

4.2.21

T: Can I explain how soil is formed?

Success Criteria

- I can state that soil is composed of different things.
- I can describe the 4 processes of soil formation.

Soil

What is soil?

What is soil made from?



What Is Soil Made Of?

Soil is the uppermost layer of the Earth. It is a mixture of different things.

Air

Soil contains gases such as carbon dioxide, oxygen, nitrogen, methane and radon.

Water

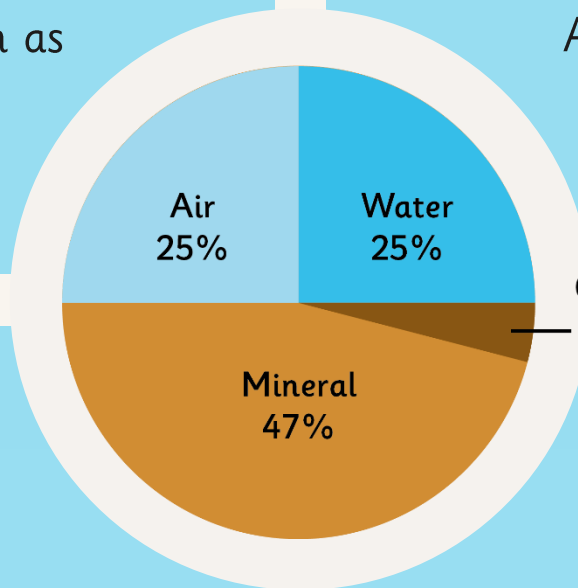
Air and water fill the gaps between particles of soil.

Mineral

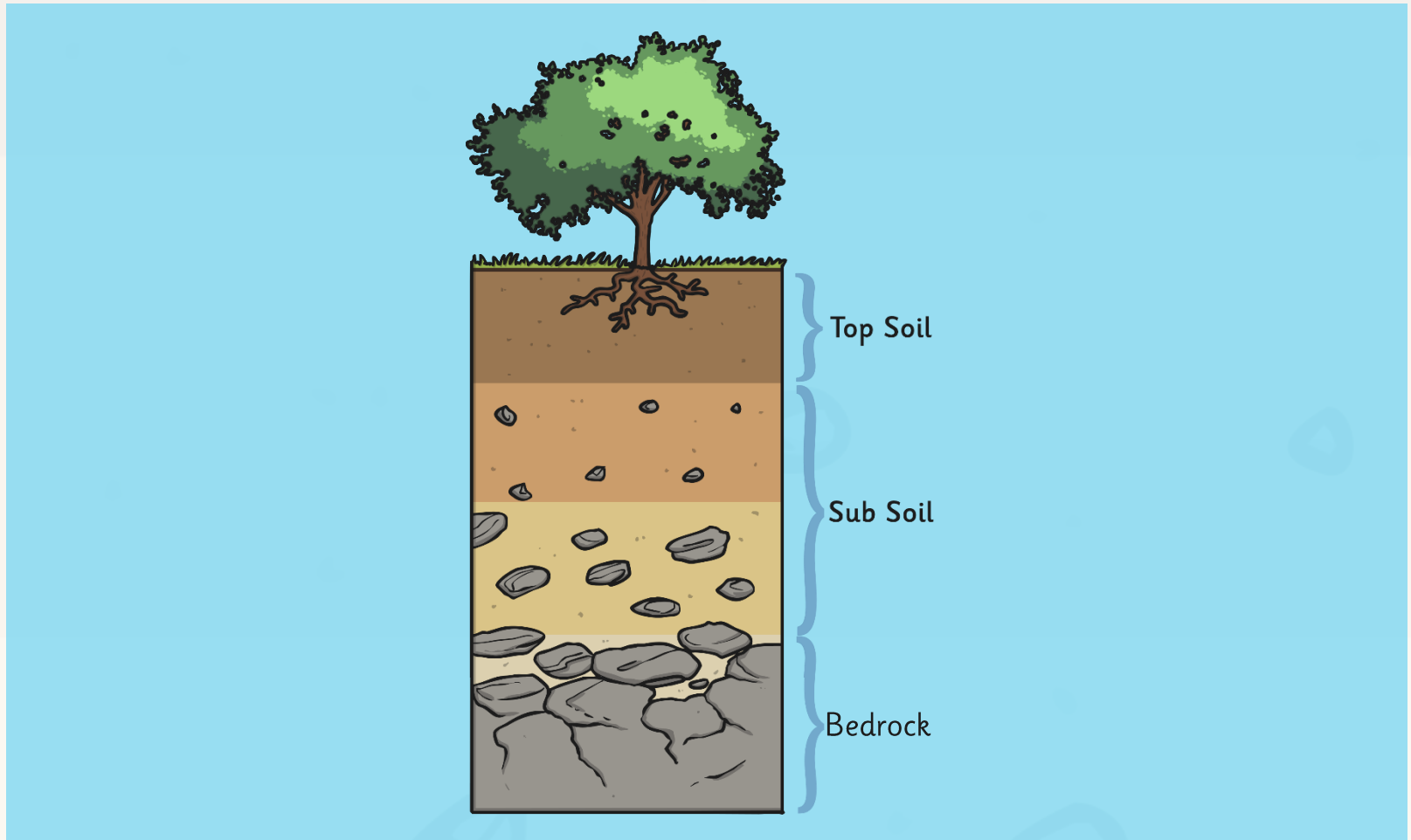
The minerals in soil come from finely broken down rock.

