All About Soil

Lesson Plan

This lesson outline gives a structure to learning about soil, covering the following:

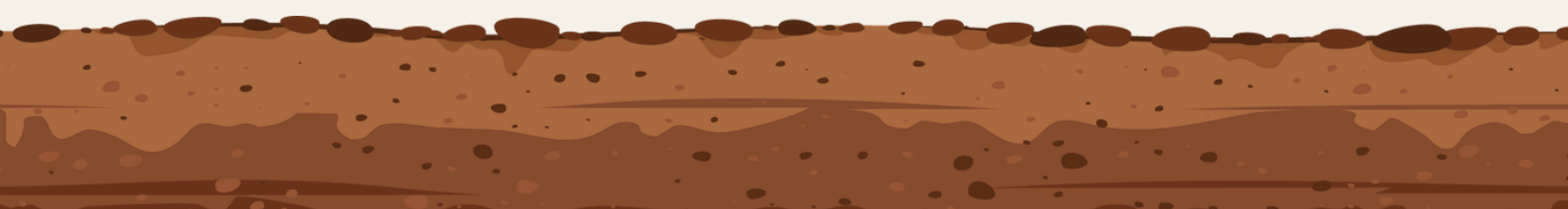
1. Why is soil important?
2. What is soil made from?*
3. What are the different types of soil?
4. How does healthy soil help us combat climate change?

We recommend carrying out the following activity first (which relates to section 2), detailed in the soil-net.com resource, at the start of your session or at the end of the previous day as it takes a while for the soil to separate and settle.

www.soil-net.com/sm3objects/activities/Activity_JamJar.pdf

You will need:

- Jam jars
- Different soil types (sandy, clay, loam - see section 3 for details)
- Water



1. Why is soil important?

To establish what your pupils already know about soil, ask them the following questions:

- Do you think soil is important? Why or why not?
- What is the purpose of soil? What do we use it for?

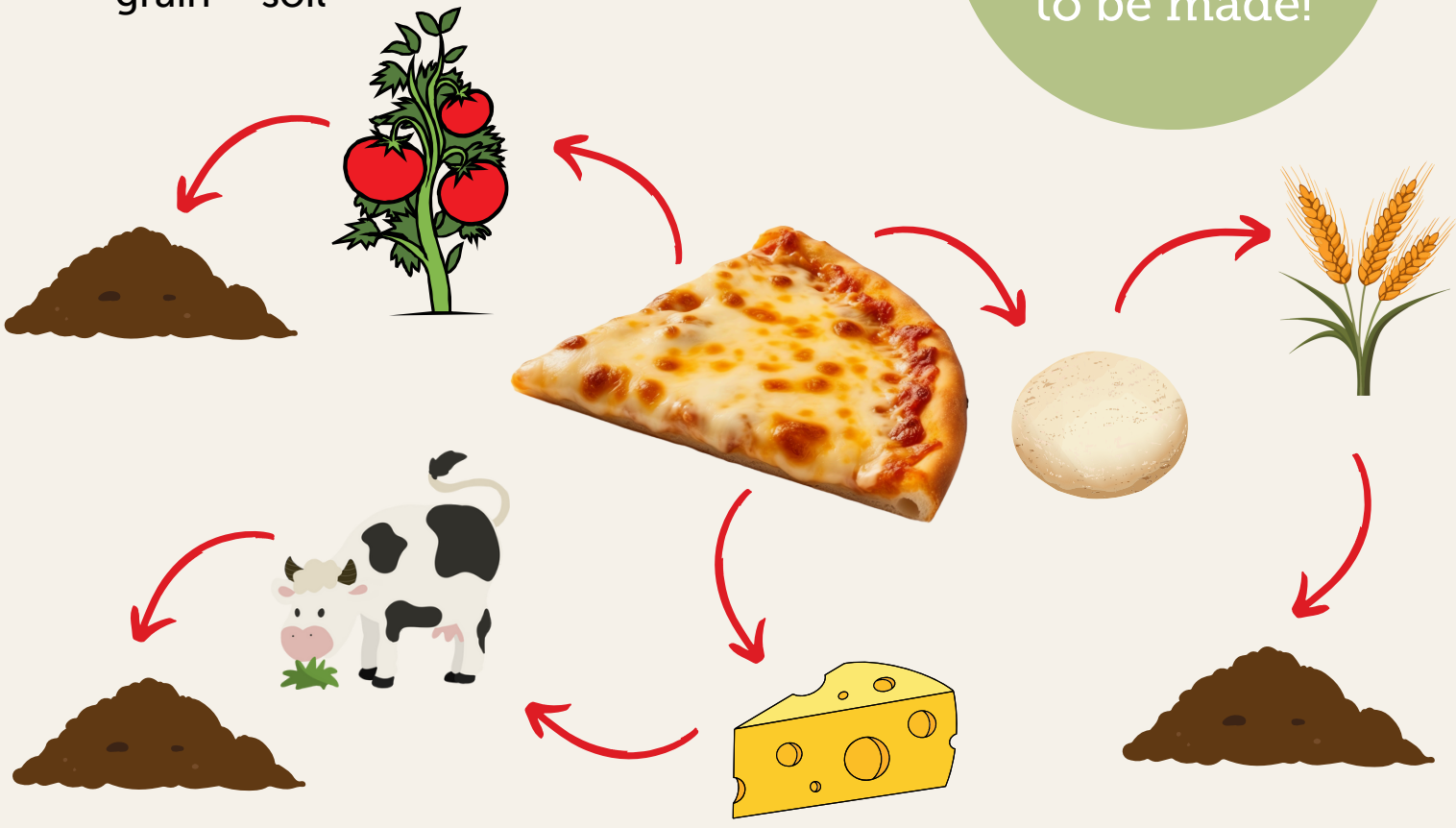
Likely responses will be about food, plants, and housing in some parts of the world.

