1.1) INSTRUCTOR'S GUIDE TO EVALUATING SOIL TEXTURE

Overview: If you choose to evaluate silt-loam, you will need to consult an agronomist about getting a sample. The silt-loam below was donated by Professor Delvin S. Fanning of the University of Maryland:

Sample Results for Lab 1.1

	Strength (grams applied)	Infiltration (seconds)	Water-holding capacity (mL)
Sand	200-400	10	50
Clay	19,000	1080	100
Top soil	400	60	260
Silt-loam	12,000	60	85

To prepare all the soils for the lab and assure that you have uniform samples that are at their maximum capacity for absorbing water, dry all soil samples in the drying oven and "sift" each sample by passing them through the sieve in order to break down solid clumps and to remove rocks and wood fragments (You may need a large pestle to break down the chunks of clay so they will be small enough to pass). Do not set the drying oven to temperatures higher than 140 °F (60 °C); otherwise, you might damage the organic matter in the topsoil.

Answers to post-lab questions: 1) Superior infiltration, aeration and workability. 2) Poor water retention. 3) Superior water retention. 4) Poor infiltration, aeration and workability. 5) Yes, all numerical measurements should be intermediate (much like the silt-loam). 6) Topsoil is intermediate only for infiltration and workability, but far exceeds sand or clay for water holding capacity. 7) For the reasons already described, topsoil provides the best textural qualities for growing plants.

Logistics: The infiltration and water-holding capacity measurements can easily be done during one period. However, because the clay absorbs water very slowly it will be necessary to wait for more than one hour for 200 mL of water to pass through the clay. If you do not have enough time in class, just measure the water that is still on top of the clay and add it to the water that has percolated after 30 minutes. This estimate is based on an assumption that the soil sample is already saturated, and that any water that remains on top is roughly equivalent to all of the water that will eventually percolate to the bottom.

Note: Topsoil that has been oven-dried may repel water before it gets moist. This artifact can seriously skew your infiltration measurement. If this happens, you might need to "pre-moisten" before measuring seconds needed for infiltration. Be sure to record the amount of water used in pre-moistening so you can add it to the total for water-holding capacity.

Degree of Difficulty: 2—Running the lab is easy. The most time-consuming part for the instructor involves grinding and sifting the clay sample prior to the lab. No rehearsal is needed. The best way to save time is to purchase dried modelling clay (for ceramics) because it is already in powdered form and does not require grinding or sifting. One disadvantage of modelling clay is that it becomes extremely difficult to crush after it is formed into a ball. If the 100% clay is too hard to crush in class, you can use the following clay percentages in clay/sand mixtures for your graph; 50%, 25, 12.5, and 0%.

Materials: One pound each of sand, clay, topsoil, and loam; a 6-inch sieve, a cloth handkerchief; a drying oven; a balance; a 1-liter beaker; a graduate cylinder; a 100-gram weight; five 200-gram weights; a brick (or similar sized block of wood); a bathroom scale; and a stopwatch.