Organic Matter

Organic matter includes both living and decaying animals and plants.



Layers of Soil



Soil Formation

There are 4 main processes involved in soil formation:

Additions



Losses



Translocations



Transformations



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Soil Formation

Additions

Rainfall adds water.

Dust adds minerals.

Animal waste adds organic matter and nutrients.

Decaying plants and animals add organic matter.

Humans add fertiliser. Fertilisers contain minerals and nutrients. Natural fertilisers are made from animal waste and organic matter. Human-made fertilisers are made from chemicals.

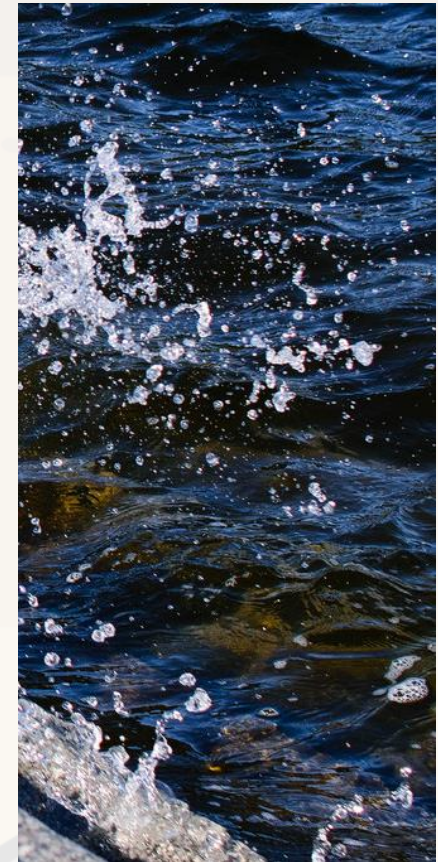


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Soil Formation Losses

Water evaporates (turns into gas when hot) into the air.

Soil particles can wash away in storms.

Organic matter can turn into the gas carbon dioxide.

Nutrients and Minerals are taken up by plants and can drain into groundwater.



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Soil Formation

Translocations

Translocations are movements within the soil.

Gravity pulls water down from top to bottom.

Evaporating water draws the minerals up from the bottom to the top.

Animals living in the soil move the soil around in every direction.



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Soil Formation Transformations

Transformations occur when something changes into something else.

Humus is what is left when dead leaves decompose.

