Soil Particle Size Distribution

Lab Guide

Task

To determine the particle size distribution for each horizon in a soil profile

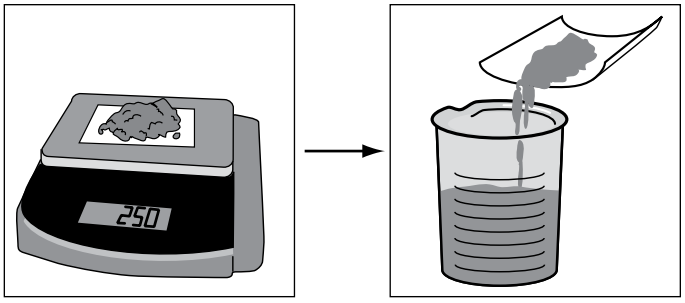
What You Need

- ❑ Dry, sieved soil
- ❑ 2 Liters distilled water
- ❑ Three 250 mL or larger, beakers
- ❑ 1 empty plastic 2 liter bottle
- ❑ Hydrometer
- ❑ Thermometer
- ❑ Plastic wrap (or other cover for cylinder)
- ❑ *Particle Size Distribution Data Sheet*
- ❑ 100-mL graduated cylinder
- ❑ Pencil or pen
- ❑ Soil dispersing reagent
- ❑ 500-mL clear cylinders
- ❑ Squirt bottle for washing soil out of beaker
- ❑ Meter stick
- ❑ Balance accurate to within 0.1 g

In the Lab

1. Prepare the dispersing solution by mixing 50 g of Sodium Hexametaphosphate (or other soil dispersing agent such as non-sudsing dishwater detergent) in 1 L of distilled water. Stir or shake until the dispersing agent has completely dissolved.

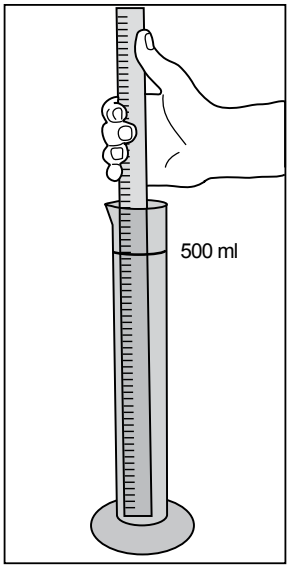
2. Weigh 25 g of dried, sieved soil and pour it into a 250 mL or larger container.



3. Add 100 mL of the dispersing solution and 50 mL of distilled water to the beaker. Stir vigorously with a spoon or stirring rod for at least one minute. Be sure the soil is thoroughly mixed and does not stick to the bottom of the beaker. Do not let any of the soil suspension spill out the top. Rinse any soil off the spoon or stirring rod into the container using a little distilled water.

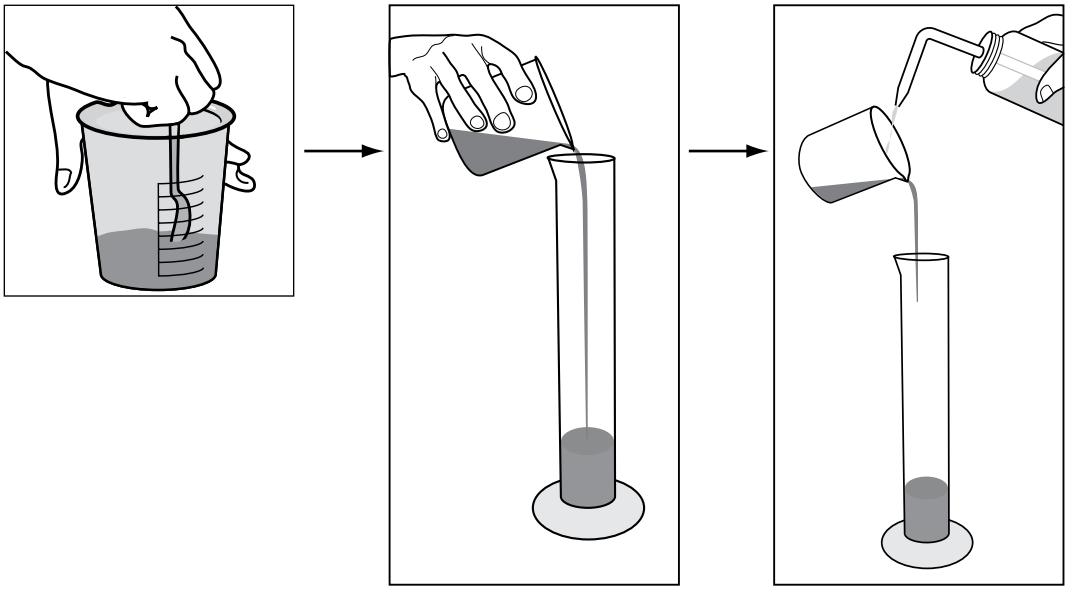
4. While the soil suspension is sitting, measure the distance between the base and the 500 mL mark of the cylinder. Place the meter stick inside the cylinder to get this measurement.

