### Description:
Students use soil samples collected in the *Soils Assessment I* activity to study how soil composition affects water flow, and consider how differences in soil composition have an effect in the habitat area. Activities integrate directly with the ‘Land & Water’ science kit, using the plots and habitat area as ‘real world’ examples.

### Objectives:
- Students recognize that composition influences a soil’s ability to absorb and hold water.
- Students understand that soil composition influences plant community types in a habitat area.

### Print Materials:
- ‘How-to-Activity: Soil Hydrology Tests’
- Master: ‘Soil Hydrology Test Instructions’

#### Kit Materials:
- Tools and equipment for assessments: 1 set per plot team (see ‘How-to-Activity’)
- Copies: ‘Soil Hydrology Test Instructions’; ‘Soil Assessment’ form (from *Soil Test Assessment I*): 1 per plot team
- Clock with second hand
- Plot Journals
- Plant lists which indicate soil preferences such as, *A Manual of Native Plant Communities for Urban Areas of the Pacific Northwest* by Charles M. Anderson

### Before activity:
After completing *Soils Test Assessment I*, carefully drain the water from the collection containers while retaining as much soil as possible. Scoop or pour the wet soil onto paper towels (if possible, do this outside on lawn or asphalt), and allow to completely dry. Maintain information about the sources of these samples (plot number or team name for samples from the plots, team name and vegetation type for samples from the habitat area). Store dry soil samples in labeled plastic baggies until ready to conduct this activity.

### Activity:
- Gather students and pass out the ‘Soil Assessment’ form from *Soil Test Assessment I*. Review data and comparisons between soil samples. Say, “How water and soil interact helps determine which plants can grow in a habitat area.”
- “Now we look at this interaction by testing our soil samples for saturation and percolation. Who can help define these words? (see Vocabulary) Ask students to share what they know about these concepts (see: ‘How to do Activity’). Note: the *Soils Science Kit* conducts similar activities at earlier grade levels.
- Demonstrate how to assemble test stations (jar, funnel, coffee filter) and conduct saturation and percolation tests:
  - **Saturation test:** measure 1 cup of dry soil from plot samples (adjust volume if needed); place coffee filter in funnel and add soil, making a slight depression in the center; measure 1 cup of water; slowly pour into center of soil; wait until no more water drips from the funnel; carefully remove filter and soil (without spilling soil); measure the water in the jar. Determine the percent of water that saturated (was retained by) the soil sample (See ‘How-to-Activity’). Show how to record data in ‘Soil Assessment’ form.
  - **Percolation test:** return saturated soil/funnel/filter to emptied jar; measure 1 cup of water; carefully pour into saturated soil; time how long it takes for water to stop dripping from the funnel. Show how to record information in ‘Soil Assessment’ form.
- Repeat with other habitat area samples.
- **Activity:** Form students into plot teams, and give teams ‘Soil Hydrology Test Instructions’. Have students repeat the tests you’ve demonstrated using their samples.
- Compare findings, “Which soil had the highest saturation percent? What holds water in soil? (humus, water adheres to soil particles) Which soil samples had the fastest percolation rates? Slowest? Consider why (particle size, types of soil particles). Were plot samples similar to each other? Were habitat area samples similar or different?”
- Return to habitat area. Compare the soil assessments with the plant communities growing there. Discuss.
- **Plot Journal:** Based on comparisons of soil types from different areas in the habitat can you make predictions about what plant community is most adapted to your plot soil type? Support your conclusions using data from the assessments.

### Vocabulary

- **Hydrology:** the science that deals with the properties, distribution and circulation of water on or below the earth’s surface and in the atmosphere.
- **Percolation:** to pass through a permeable substance such as soil.
- **Saturation:** the state of being full of moisture, unable to absorb any more.

### Washington State EALRs

- **Science 1.1** Identify, describe, and sort materials using physical properties such as hardness, shape, state of matter, smell, temperature, texture, weight, and magnetic properties. **2.1.3** Understand how to construct a reasonable explanation using evidence. Generate a scientific explanation or conclusion including data from an investigation and an explanation of how the data supports the explanation or conclusion. **3.2.3** Understand how knowledge and skills of science, mathematics, and technology are used in common occupations.

- **Science Kit: Land & Water**

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_Soil Assessment II- Hydrology_  
*Adapted from numerous sources by Heidi Bohan/Starflower Foundation*