Weathering causes hard rock to erode and turn into smaller and smaller pieces of rock.

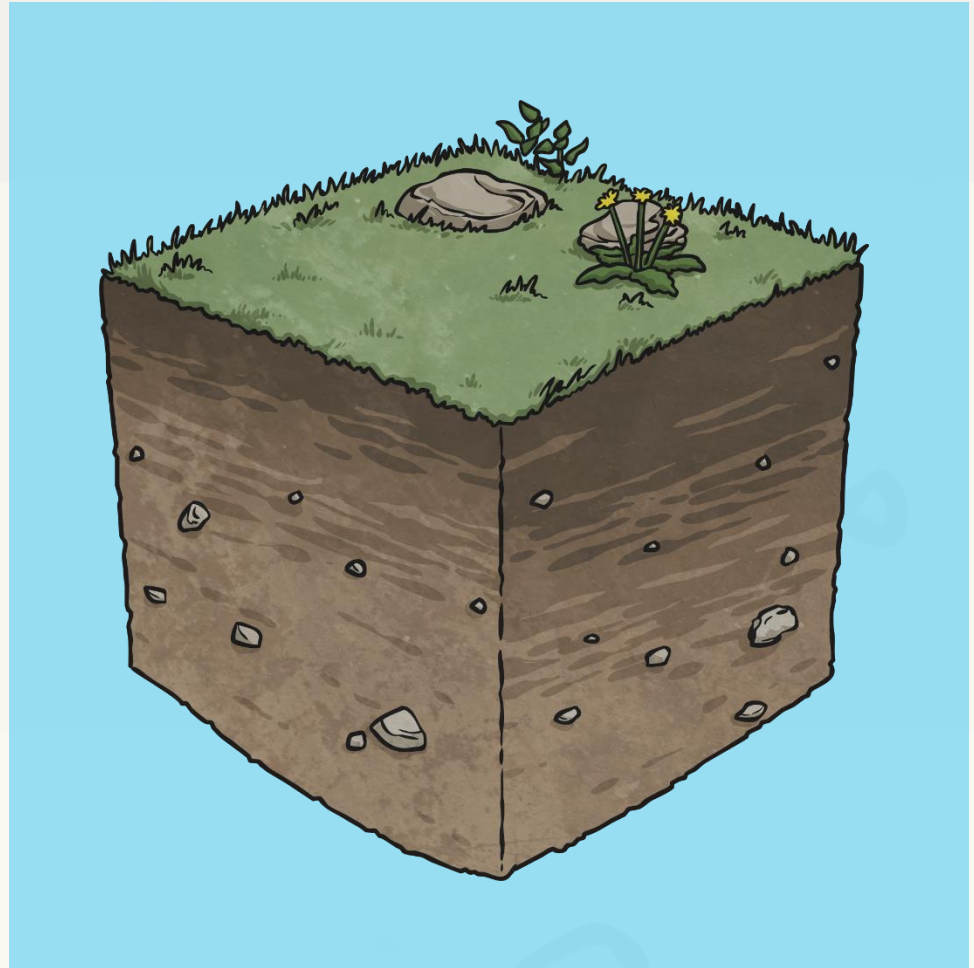
Oxygen **reacts** with the minerals such as iron which can make the soil look a reddish, 'rusty' colour.



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Soil Formation

All four processes are taking place at the same time all the time!



TASK

Now you can choose whether you answer the questions with support, or the trickier challenge questions on the website, or on Teams.

Extra Challenge:

If someone at home can help you, you can have a go at making your own compost!

(You don't have to do this – it's an extra science challenge ONLY if you have the equipment and someone to help.)

Follow the instructions on the next few pages.

