Properties of Soils

Percolation of water through the Soil

- Percolation is the property of absorption of water by soil.
- If we pour a bottle of water on the floor and another bottle of water in the soil, the water on the floor will flow down but water in the soil will be absorbed.
- The percolation rate is the amount of water absorbed by any soil at any given time.
- Formula for calculating percolation rate is-

- Percolation rate (ml/min) = $\frac{\text{amount of water (ml)}}{\text{percolation time (min)}}$

NUMERICAL

- **If 200 ml of water is percolated through the soil sample in 40 min. Calculate the rate of percolation.**

  Solution-

- **Rate of percolation is = $\frac{\text{amount of water (ml)}}{\text{percolation time (min)}}$**

  = 200 ml / 40 min

  = 5 ml / min

- **Ans - The rate of percolation is 5 ml/ min.**

Q. Suppose certain sample takes 120 min for 960 ml water to percolate into the soil. Calculate the rate of percolation of water.

A. Given, amount of water = 960 mL

Time taken to percolate =120 min

The rate of percolation will be

$$= \frac{\text{Amount of water (in ml)}}{\text{Percolation time (in min)}}$$

$$= \frac{960\text{ml}}{120\text{min}}$$

$$= 8 \text{ ml / min}$$

Percolation rate = 8 mL/min

Moisture in soil

- Moisture is the amount of water present in soil.
- During summer, the water content in the soil evaporates and moves up which reflect the sunlight, thus the air above soil seems to shimmer.

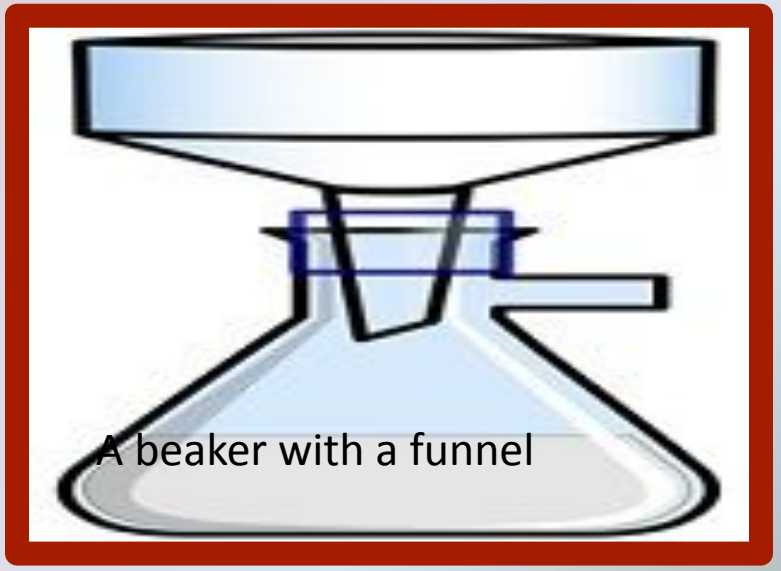
Absorption of water by soil -

- Different soil samples absorb water in different extent.
- The absorption of water by different soil can be found out by taking 50g of different soil samples.
- Pour the soil in different funnels placed in different beakers and pour water in the soil with the help of measuring cylinders.

- Continue pouring until it starts dripping.
- Now, check the amount of water left in the measuring cylinder and subtract it from the initial amount which was taken.
- The resulted amount of water is retained by the soil.

Formula to calculate percentage of water absorbed -

- Percentage of water absorbed = $\frac{(U-V)}{50} \times 100$
- 50g is the amount of water absorbed.
- U is the initial volume of water
- V is the final volume of water (ml)


A beaker with a funnel

Colour -

- Different soils have different colours as well. This is because of the minerals and nutrients present in the soil.
- For instance, some soils are black in colour because of the presence of humus and minerals.
- Some soils are red in colour because they have iron in large quantities in them.

Soils have different Colors

PLENARY -

Q. Rajasthan is a desert state in India. Once while travelling to Rajasthan by train, Boojho observed several streams and rivulets of rainwater during the journey but to his surprise, he did not see streams of water in the desert region even during rains. Help Boojho to find a suitable explanation for this.

A. Deserts are made up of sand, thus when the rainwater falls on land, it percolates immediately downwards in the spaces between sand particles. So, the streams of water in desert region are not visible even during rainy season.

ASSESSMENT / EVALUATION-

Q. A man digging a pit found that he could dig with ease initially but digging became difficult as he went deeper. He could not big beyond a depth 5 feet. Provide a suitable scientific explanations.

A. The man digging a pit could dig with ease initially because of the presence of topsoil and subsoil (mainly comprising of humus and nutrients). But as he digs deeper, he finds it difficult to dig beyond a depth of 5 feet as lower layers are made up of small partially weathered rocks with cracks, crevices and with bedrock which make it hard to dig.

Q. Write the difference between rate of percolation and the amount of water retained.

A. Percolation property of any material is linked to its porosity. Different soils have different porosity.

Therefore, water percolates differently through different soil.

Percolation rate of water in the soil

$$= \frac{\text{Volume of water percolated}}{\text{Time taken for percolation}}$$

Whereas water retaining capacity of a soil is described in terms of the amount of water absorbed by a particular type of soil. High water retaining capacity means higher water absorption.