Printable worksheet

Soil jar test: discover your soil's texture

A soil texture sedimentation test: shake soil and water in a jar, measure the sand, silt and clay layers and work out percentages to classify your soil.

Ages	Time needed	Materials
8–14 (younger children with adult help)	20 minutes setup, readings at 1 minute, 2 hours and 2–3 days	Clear, straight-sided jar with a tight lid (plastic for younger children), Soil sample, about 1 to 2 cups, Old sieve or colander, Water, Non-foaming dishwasher detergent, 1 teaspoon (handled by an adult), Permanent marker or masking tape, Ruler with millimetres, Calculator, Pencil and this sheet

Learning goals

By the end of this activity you will be able to:

- Name the three main mineral particles in soil: sand, silt and clay.
- Explain why particles of different sizes settle at different speeds.
- Measure layers and calculate percentages.
- Describe your soil's texture and what it might mean for plants and water.

Your question

What is our soil made of?

My prediction (circle one): mostly sand / mostly silt / mostly clay / a mix

Step-by-step instructions

1. **Collect soil.** With an adult, dig a sample from just below the surface in a place where you have permission. Note where it came from.
2. **Prepare it.** Remove stones, roots, leaves and twigs. Press the soil through an old sieve or colander to break up lumps.
3. **Fill the jar.** Put soil in the jar until it is about one-third full.
4. **Add water.** Fill the jar with water to about three-quarters full, leaving space at the top.
5. **Add detergent (adult).** An adult adds one teaspoon of non-foaming dishwasher detergent. This helps the particles separate.
6. **Shake.** Screw the lid on tightly. Shake hard for several minutes until there are no lumps and the mixture looks even.
7. **Reading 1 (1 minute).** Put the jar on a flat surface where it will not be moved. After 1 minute, mark the top of the layer that has settled. This is **sand**.
8. **Reading 2 (2 hours).** After 2 hours, mark the top of the next layer. This is **silt**.
9. **Reading 3 (2–3 days).** When the water has mostly cleared, mark the top of the final layer. This is **clay**.
10. **Measure.** Use the ruler to measure the thickness of each layer in millimetres, and the total thickness of all three.
11. **Calculate.** For each layer: (layer thickness ÷ total thickness) × 100 = percentage.

Recording table

Soil collected from: _____ Date: _____

Layer	Time marked	Thickness (mm)	Percentage of total (%)	What it looks like
Sand (bottom)				
Silt (middle)				
Clay (top)				
Total			100	

Draw your jar and label the layers:

My jar

My soil is mostly: _____

If you have access to a soil texture triangle, use your three percentages to find your soil's texture class: _____

Reflection questions

1. Which layer settled first? Why do you think the biggest particles sink fastest?
2. Was there anything floating on the water? What might it be?
3. Was your prediction correct?
4. If your soil is mostly sand, what might happen to rainwater that falls on it? If it is mostly clay?
5. Compare your results with a sample from a different place. What was different?
6. Why might a farmer or gardener want to know their soil's texture?

Safety notes

- An adult should handle the detergent. Keep it away from eyes and mouths, and rinse with water if it splashes.
- Make sure the lid is on tightly before shaking. Use a plastic jar if a glass one might be dropped.
- Dig only where you have permission, away from roads, and avoid soil where animals go to the toilet.
- Wear gloves if you have cuts on your hands, and wash your hands with soap afterwards.
- Do not drink the water or put soil near your mouth.
- Pour the finished mixture onto a garden bed, not down the sink, where it could cause a blockage.

Background for adults

The jar test is a simple sedimentation method used by university extension services. Particles settle at different rates depending on size: coarse sand within about a minute, silt within a couple of hours, and fine clay over about two to three days. Clemson Cooperative Extension's jar test factsheet recommends readings at 1 minute, 2 hours and 48 hours, then calculating each layer as a percentage and reading the result on a soil texture triangle.

Colorado State University Extension's GardenNotes #214 adds a teaspoon of non-foaming dishwasher detergent to help particles separate and notes the approximate particle sizes: sand 0.05–2.0 mm, silt 0.002–0.05 mm and clay smaller than 0.002 mm. It also describes a quick feel and ribbon test that pairs well with the jar test.

Results are estimates. Organic matter may float, and layer boundaries can be hard to see, so treat percentages as approximate. For a fuller explanation of soil texture and plant growth, see the related article on soil and plant science basics.