Focus on food and plants. Ask pupils if they can think of a food, apart from seafood, that doesn't in some way rely on soil to be made. They are likely to suggest foods like sweets and pizza. Discuss how these foods connect back to and rely on soil.

Examples:

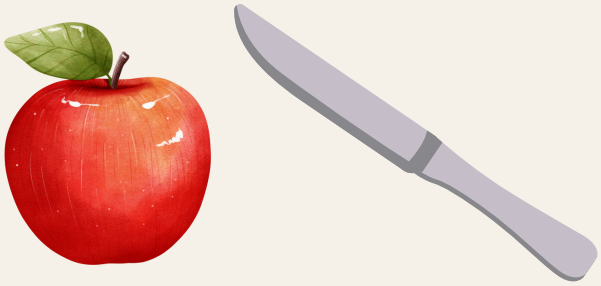
- Sweets: sugar cane – soil
- Pizza: dough (wheat) – soil; tomatoes – soil; cheese – milk – cow – eats grass or grain – soil

Key fact: 95% of our food relies on soil to be made!



Apple activity

This is a great way to demonstrate how much of the Earth's surface is available for growing food.



You will need:

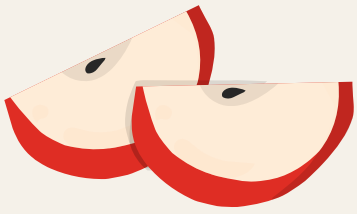
- An apple
- A knife

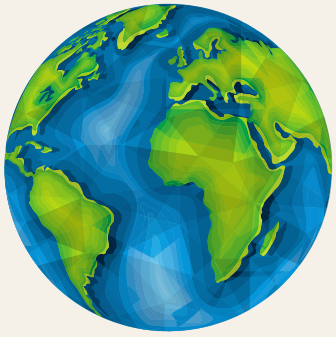
Cut the apple up into the amounts indicated below, putting the amounts aside each time to show how much of the earth's surface is unavailable for growing food.

When you cut the apple up into four quarters, three of those represent the amount of Earth's surface which is water. Half of one of those quarter slices represents how much is ice, deserts, swamps and mountains. Keep cutting the apple slices into smaller pieces to demonstrate the amounts listed below.

- 3/4 of Earth's surface is water
- 1/8 is ice, deserts, swamps and mountains
- 3/32 is too rocky, wet, cold, steep or has been built on – houses, roads, schools etc.
- This leaves only 1/32 to grow 95% of all the food eaten by over 7 billion people on the planet, and the soil on that area is only about 1.5m deep

You could show this film when you're cutting up the apple too: Apple as Planet Earth. This illustrated film is clear and concise and you only need to play the first 30 seconds.

