



Designing Rain Gardens for Stormwater Solutions

Handout: Surveying in the Field

Background: Surveying is the science of measuring and mapping the land, a skill essential for engineers, geoscientists, and city planners. By collecting precise measurements, land surveyors can determine the shape, slope, and volume of landscapes or features such as rain gardens. Typically, professionals use specialized instruments such as a total station or auto level, a stadia rod, and a hand level, but the same principles can be explored with simplified tools.

Key Question: How do scientists measure the shape of the land?

MATERIALS

- ◆ meter sticks
- ◆ bubble levels
- ◆ corner brackets
- ◆ data table
- ◆ clipboard (optional)
- ◆ tape measure(s) (optional)

ROLES

- 1. Equipment Handler:** This person is in charge of handling the meter stick, corner bracket, bubble level, and tape measure.
- 2. Data Reader:** Reads the depth measurement at eye level and reports with units.
- 3. Data Recorder:** Fill out the data table and any notes about the measurements that are worth capturing.
- 4. Quality Control Officer:** Double-checks that the meter stick is vertical, units and significant figures are correct, and the data table is filled out correctly and completely.

PROCEDURE

- 1.** Each member of the group selects or is assigned a role.

- 2.** Find the transect you will measure. The Data Recorder and Quality Control Officer will stand on the edge of the rain garden near the transect your group will be measuring.
- 3.** The Equipment Handler will go to the first spot, tell the Data Recorder the name of the location based on the label on the tag, and hold the meter stick vertical at that spot using the bubble level. Be sure the 0 cm side is on the ground.
- 4.** The Data Reader will walk to the Equipment Handler, crouch down to eye level, and read out loud where the string crosses the meter stick with correct significant figures and units.
- 5.** The Data Recorder fills in the measurement in cm on the data table provided by your teacher and also records any observations or comments about the measurement in the Notes section. The Quality Control Officer makes sure the data reader was down at eye level, that the reading has the correct number of digits and units, and that everything is correctly filled in on the data sheet.
- 6.** Move to the next spot. Repeat procedure until all spots on the transect are measured.
- 7.** Measure the distance between transects:
 - a.** After all of the depths of the rain garden at the tags have been measured, the Equipment Handler will measure the distance from the transect you

just measured to the transects on either side of it. If you are working on an edge transect, measure the distance from the edge of the rain garden to the transect.

b. The Data Recorder will note these distances on the Data Table, along with any observations or comments about the measurements in the Notes section.

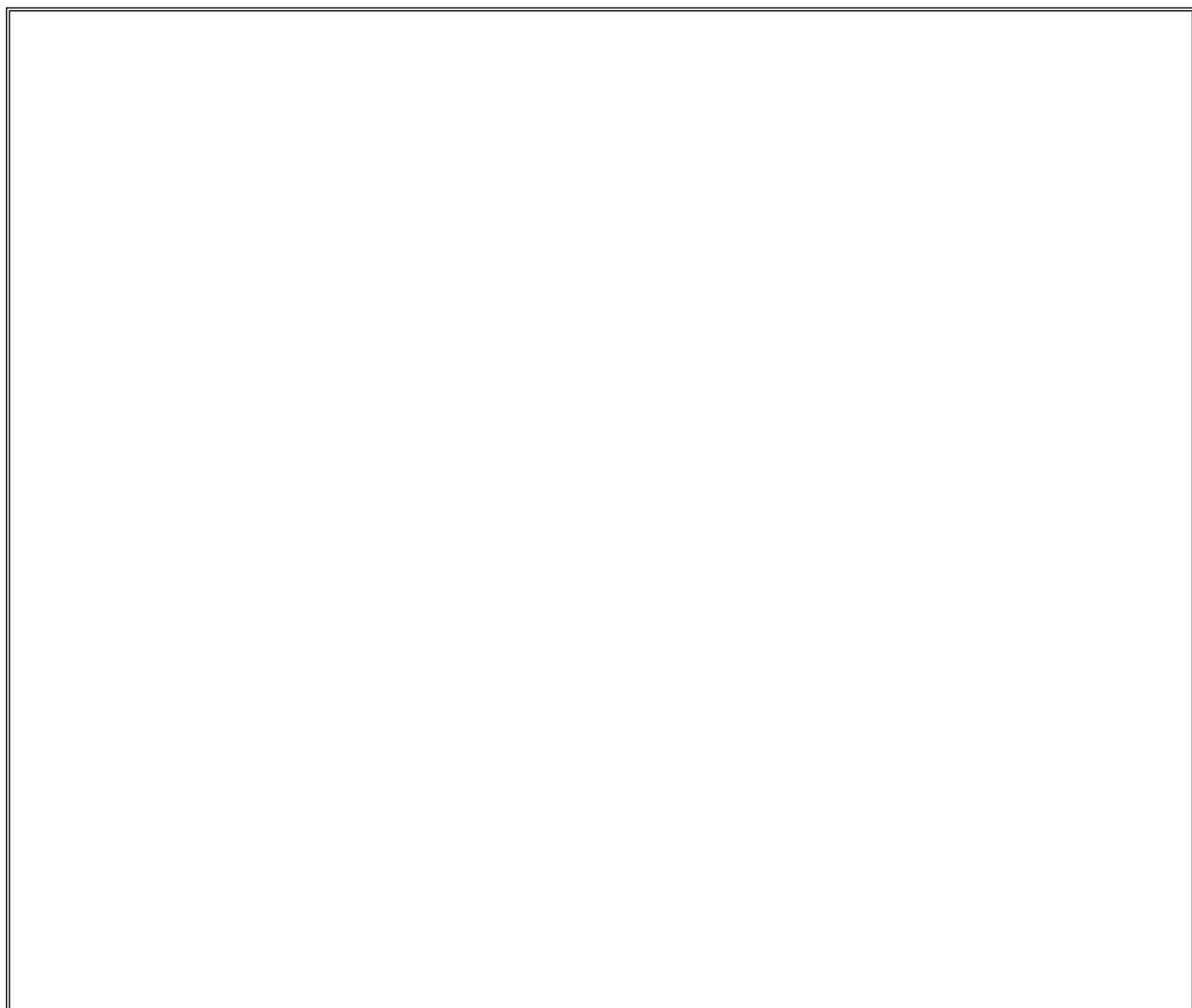
8. Move to a new transect, rotate roles, and repeat the procedure.

9. Share the data with the class.

DIAGRAM



Draw a diagram of the rain garden with the labeled transects.

A large, empty rectangular box with a thin black border, intended for drawing a diagram of a rain garden with labeled transects.

Credit: Pencil icons: The Noun Project