

SSA Introduction to Soils – Primary School resource

Notes to accompany powerpoint presentation, as found on our website

Slide number	Accompanying notes
1	No notes needed
2	No notes needed
3	No notes needed
4	<p>If the London Eye was the size of the earth, the soil would be the equivalent to 1,000th of a coat of paint.</p> <p>It sounds like soil is unimportant... but without it there would be no life on earth! So we need to do what we can to protect it.</p>
5	<p>In fact, there are more living things in one teaspoon of soil than there are people on the planet!</p> <p>Soil is full of billions of tiny little creatures, lots of them too small to see without a microscope.</p> <p>Soil is the perfect example of how all of nature knits together and supports each other.</p> <p><i>Image: www.salinajaneart.com/</i></p>
6	<p>Soils store three times more carbon than is stored in the atmosphere.</p> <p>They act as a giant sponge, storing water for us. In fact, they store more water than all our our rivers and lakes combined!</p> <p>Soil provides a vital habitat for many forms of life ranging from microbes to earthworms and moles. It also provides an interface for all other forms of life.</p> <p>Nearly all our food comes from the soil (95% of it). The animals we eat and products that are made from them, like cheese, eat plants which grow in the soil.</p> <p>Many medicines and antibiotics, including the new ones discovered most recently, come from the soil.</p>
7	No notes needed
8	<p>There are 298 different soil types in the UK alone!</p> <p>Our soils were formed in the ice age.</p> <p>Think about all the different types of soil around the world – deserts, swamps, gardens.</p>
9	<p>Soils can vary right across the landscape.</p> <p>They have shaped our landscape and our landscape has shaped them.</p>

	<p>Different soils can manage different things. Some can withstand heavy loads, others store water well, others store carbon well.</p> <p>It is important to know about soils in the landscape because this helps us make the right decisions to look after them properly.</p>
10	No notes needed
11	<p>This picture shows how all the different creatures depend on each other. All of this happens right at the very top layer of the soil.</p> <p>Animal dung and decaying organic matter like rotting fruit and leaves feed the soil, which then feeds the roots of plants, which then go on to feed people and animals.</p>
12	No notes needed
13	Here's a video of some bacteria from soil seen under a microscope. Bacteria are so tiny that there are billions of them in a single teaspoon of soil.
14	<p>Some other important (and exciting!) soil creatures:</p> <p>1. Nematodes.</p> <p>The world's most abundant animal: their biomass = 80% weight of global human population – for every human on earth there are 57 billion nematodes! 4 out of 5 animals are nematodes. One handful of soil contains up to 50,000 nematodes.</p>
15	<p>2. Tardigrades.</p> <p>Can stand extreme heat/cold! Can repair their own DNA! Can live in a vacuum, survive radiation or boiling liquids! Have survived in space and in environments up to 6x the pressure of the deepest part of the ocean!</p> <p>Can dehydrate until in a glass state and rehydrate later when the environment becomes habitable again.</p> <p>Known as a 'Pioneer species' – inhabiting new developing (often harsh) environments, they feed on the microbes available and accumulate the essential elements for life (such as nitrogen, carbon and phosphorous) which then enables other organisms to join them.</p> <p>Photo credit: Nicole Ottawa & Oliver Meckes / Eye of Science / Science Source Images</p>
16	<p>3. Flower Longhorn beetle</p> <p><i>Photo credit: Strangalia famelica, the hungry strangalia © Beatriz Moisset</i></p>
17	<p>4. Rotifer</p> <p><i>Photo credit: Digital Eclipse Image Gallery @ Microscopyu.com</i></p>
18	<p>5. Springtail</p> <p><i>Photo © Henderickx, 2007</i></p>
19	<p>6. Dung beetle</p> <p>Dung beetles cut up animal dung and take it down into their burrows underground, where it feeds the soil with nutrients.</p>

