the entire surface uniformly.

You must keep track the volume of water you are adding each time. Their sum is important.

After some time water will start dripping into the funnel. Continue the experiment till substantial volume of water is collected in the funnel.

Stop the stop clock and immediately separate the funnel and the beaker.

Measure the volume of the water in the beaker.

You can also measure the mass of the collected water and find out the volume if you know the density of water at that temperature.

Denote the various measurements with appropriate symbols.

Repeat the experiment 3-5 times.

Trial no.	Mass of soil	Volume of water added.	Volume of water collected.	Time taken in minutes & seconds.	Difference in volumes.
1.	M1	Va1	Vc1	T1	D1
2.	M2	Va2	Vc2	T2	D2
3.	M3	Va3	Vc3	T3	D3
4.	M4	Va4	Vc4	T4	D4
5.	V5	Va5	Vc5	T5	D5

D = Va – Vc (same units.)

Flow rate/percolation rate = D/T ml per second.

Change the masses of the soil and the shapes of the container…use a PVC pipe (cylindrical) rather than a funnel (conical) using the same kind of the soil.

Do you find any difference in your results?

Set-2: using dry soil:

Now repeat the whole experiment using sun dried soil.

What differences do you observe in you results?