PRELIMINARY ACTIVITY FOR

Soil Salinity

Soil salinity is a measure of the saltiness of the soil. Many plants have trouble growing in soil that contains too much salt. High soil salinity makes it more difficult for plants to get water from the soil and can interfere with their obtaining the proper nutrients. The table below provides a general idea of the effect salinity has on plants.

Soil can become saline by the natural weathering of minerals, irrigation, or run-off from salted roads. Poor drainage and hot, dry weather also contribute to the build-up of salt in the soil. Sodium chloride, NaCl, is the most common salt, but others such as calcium chloride, $CaCl_2$, and magnesium sulfate, $MgSO_4$, are often present as well.

Soil salinity is determined by measuring the electrical conductivity of a soil-water mixture. The higher the salinity of the soil, the higher the conductivity of this mixture will be.

Plant Response to Salinity	
Salinity (dS/m)	**Plant response**
0 – 2	few problems
2 – 4	some sensitive plants have trouble
4 – 8	most plants have trouble
8 – 16	only some plants will survive
above 16	very few plants will survive

In the Preliminary Activity, you will gain experience using a Conductivity Probe and learn soil salinity measuring technique as you determine the salinity of a soil sample. Soil salinity is commonly reported in units of dS/m, deciSiemens per meter.

After completing the Preliminary Activity, you will first use reference sources to find out more about soil salinity before you then choose and investigate a researchable question. Some topics to consider in your reference search are:

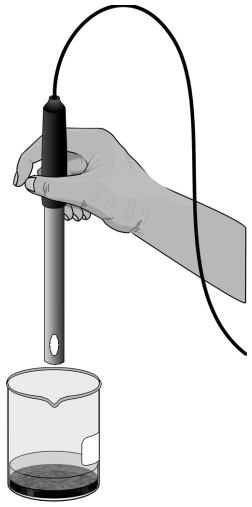
- soil salinity
- salinization
- how soil salization affects plants

PROCEDURE

1. Prepare the water-soil mixture.
   a. Place 50 g of soil into a 250 mL beaker.
   b. Add 100 mL of distilled water and stir thoroughly.
   c. Stir once every three minutes for 15 minutes. Continue with Steps 2–3 while waiting.
2. Connect the Conductivity Probe and the data-collection interface. Set the switch on the Conductivity Probe box to the 0–20000 μS/cm

salinity range (equivalent to 0.20 dS/m).

3. Calibrate the sensor using the 2-point calibration option of the Vernier data-collection program or manually enter the calibration values as directed by your instructor.



4. Collect salinity data.
   a. Place the tip of the electrode into Sample A. The hole near the tip of the probe should be completely covered by the water-soil mixture.
   b. Start data collection.
   c. Stop data collection after about 15 seconds.
   d. Use the statistics option to determine the mean salinity value.

QUESTIONS

1. What is the salinity (in dS/m) of the soil sample you tested in the Preliminary Activity?

2. According to the table on the previous page, how would plants respond to the soil sample you tested?

3. Describe two ways in which soil can become saline.

4. List at least one researchable question for this experiment.