	You can see the cutters and grabbers they use to cut and move the dung on their legs.
20	This picture is of dung beetles actually moving poo! It probably took them about a week to cut up all this dog poo and take it away into their hole.
21	7. Woodlice One of the soil creatures we can see without a microscope. You have probably seen them in your garden.
22	8. Fungi <i>Photo credits: Andreas Kunze - Own work, CC BY-SA 3.0, commons.wikimedia.org/w/index.php?curid=15954511;</i> <i>TheAlphaWolf - Own work, CC BY-SA 3.0, commons.wikimedia.org/w/index.php?curid=676144</i>
23	8 Earthworms Video of worms at work: https://www.youtube.com/watch?v=n3wsUYg3XV0 https://www.youtube.com/watch?v=Mxp1nnrUG0Q (bioturbation, with and without fauna) Earthworms eat the soil and process it through one long tube running all the way from mouth to bottom – turning rotting leaves and waste into nutrients for plants to suck up through their roots. They also help move oxygen around the soil with their burrows and tunnels. <i>Photo credits: Luis Miguel Bugallo Sánchez - [1]. Shot with a Nikon E8800., CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=392022</i> <i>Michael Linnenbach - From the German Wikipedia, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=807236</i>
24	What happens if we squash the soil down with heavy machinery? Can it still absorb water when it rains? If we squashed our houses down, would we have room to live in them? If the soil can't hold water and there's no room for creatures to live in it, can it help plants to grow?
25	We've seen that healthy soils store lots of water. What happens to water that falls on unhealthy soil? What happens when the soil has been squashed, and is no longer spongey? Where do you think this water will go? How do creatures who live in rivers and lakes feel about lots of soil washing into their homes? How might this affect them?
26	Two videos showing what happens when water falls on compacted soil. 1. A person uses a tool to pull soil out from under where the land has flooded. When he breaks open the clod of soil, he can see that the soil is dry in the middle. The water has not been absorbed in to the soil – it can't soak in as the soil has been compacted (possibly by heavy machinery) and is too dense. Instead the water collects on top of the soil and causes floods.

	<p>2. A river that is brown because the water is full of soil sediment that has been eroded from fields by the rain. Unhealthy soil is easily eroded. This can pollute rivers and cause problems for the plants and creatures that live in the water.</p>
27	<p>When soils are unhealthy, it's easy for water to wash them away and wind to blow them away.</p> <p>Sadly, across the world a lot of soil is washed and blown away: in fact, as much as 31 football fields'-worth of farmland soil is eroded/lost every minute.</p>
28	<p>The amount of soil that is eroded in the UK every year is the same weight as 240,000 double decker buses. In the UK 2.9 million tonnes of soil is eroded every year – you can see the brown patches running in to the sea in the picture on the right.</p> <p>In fact soils are lost at 10x the rate of formation – it takes 1000 years to create 1 inch/3cms of topsoil. The soil left behind has had many of its nutrients washed away – meaning it can't support plant life and produce food as it used to. Neither can it store carbon to help us with climate change or hold water to help prevent floods.</p>
29	No notes needed
30	<p>We can collect up all the dead leaves in autumn and use them to make leaf mulch to feed the soil, the worms and all the other creatures we've learnt about.</p> <p>Life in a compost bin: https://www.youtube.com/watch?v=6em_8iFfKlk</p>
31	<p>We can use the composts we've made to look after the soil around us. Compost puts nutrients back into the soil and feeds the creatures which bring oxygen in and create good healthy soil structure so it can absorb water and to stop it being eroded.</p> <p>We can also help soil by growing vegetables in our gardens or allotments.</p>
32	<p>We can help children to feel more connected with nature and to understand and care about how it works.</p> <p>So that they can feel inspired to look after it and grow up to be part of the solutions for looking after our planet.</p>
33	<p>This year has been hugely important for how children's voices can influence even the government.</p> <p>Children have been telling the whole country (and all the grown ups!) to look after the environment better.</p> <p>Who knows, one of you in this very room may be the next great soil scientists! Or conservationist!</p> <p>So keep asking questions about nature. Notice how the seasons change and how they make you feel.</p> <p>Spend time noticing what new plants are out, what the leaves are doing on the trees. The more you notice nature, the more you will learn to understand the world and grow up to be part of the solution.</p>