Home Learning TV: Junior Science

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| **Segment lesson planning details** |  |
| Title for segment: | Oneone - soil |
| Year levels *(e.g., Yrs1 – 3)*: | 1-3 |
| NZC learning areas:  | Nature of Science: Investigating in science - students extend their experiences of the natural world through asking questions and simple modelsPlanet Earth and Beyond: Earth systems - students explore and describe resources |
| Purpose of lesson:(What learners will learn) | An introduction to the nature and property of soilsSoil is a resource as both a growing medium and as a cultural mediumStudents practice gathering data through asking questions and making careful observations |
| Success Criteria – students will be able to:(how they will know when they have learnt it) | Ākonga will be able to:* identify some of the components that make up soil
* describe that soils may differ from place to place
* make connections to enterprise via the mātauranga/knowledge that enabled Māori and later Pākehā settlers to best use soil as a resource
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| **Segment production details** |
| Equipment requirements: | ice cream container of garden soil, spoon, sheet of white paper, wet wipes, tablet for displaying the online version of [What makes up soil?](https://www.sciencelearn.org.nz/resources/898-what-makes-up-soil) OR printing and using the paper-based version; notebook and felts, PPTgumboots and a spade (optional)Jar with soil and water to shake (optional) |
| Copyright requirements:Please be specific: Source: (*Seven Sizzling Sausages* by Sam Smith –url link to the source), intended use (to demonstrate alliteration), Length (timings for video clips) | All images and video provided in the media zip folder below have been cleared for use  |
| **Segment links and attachments *(list all links to recordings or attachments, the source and confirm that copyright permissions are granted)*** |
| Links to recordings /resources |  |
| Attachments  |  |
| **Segment plan content** |
|  | Teaching and learning activities linked to purpose | High level script (key points/questions)  |
| **Activate**: Activating prior learning, knowledge of contexts and relationships | Introduction, making connections and setting the scene.Using a simple model as a visual representationSlide 2:FILE NAME: JS08\_dirt dessert.jpgHelping tamariki and whānau switch into science mode.Providing a pause for tamariki to organise their things. | Kia ora, greetings. [Touch base with the audience.]I’ve been having fun in the kitchen. Would you like to see what I’ve made? I made some dirt dessert to have after dinner this evening. Have a look. I promise that this isn’t mudpies - this really is something to eat.Let’s start at the top and dig our way down. What do you see?* a teddy bear having a picnic on the lawn
* coconut grass
* a worm or two poking their heads out
* chocolate chip rocks
* some muddy looking chocolate dairy food -type of soil
* some crumbly chocolate chip biscuits right at the bottom.

This is a different sort of treat and I’m sure my whānau will enjoy it, but I can see the way you’re looking at me. Some of you are thinking, “I hope that Suzy shares that with me.” And others of you are thinking, “Hang on, is that what soil really looks like?”Well, this is our time for pūtaiao, science, so let’s find out. Are you ready to get the dirt on oneone - soil? You are? Awesome. Get on your boots and find your spade [you could act a little scene with these if you have them handy], I mean get out your pukapuka/science journal and find your pene, felts and crayons and let’s get started. While you get your things organised, I’m going to nip outside [could do a sped-up version of popping outside to fill an ice cream container with soil - this container will be used in the script]. I’m back and I’m ready to write in my book. You know how we always put the title at the top of the page? This time, let’s start at the bottom of the page and work our way up, because soil is the good stuff underneath our feet. Let’s write our title for the day - Oneone - soil.I’ll be using a bit of te reo Māori today. You might know other kupu Māori for some of the words I’m using. Whānau, if you have specific kupu for your rohe, please talk with your tamariki about these. |
| **Learn**: Introducing learningReinforce routines, provide multiple exposure to concepts, and strategies. Scaffolding learning  | NOS - asking questions to extend knowledge/experience of the natural world.Slide 3:VIMEO LINK: <https://vimeo.com/603494326>FILE NAME: JS\_09\_Kidsvox.mp4Opportunities for observation/data gathering | Let’s start by making a list of questions that we have about oneone. What do we want to know? I’ll start and then you can tell me your questions. My first questions are:* What’s actually in soil? Does my dirt dessert really look like soil?
* Is there a difference between dirt and soil? (Should I call this a soil dessert instead?)

Your turn now. What do you want to know? [Show video of children asking questions.]* Does the soil in my garden look the same as the soil in your garden?
* Why do some things grow well in my koro’s garden but not in mine?