How Soil is Formed	
There is a thin layer of soil on the Earth, which is only a few metres deep. It is very important, though, as plants need it in order to grow and, without plants, there would be no animals or humans.	1. What is soil and why is it so important?
Two things happen in order to make soil. One works from above, the other from below.	
Beneath the soil is a layer of solid rock. Over millions of years, tiny particles wear off the surface of this rock. They mix with water to form a thick paste.	2. What is the underground process that helps form soil?
If the grains are large, they make a sandy soil, whereas if they are small, they make clay. Water drains through sand easily, because of the gaps between the grains. It does not drain through clay, though.	
The second thing that happens is that when plants and animals die, they fall onto the ground. They then rot and the ground absorbs their nutrients.	3. What is the over-ground process that helps form soil?
Rain washes the rotting plants and animals down and they mix with the thick paste from the rocks to form soil. Underground creatures such as worms help blend everything together as they tunnel through the soil.	
	4. How do the the two parts of the soil get mixed together?

How Soil is Formed	
There is a thin layer of soil on top of the Earth. Plants need it in order to grow. Without plants, there would be no animals or people.	1. What happens under the ground that helps make soil? Under the ground...
Two things happen when soil is made. Tiny grains wear off the rocks under the ground. They mix with water to make a thick paste.	
If the grains are large, they make sandy soil. If they are small, they make clay.	2. How do plants and animals help make soil? Plants and animals...
The second thing that happens is that plants and animals die and fall on the ground. They rot and rain washes them in.	
The paste from the rocks mixes with the rotten plants and animals to make soil. Worms help to mix them together as they tunnel through the earth.	3. How does the soil get mixed together? The soil...

Compost

Compost is organic matter that has been decomposed so that it can be recycled as natural fertiliser.

Many people choose to have a compost bin at home as they see it as more environmentally friendly to recycle waste food rather than throw it away.

It also means they can create their own fertiliser for soil in their garden or for plants, rather than buying it. You will now have a go at creating your own mini compost bin complete with worms!



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Creating Compost

Health and Safety

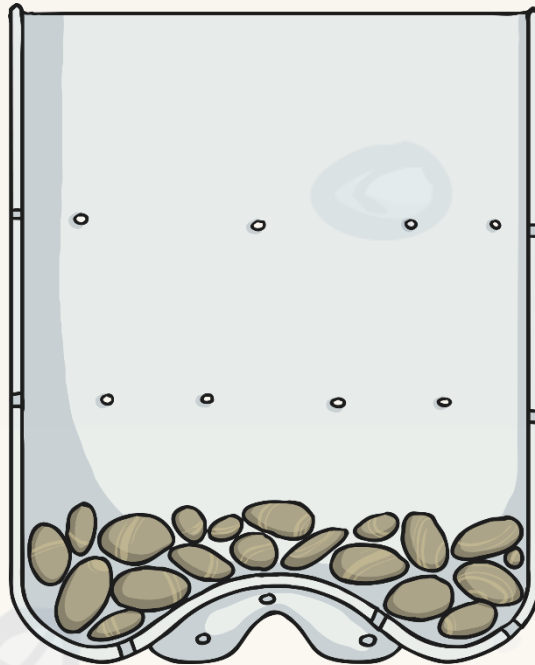
Make sure you handle all waste materials with **plastic gloves** as all food waste contains **bacteria** that could make you feel ill.

Just because **worms** don't cry or scream when they are in **pain** does not mean they don't feel it. Handle them gently and carefully.

Creating Compost

Step 1

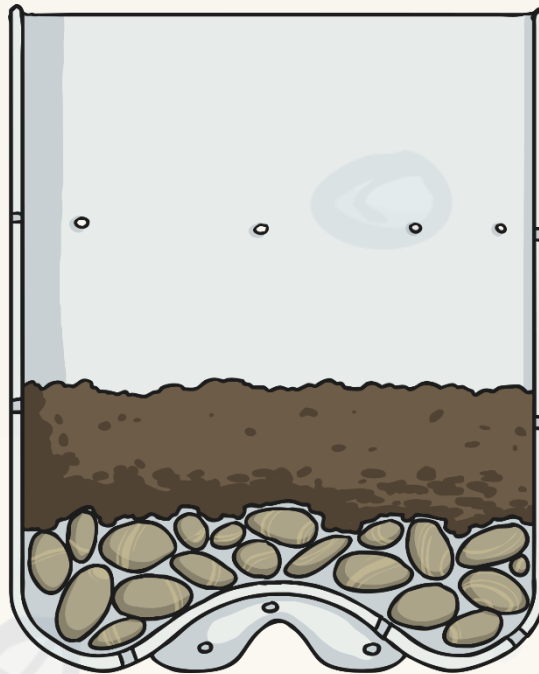
Place small stones as the first layer.



