

Soil doughnuts Sorting out soils

Lay out some different soil types ranging from sandy to heavy clay. Show the pupils a copy of the table opposite.

Ask the pupils to:-

- if possible, wear the plastic gloves provided. (If these are not available, hands must be washed carefully after handling soil);
- take a plastic cupful of one of the soil types;
- the soil should be damp, not wet - add a little water if necessary, (help may be needed with this);
- squeeze the soil and knead it like bread dough;
- try to make the shapes shown on the table in order from 1 to 7;
- identify their soil type by looking at the table. If they can make a ball but not a sausage, then their soil is a sandy loam. If they can make a horseshoe but not a tyre, their soil is a clay loam;
- suggest which soil will let rain go through most easily and which one will hardly let any rain through;
- decide which soil it would be best to have in a garden;
- suggest why the type of soil in a garden, or on a farm, is important.

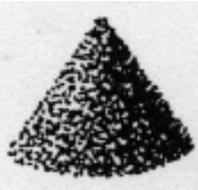
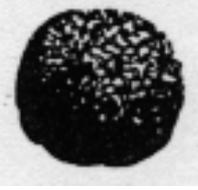
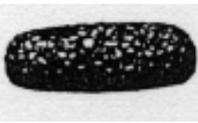
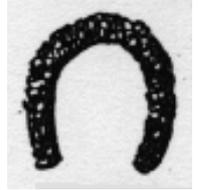
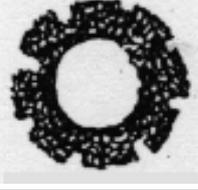


Sandy soil
(forms cone
but not ball)

Silt loam
(forms sausage
but not worm)

Light clay
(forms horseshoe
and tyre but not
inner tube)

Three different soil types *Photo: Elizabeth Devon*

	Shape	Soil type	Picture
1	cone	sandy	
2	ball	sandy loam	
3	sausage	silt loam	
4	worm	loam	
5	horseshoe	clay loam	
6	tyre	light clay	
7	inner tube	heavy clay	

Soils table from an unknown source

The back up

Title: Soil doughnuts

Subtitle: Sorting out soils

Topic: This activity can be used in any lesson about the environment, rocks and landscape, agriculture, gardening or investigations out of doors.

Age range of pupils: 6 - 18 years

Time needed to complete activity: 20 minutes

Pupil learning outcomes: Pupils can:

- identify types of soil;
- decide which soil lets water through easily and which does not;
- suggest a suitable garden soil;
- realise that the type of soil is important for good crops to be produced.

Context: Sandy soils allow water through easily and clay soils do not. Gardeners usually prefer loam soils. For a farmer or gardener, it is important to know the soil type so that it can be managed properly and crop production increased.

Following up the activity: Pupils could find out how soils develop and why it is important to understand and conserve soils.

They could try the following Earthlearningideas:-

- Make your own soil
- Soil layers puzzle
- Permeability of soils - 'The great soil race'.
- Why does soil get washed away?
- Darwin's 'big soil idea' (make your own wormery).

Underlying principles:

- Loam is a mixture of 40% sand (usually quartz grains), 40% silt (usually quartz and feldspar grains, smaller than sand) and 20% clay (very small particles of clay minerals).
- Loam soils contain more nutrients and humus (decayed material) than sandy soils.
- Loams are easier for gardeners and farmers to dig and plough than clay soils.
- Loams are easy to work over a range of moisture conditions; they retain more moisture than sandy soils and allow better drainage than clay soils.
- The soils of most successful farming areas around the world are loams.

Thinking skill development:

Pupils can see a pattern as they try to make various shapes. Many children think all soils are the same and finding that there is a lot of variety causes cognitive conflict. Discussion of soil types is metacognition and applying the soil types to the farming world involves bridging.

Resource list:

- a range of soil types from very sandy to heavy clay
- disposable plastic gloves (if available)
- hand washing facilities
- plastic cups
- jug of water

Useful links: Soil-net <http://www.soil-net.com>

'Working with Soil' - activity pack and booklet (Waldorf the Worm ISBN 873266 16 2), ESTA Primary Committee, Earth Science Teachers' Association, 2003.

Source: Elizabeth Devon, Earthlearningidea team.



Photos: Elizabeth Devon

The progression of thinking skills shown by the Earthlearningidea 'Soils' activities

Earthlearningidea	Strategies and skills development
Make your own soil: investigating type and origin of the ingredients of soil.	Pupils discover the ingredients of soil. The ingredients can be varied to make different soils.
Soil doughnuts: sorting out soils.	By experimenting with different soils, pupils discover that different soils have different properties depending on their ingredients.
Soil layers puzzle: make your own soil profile and investigate others.	Pupils now realise that other factors apart from ingredients, affect soil types.
Permeability of soils - 'The great soil race': investigating the properties of different soils by pouring water on them.	Different soils have different permeability.
Why does soil get washed away? - investigating why some farmers lose their soil through erosion whilst others do not.	The essential minerals in soils can be easily eroded. Pupils become aware of this and can suggest remedies.
Darwin's 'big soil idea': can you work out how Charles Darwin 'discovered' how soil formed?	Pupils discover for themselves how a great scientist formed his ideas about soils.

© **Earthlearningidea team.** The Earthlearningidea team seeks to produce a teaching idea regularly, at minimal cost, with minimal resources, for teacher educators and teachers of Earth science through school-level geography or science, with an online discussion around every idea in order to develop a global support network. 'Earthlearningidea' has little funding and is produced largely by voluntary effort.

Copyright is waived for original material contained in this activity if it is required for use within the laboratory or classroom. Copyright material contained herein from other publishers rests with them. Any organisation wishing to use this material should contact the Earthlearningidea team.

Every effort has been made to locate and contact copyright holders of materials included in this activity in order to obtain their permission. Please contact us if, however, you believe your copyright is being infringed: we welcome any information that will help us to update our records. If you have any difficulty with the readability of these documents, please contact the Earthlearningidea team for further help.

Contact the Earthlearningidea team at: info@earthlearningidea.com

