# Soil Homework

# **INSTRUCTIONS:**

This document contains two soil analysis activities and 9 questions. The first activity, the Percolation Test, takes 3 days to complete. The second activity, the Jar Test, take 24hr. up to 3 days.

# PERCOLATION TEST

# STUDENT OBJECTIVE:

Analyze Soil Drainage with the Percolation "PERC" test

# ACTIVITY DESCRIPTION:

This is a practical at-home activity. This simple drainage test helps the gardener determine the suitability of a garden soil for growing plants.

TIME:

3 days

# MATERIALS:

- Shovel
- Ruler
- Water
- Watch/timer
- Garden Stake (optional)

# **REFERENCE MATERIALS**

UCANR Percolation Test

# ACTION STEPS:

- 1. Choose an area of your garden that currently lacks a landscape planting.
- 2. Dig a hole approximately 8in across by 12in deep.

- 3. Fill the hole with water.
- 4. Allow the water to drain completely.
- 5. Refill the hole with water.
- 6. If you have a garden stake, hammer the stake into the bottom of the hole and mark the level of water.
- 7. Allow the water to drain overnight.
- 8. Measure the number inches the water has dropped.
- 9. Divide the inches the water dropped by the number of hours elapsed

## Considerations:

- The size and depth of the hole is somewhat arbitrary. For example, a hole that is one foot deep is useful because a lot of plants root within this depth. The width of the hole doesn't really matter, but if you dig too wide it will take more water to fill.
- For tree crops it could be helpful to dig a deeper hole since they can root 2-4 feet deep. Water should be put in the hole and allowed to drain so the soil will be saturated when the final test is done. Dry soil will accept water more readily and you will want to know what happens when the soil is wet.
- The interpretation of measuring how fast the water drains on the second fill is also a bit arbitrary. One-quarter inch or more per hour is considered good for most plants. Some plants that require excellent drainage might do better with faster drainage. Soils that accept water at 1/10 inch or less are going to limit plant growth because the soil will stay saturated for a longer period after heavy rain or irrigation.

## QUESTIONS

- 1. How many inches did the water drop? Based on the "considerations" above, what do the results suggest?
- 2. What are some factors that will affected the infiltration of water into the surrounding soil?
- 3. What kind of soil texture and soil structure would have poor drainage?

# JAR TEST

# STUDENT OBJECTIVE

Analyze Soil Texture by using a sedimentation test.

## ACTIVITY DESCRIPTION

This is a practical at home and in-class activity. This simple texture test helps the gardener determine the suitability of a garden soil for growing plants.

#### DURATION

24 hours - several days

## TOOLS AND SUPPLIES

- Small garden shovel or trowel
- 1 mason jar or other cylindrical clear container with lid.
- Tape
- Marker

## REFERENCE MATERIALS

- Soil Texture Triangle
- Soil Texture Computation

#### ACTION STEPS (COMPLETE STEPS 1-4)

- 1. Obtain a sample of soil from your garden (approximately 3 cups)
- 2. Fill the container two-thirds full with water. Add soil until the water level is nearly to the top of the container.
- 3. Cap and shake vigorously. Set the container on a level surface and allow time for the particles to settle. The smallest particles may take overnight or even several days to settle.
- 4. Using a permanent marker, mark the different layers on the container. Label these layers, form the coarsest to finest (bottom to top), as sand, silt, and clay.

- 5. By measuring each layer of soil and the overall height of the soil, calculate the percentage of each component by using the Soil Texture Computation Chart
- 6. Plot your percentages on the Soil Texture Triangle.
- 7. Compare your results to the Soil Texture Triangle to determine the overall texture.

#### CONSIDERATIONS

Please complete steps 1-4 at home. This is important because as your jar is transported to class the layers will likely mix. The marks made on the jar in step 4 will allow you to complete the remained of the soil analysis in class (steps -5-7).

### QUESTIONS

- 1. Explain how soil composed predominantly of sand affects soil drainage.
- 2. How could a home gardener modify his/her practices to grow plants in a sandy soil?
- 3. What problems would a soil composed predominately of clay present to a home gardener?
- 4. How could a home gardener modify the texture of a clay soil.
- 5. How could a home gardener modify their practices to grow plants in clay soil?

6. What irrigation and fertilization strategies would you use for the plot that you tested? Consider the existing planting adjacent to the plot and the purpose of the plot.