

# HOW-TO-DO ACTIVITY- SOILS ASSESSMENT II

## SOIL HYDROLOGY TESTS

### Background information

The composition of soil determines how water moves, or percolates, through it. The amount of air space between soil particles determines how quickly soil can absorb moisture and how quickly it dries out. Sand has large air spaces between its particles. Therefore it can quickly absorb water and also loses water quickly through capillary action (primarily as a result of gravitational pull and evaporation). Clay absorbs water slowly and also loses water slowly by holding it more tightly in its much smaller air spaces. Humus acts like a sponge and absorbs large amounts of water. The percentage of humus in soil is a major determinant in the long-term moisture holding capacity of a soil (consider the water holding ability of peat moss, a form of humus, which is the primary component in most bog soils)

Native plant communities have specific needs and are adapted to specific soil types - there are no 'good' or 'bad' soil types from naturally occurring ecosystems. Bogs have diverse and rare plant communities with soils that hold water and do not drain well. Upland forests thrive in soils that absorb water quickly, yet drain adequately. Emergent wetland communities occur in clay soils which are rich in nutrients and form slow draining areas. The percentage of sand, silt, clay and humus in a soil sample helps to provide insight into the types of native plants that will thrive. Because of the relationships between plant communities and soil types, soil tests help to inform planners about the appropriate plant communities for restoration and dissuades them from suggesting amendments to the soil (as common with soil testing for agricultural purposes). Restoration project planners make use of this information by referring to plant lists indicating the preferred soil types of specific plant species.

**Overview of Soil Assessment I and II Activities:** The two soil assessment activities will have achieved their goal if students can show understanding that types of soil are one of the key factors in determining plant community success. By comparing soils in the plots with soils from different habitat types (i.e. near a pond, in an upland forest, on a creek bank) students can theorize about the types of plant communities that might be most adaptable to their plots. Though simple, the assessments in this activity are standard techniques used to assess soils.

### Suggested Equipment for Hydrology Tests

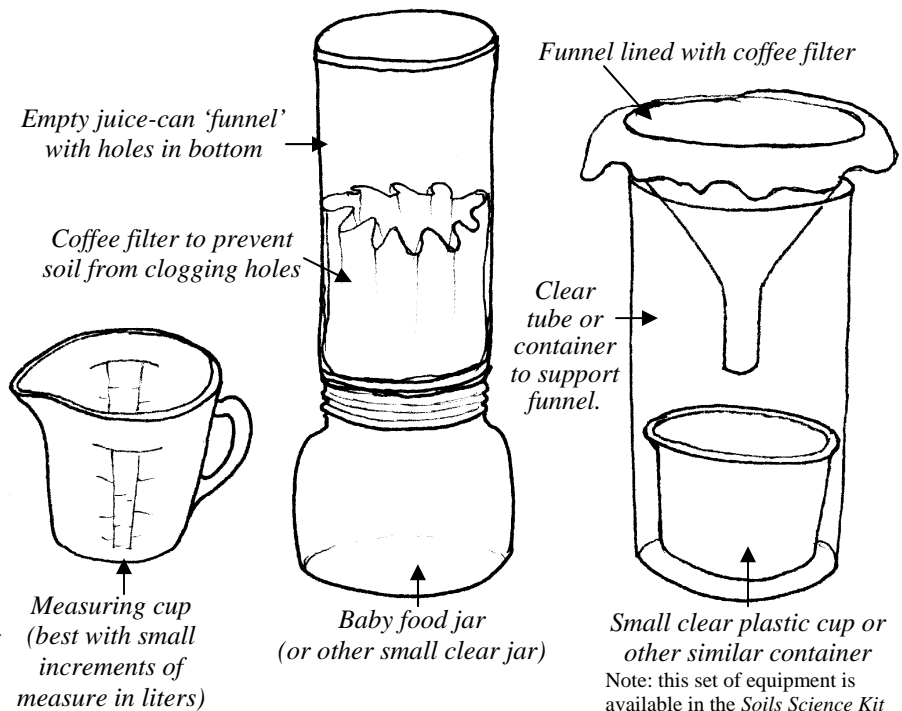
*Either of these alternate setups will work for both tests.  
Create your own version based on available resources.*

#### Supplies per team:

- 2- Sets of percolation testing equipment (see suggestions)
- Soil samples from *Soils Assessment I*
- 2- Plastic spoons to handle soil
- 1 cup of water per cup of soil sample
- Access to a clock with a second hand
- Towels, handy wipes or other method for cleanup

#### Saturation test:

- Measure 1 cup of dry soil from *Soil Assessment I* samples
- Place soil in funnel/coffee filter, make a slight depression in the center
- Measure 1 cup, or 1/4 liter of water
- Slowly pour into center of soil
- Wait until water stops dripping
- Carefully remove filter and soil (without spilling soil)
- Measure the water in the jar or cup
- Determine the percent of water that saturated (was retained by) the soil sample
- Record % of water saturated in soil on the 'Soil Assessment Form'



#### Percolation test:

- Return saturated soil/funnel/filter assembly to the top of the emptied jar or cup
- Measure 1 cup or 1/4 liter of water; carefully pour into saturated soil
- Time how long it takes for water to completely pass through soil sample
- Record information in 'Soil Assessment Form'