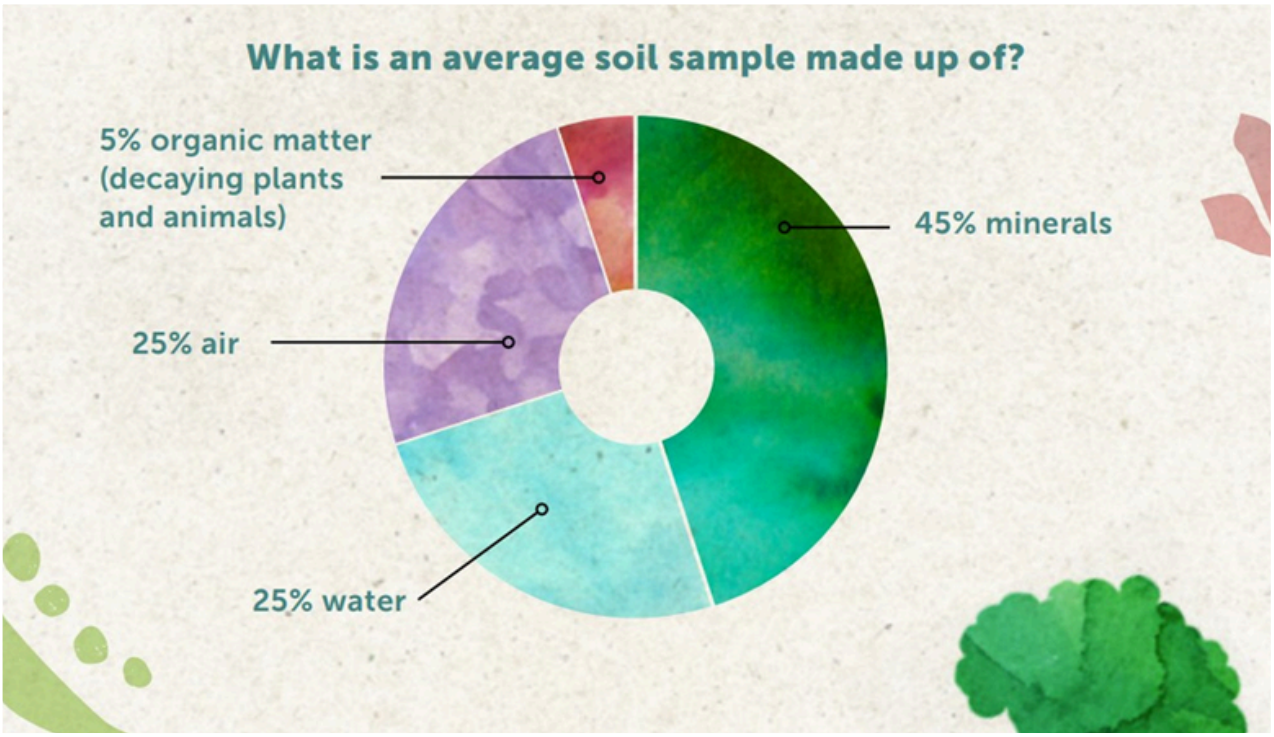




2. What is soil made from?

*See activity listed above, before section 1.

Discuss the pie chart below. This is available as a separate PDF file here.



This BBC Bitesize video is a fun way to further illustrate what soil is made from and also introduces different types of soil:

www.bbc.co.uk/bitesize/topics/z9bbkqt/articles/ztvbk2p

Topsoil, the top layer of soil that we use to grow food and plants that is home to millions of living things, is the one pupils will most likely have heard of.

See page three of our All About Soil resource for a colouring page showing the different layers of the earth from bedrock to topsoil, for pupils to label and colour. Information to share on these different layers can be found in our Soil Factsheet for Teachers.

3. Different types of soil

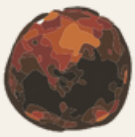
Farmers need to know what soil types they have on their farm so they can decide how best to use their land: which crops will grow best and which is best for grazing animals.

Use the method on page one of our All About Soil resource to learn more about the different types of soils. Discuss the pros and cons of different soil properties for plant growth, using the information provided with this activity.

Pupils can try making each of the shapes below with soil. The last one they're able to make will indicate which type of soil it is.

Cone

Sand. This soil contains sand and is rough to touch. This soil is low in nutrients as water drains through it quickly, washing it away.



Ball

Silt. Retains moisture but can be slow to drain, this is a good soil if you look after it. Smooth to touch and can feel soapy when wet.

Worm

Loam. A mix of clay, sand and silt which is mouldable but does not feel sticky.

Broken bent worm

Chalk. Gritty and dry to touch, this soil is stony and free draining but can suffer from poor plant growth.

Smooth bent worm

Clay. This soil has the smallest size grains, it's smooth when dry and sticky when wet. It holds nutrients well and is a good soil to grow plants in.

4. How does healthy soil help us combat climate change?

Globally, we lose the equivalent of 30 football pitches of soil every minute to degradation due to intensive farming and more frequent extreme weather events.

Watch our film, Meet the Soil Heroes and ask your pupils to listen out for the reasons why soil is good for preventing climate change.

Carbon storage

- Soil stores more carbon than the world's plants, forests and atmosphere combined.
- UK soils store 10 billion tonnes of carbon.
- Healthy soils capture carbon dioxide as soil organic carbon.

Extreme weather events

- Healthy soils can store lots of water with the help of organisms, organic matter and good soil management. This makes them a vital resource for protecting against flooding and droughts.
- A single hectare of soil has the potential to store and filter enough water for 1000 people for one year.

Further resources on soil can be found on our Learning and Skills Hub:

www.foodforlife.org.uk/learning-and-skills/farming-climate-and-nature/nature/