

The soil water shake test

Investigate the components of soil

- Show pupils a pile of soil, and ask how we might be able to find out what different things go to make up a soil.
- Follow up the class's suggestions by showing them an empty coffee jar with its lid and a jug of water, and ask if this might help them to suggest a method.
- Tip the soil into the jar. Then fill up about three quarters of the jar with water and screw on the lid. Ask if this has helped to sort out the different bits in the soil. (*Probably not*). NB. It is advisable to wear disposable gloves when handling natural soils, to avoid infection)
- How might we improve the separation? (*Shake it up*).
- Shake the jar and ask, "What can you see happening?" (*The soil is settling out – some very quickly, and a lot taking longer*).
- Can you explain what you have seen? (*The bigger bits fell to the bottom because they are not suspended by the water. The finer bits remain in suspension in the water and made it cloudy*).
- Ask pupils to predict what changes they will see if the jar is left without shaking for half an hour. (*More bits might float to the top, because they are less dense than water; the cloudy water might clear a little; layers might begin to form*).
- If possible leave the jar until the next lesson, or display a similar jar with the same soil mixture which you have set up the day before.
- Ask where pupils think the ingredients of the soil came from. (*From the rocks underneath, and from the plants growing in the soil*).
- Ask if there is anything missing from our sample which pupils might expect to see in the soil, and if there is anything present that they can't see. (*Worms and other small animals. Microbes and fungi. Some of the soil might have dissolved in the water and become invisible. Soils also contain air and water*).
- Ask the pupils to draw what they can see in a diagram. They can add labels to their diagrams: small pebbles or gravel; sand; mud; pieces of decaying plant; muddy water.



A coffee jar of soil after shaking and allowing to settle.

The back up

Title: The soil water shake test

Subtitle: Investigate the components of soil

Topic: A teacher demonstration (or a small group activity) showing how the components of soil may be separated and studied

Age range of pupils: 8 – 9 years

Time needed to complete activity: Simple demonstration – 5 minutes, but at least 20 minutes with follow up by pupils, preferably with delay between inspections of the jar to allow for settling

Pupil learning outcomes: Pupils can:

- observe the outcomes of simple demonstrations;
- measure the time taken for different sizes of soil particles to settle out;

- explain that soil consists of several constituents, some of mineral origin of different sizes and some of plant or animal origin.

Context: A simple activity to enhance the learning about soils at Primary level

Following up the activity: Encourage pupils to investigate the soil from their own school grounds or garden.

Use one or more of the soil activities at:

<https://www.earthlearningidea.com/English/EarthMaterials.html#soils>



A sandy soil with little humus content



A heavy clay soil with humus but subject to waterlogging
(Photos: Peter Kennett)

Underlying principles:

- Rock weathers by physical and chemical processes and the broken pieces form the inorganic component of soils.
- Litter, (decayed plant matter) and humus, (decomposed litter and animal remains) comprise the organic components of soils.
- Soils also contain air and water as well as microbes, fungi and small animals.

Thinking skill development:

Construction –building up a pattern of the settling process; Metacognition – considering thinking of explanations for different settling rates; Bridging – relating the coffee jar investigation to real soil.

Useful links: Video “The soil water shake test”

https://www.earthlearningidea.com/Video/Pr_Soil_water_shake.html

Resource list:

- empty transparent plastic coffee jar or similar, with a close-fitting lid
- loose soil, either dug from the garden, or made up using different grades of sediment from gravel to clay, leaf litter and garden compost
- water
- disposable gloves

Source: Developed for the Earth Science Education Unit from the ESTA Primary activity ‘Separating Soil by Settling in Water’ by Tony Comerford, Julie Shenton, Clare Dawe, Ruth Oakes and Elizabeth Devon

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