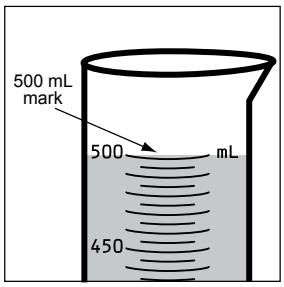
   Read the temperature at which your hydrometer has been calibrated (such as 15.6° C [60° F] or 20° C). This value is found on the body of the hydrometer.



5. Complete the top section of the Particle Size Distribution Data Sheet.

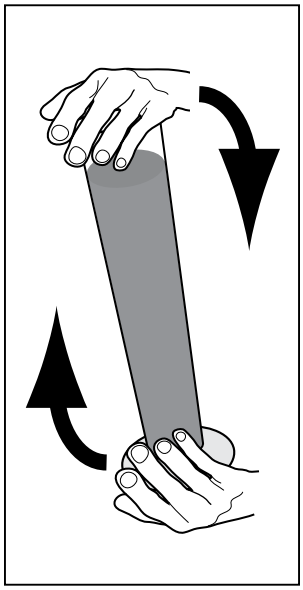
6. After at least 24 hours, stir the suspension in the container and pour it into a 500 mL graduated cylinder. Use a squirt bottle to rinse all soil out of the container and into the cylinder.

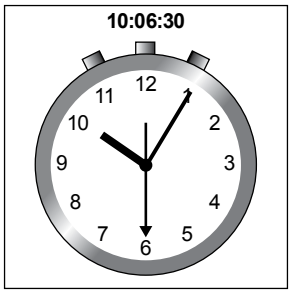




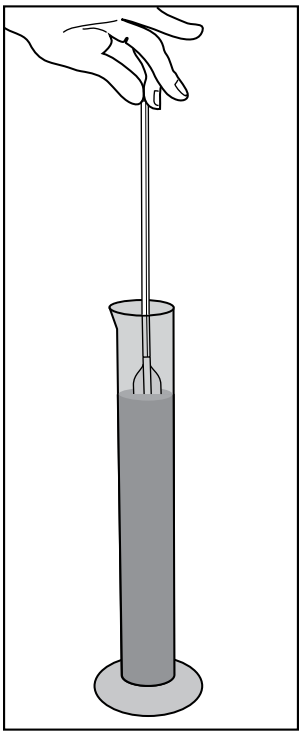
7. Add enough distilled water to fill the cylinder to the 500 mL mark.

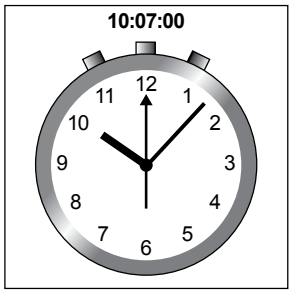
8. Securely cover the top of the cylinder using plastic wrap or other cover. Place your hand over the mouth of the cylinder and mix the soil suspension vigorously by rotating the covered cylinder hand-over-hand at least 10 times. Be sure that the soil is thoroughly mixed in the suspension and that no soil is sticking to the bottom of the cylinder. Also, try not to let any of the soil suspension leak out of the top of the cylinder.
9. Gently set the cylinder down in a safe place and immediately begin timing with a stopwatch or clock that has a second hand.
10. Record the time that the cylinder was set down to the second. (In the example to the right, the starting time is: 10:05 and 0 seconds.)
11. After **1 minute and 30 seconds** has passed, carefully lower (do not drop) the hydrometer into the cylinder and let it float in the soil suspension. Carefully steady the hydrometer to stop its bobbing motion.





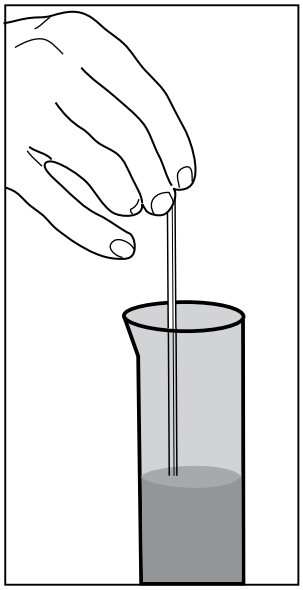
Time Cylinder was set down





Time Hydrometer is read

12. At exactly **2 minutes** after the cylinder was set down, read the line on the hydrometer that is closest to the surface of the soil suspension and record that number on the *Particle Size Distribution Data Sheet*.



13. Remove the hydrometer, rinse it away from the cylinder, dry it and gently put it down in a safe place.

14. Suspend the thermometer in the suspension for about one minute.

15. At the end of a minute, lift the thermometer from the suspension enough so that you can read the temperature and record the result on the *Particle Size Distribution Data Sheet*.

16. Rinse the thermometer off and dry it.

17. Leave the cylinder undisturbed for 24 hours. After 24 hours, take another hydrometer and temperature reading. Record the results on the *Particle Size Distribution Data Sheet*. (The 24-hour hydrometer reading should be 24 hours from the initial timing start.)

18. Discard the soil suspension by pouring it into a special pail and spill the contents outside in a special place for discarding soil materials.