Name:_____ **Date:** _____

Partner(s):_____

CHARACTERIZATION of COASTAL SOIL PROPERTIES INVESTIGATION

Research Objective:

The purpose of this investigation is to characterize the physical and chemical properties of a soil horizon found beneath overlying beach pebbles. For each delineated soil horizon, the following properties will be assessed; temperature, density, soil moisture, pH, nitrogen content, phosphorous content, potassium content, permeability, porosity and water retention.

Materials:

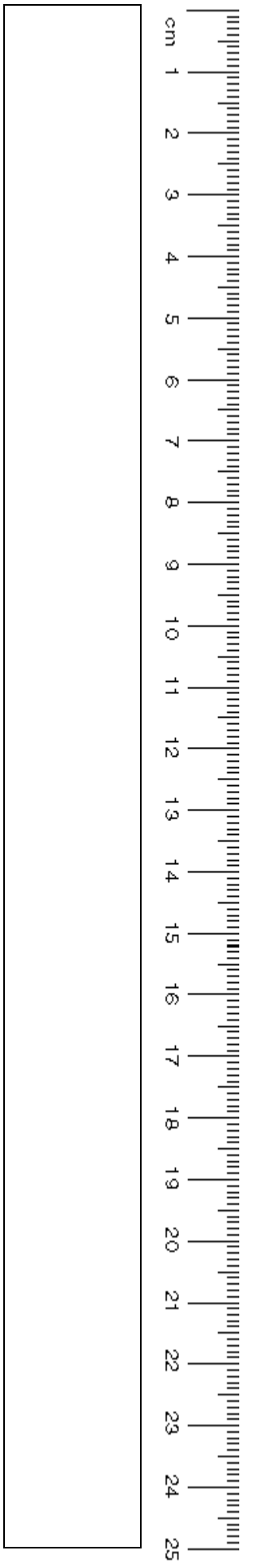
Small hand trowel
Two-inch diameter hand auger
Thermometer
4-Way Soil Analyzer or comparable hand-held soil analyzer
Sandwich bags (sealable)
Electronic scale
Graduated cylinder
Heat Lamp
Stackable sieves

Field Tests/Experiments:

1. Obtaining and Measuring Your "*Moist*" Soil Sample:
    - Use the hand trowel to scrap away overlying pebbles from your location (one of four sampling locations situated perpendicular to the shoreline, with the first location closest to the water and each successive location approximately two feet directly inland from the previous sampling location).

    - Use your *hand auger* to extract a sediment sample, approximately two feet in depth.

    - **Measure** each soil horizon present and **sketch** your results in the rectangle found along the right side margin of this page.
        - The vertical measurements of your soil horizon sketch should correspond to the actual soil horizon sample you collected.



Using the *thermometer* and the *4-Way Soil Analyzer*, **record** *temperature, moisture, pH, nitrogen (N), phosphorous (P) and potassium (K)* for each horizon on **TABLE 1** below.

2. Place your sample into the *plastic bag* provided and **label** it with your group member's names.

TABLE 1:

Horizon	Temp.	Moisture	pH	N*	P*	K*
#1						
#2						
#3						
#4						

*** N = Nitrogen, P = Phosphorous, K = Potassium**

Classroom Tests/Experiments:

3. Measuring the volume and mass of your "*Moist*" Soil Sample:
    - Complete the following and place all information on **TABLE 2** below:
        - Measure the mass of the empty graduated cylinder to the nearest 0.1g.
        - Place your soil sample into the graduated cylinder and use the wooden dowel provided to force out as much air as possible.
        - Measure the volume of your sample after being pressed to the nearest 0.1ml.
        - Measure the mass of the soil-filled graduated cylinder to the nearest 0.1g.

4. Drying your sample:
    - Evenly spread out your sample on a flat surface and place it under a heat lamp to begin drying it.
    - Leave the sample overnight to dry. Upon returning to the lab, mix the sample and allow it to dry further, ensuring that all moisture has been evaporated.

5. Measuring Your "*Dried*" Sample:
    - Complete the following and place all information on **TABLE 2** below:
        - Measure the mass of the empty graduated cylinder to the nearest 0.1g.
        - Place your soil sample into the graduated cylinder and use the press provided to force out as much air as possible.
        - Measure the volume of your sample after being pressed to the nearest 0.1cm^3.
        - Measure the mass of the soil-filled graduated cylinder to the nearest 0.1g.
    - Calculating the Moisture Content of Your Sample.
        - Using the data obtained for your moist and dry sample and the formula below, calculate the moisture content of your sample.
    - Record your value for "Moisture Content" on **TABLE 2** below.

6. Sieving Your Sample:
    - Use the *sieves* provided to separate out your soil sample by grain size. The sieves must be arranged so that the sieve with the largest spacing in the mesh is on the top and the sieve with the smallest mesh size is on the bottom.
        - Place your soil sample in the top sieve.
        - Shake the sieve back and forth vigorously for *at least* 2 minutes.
            - Check to ensure that all of your soil has passed through the sieve. <u>If not, continue to shake your sample until all sediment sizes are sorted</u>.

EQUATION:

$$\left(\frac{\text{“Moist” Sample Mass (g)} - \text{“Dried” Sample Mass (g)}}{\text{“Dried” Sample Mass (g)}}\right) \times 100$$

TABLE 2

Sample	**Graduated Cylinder Mass (g)** **(A)**	**Volume of Sample (ml)** **(B)**	**Graduated Cylinder + Sample mass (g)** **(C)**	**Sample Mass (g)** **(D) = C-B**	**Sample Density (g/ml)** **(E) = D÷B**	**Moisture Content of Sample (%)** **(F)**
Moist						
Dry						