Creating Compost

Step 2

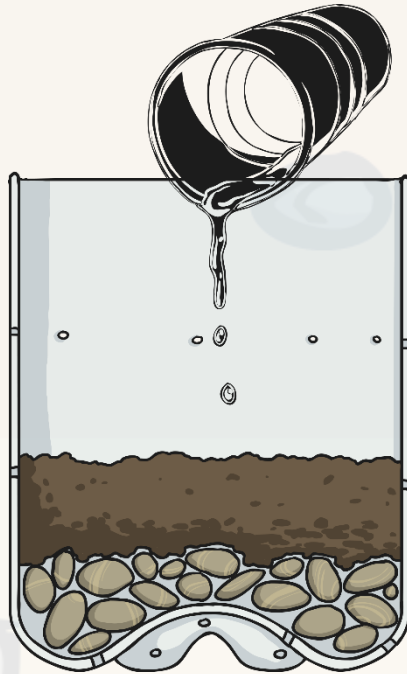
Add a layer of compost, or soil from your garden.



Creating Compost

Step 3

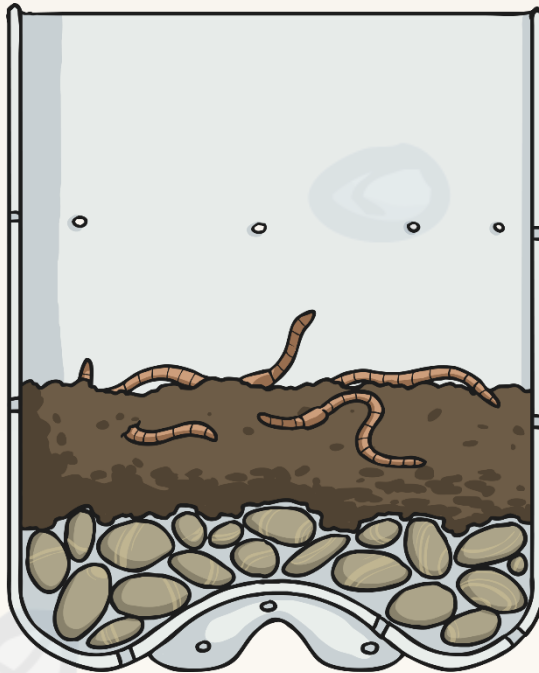
Add a small amount of water so that the compost is moist but not completely wet.



Creating Compost

Step 4

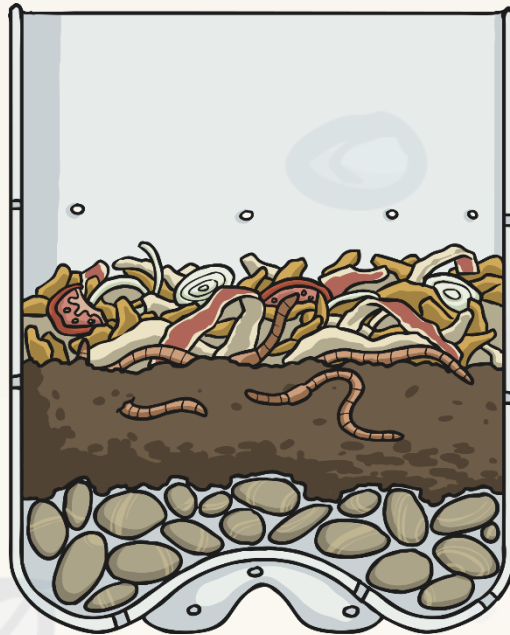
Wear plastic gloves to handle the worms. Ensure that worms are handled gently. Place a few worms gently onto the compost.



Creating Compost

Step 5

Wear plastic gloves while adding waste food. Place a handful of scraps on top of the worms. Leave it placed gently on the worms; it will fall further by itself so there is no need to push it down.



Creating Compost

Step 6

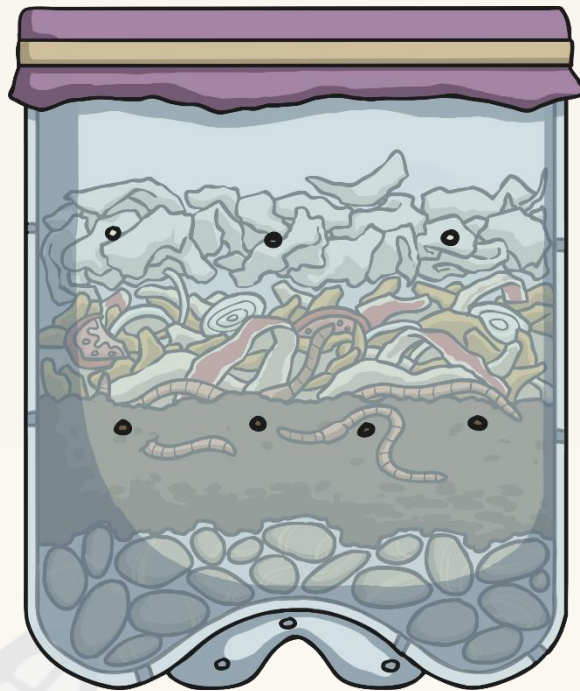
Wet the shredded paper and add it as the topmost layer of your mini compost bin.



Creating Compost

Step 7

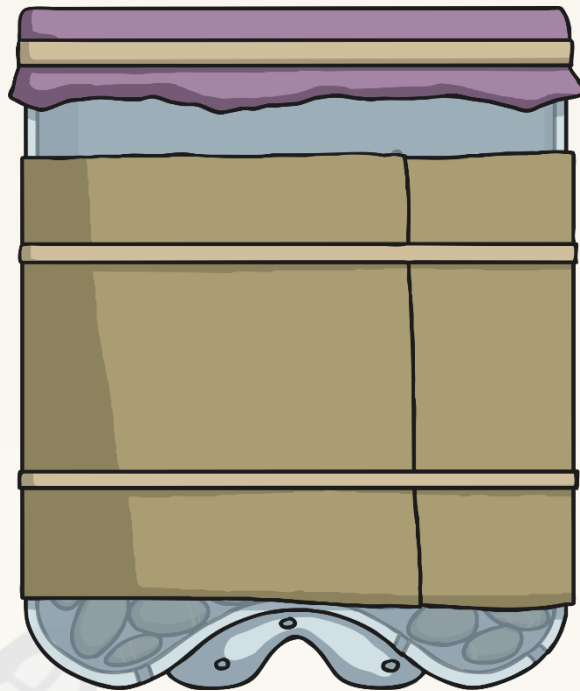
Add a thin piece of fabric over the top of the plastic bottle and secure it with an elastic band.



Creating Compost

Step 8

Attach long rectangular pieces of card around the bottle so that it makes it dark for the worms. They live in the dark and do not like bright lights.



Caring for Worms

How will you care for the worms?

- Keep the mini compost bins in a quiet place.
- Keep the mini compost bins away from the sunlight and keep the cardboard pieces in place.
- Do not place anything on top of the compost bins so that enough air gets through.
- Every other day, check that the top layers of compost are damp. The worms need moist skin to breathe.
- Add only small amounts of food once the first scraps have been eaten.
- After a few weeks, return the worms to a compost bin or heap as they may not survive in the soil straight away.