Those are really good questions. When kaipūtaiao/scientists have questions, they investigate. Let’s work as kaipūtaiao and do some investigations of our own. We can start by making observations. While you were finding your pukapuka and pene, I nipped outside to get this. [Open an ice cream container of soil and show it to the viewers.]What’s in the container? [Ehē](https://maoridictionary.co.nz/search?idiom=&phrase=&proverb=&loan=&histLoanWords=&keywords=ehe) - no it’s not dirt ice cream to go with the dirt dessert! First of all, I got it from the garden, not the kitchen! I was planning to pot up some seedlings for my veggie garden after this, so I have some soil for the pots. How about I put a spoonful on a piece of white paper so it is easier to see. Let’s use our eyes - our sense of sight - to observe. [Spread out the particles. Discuss the colours, the size of the particles, whether there are bits of bark/wood/leaves, sand, small stones, etc.] Now let’s use our sense of touch to observe. Believe it or not, soil scientists use touch all of the time to gather information about soil. When I rub the soil between my fingers, I feel: [gritty, sandy, smooth, some bits feel bigger/smaller than others, it feels damp, etc.] What I didn’t feel was an earthworm, though. That’s probably good. Earthworms are awesome, but they are happiest in the garden.My observations have made me realise that soil must be made up of all kinds of different things - including things that might make me feel unwell, so I will give my hands a wipe. That’s the answer to my second question! When soil is on my hands or under my fingernails, it’s dirt. When it’s where it is supposed to be, it’s soil. |
| **Respond**: Providing opportunities to use and practice  | SLIDE 4:Link to <https://www.sciencelearn.org.nz/resources/898-what-makes-up-soil> or use the paper-based version printed from the Word docTamariki are able to use prior knowledge with some of the components, but their thinking and reasoning will likely be extended.Opportunities to justify choices, using both evidence and inference.Making links to prior learning/experiences.Slide 5:FILENAME: JS08\_Road cutting.jpgMaking observationsPractising the science capability ‘interpret representations’.Slide 6: FILENAME: JS08\_Similar-but-different.jpg Making connections to known contexts.Soil can be a cultural resource as well as a resource for growing things.Slide 7:VIMEO LINK: <https://vimeo.com/602996448> FILENAME: JS08\_Kokowai.mp4<https://kauwhatareo.govt.nz/en/resource/kokowai/> Providing an opportunity to get up and move.Recognition of the innovation and enterprise shown by early Māori settlers. Slide 8: FILE NAME: JS08\_Otuataua Stonefields.jpgSlide 9: FILE NAME: JS08\_Te-Parapara-Garden.jpgLinks to ongoing mātauranga and enterprise, which enables Aotearoa’s primary sector to produce abundant and quality kai. | Our observations have given us a bit more information about soil, but I wonder if we are missing some things. Let’s use this [graphic organiser](https://www.sciencelearn.org.nz/drag_and_drops/9-what-makes-up-soil-graphic-organiser) from the Science Learning Hub and see if it helps us get more information. Check out the background first. Can you see that it has grass at the top, along with a few roots and some stones at the bottom. Let’s make a quick sketch in our pukapuka. If you have felts or crayons, make some green lines at the top to represent [karaihe](https://maoridictionary.co.nz/search?idiom=&phrase=&proverb=&loan=&histLoanWords=&keywords=grass) - grass. We can make some squiggly lines to represent the grass’ [pakiaka](https://paekupu.co.nz/word/pakiaka) - roots. And then at the bottom, just above where we wrote the title - oneone, we can draw a few circles to represent [pōhatu](https://maoridictionary.co.nz/search?idiom=&phrase=&proverb=&loan=&histLoanWords=&keywords=stone) - stones. We’ll come back to our drawing once we’ve done the activity.[Commence using the interactive graphic organiser. The Word document from the activity [What makes up soil?](https://www.sciencelearn.org.nz/resources/898-what-makes-up-soil) has the answers - most of the components are obvious, but some can be debated. Please spend some time with the debatable components like the volcano.]Were you surprised to find out that air and water are part of the soil? What about dead insects? I read somewhere that if we didn’t have soil organisms to help break down and compost dead things, that the entire world would be covered in dead insects, all the way up to our knees! Ew. Thank goodness for soil bacteria and earthworms.Let’s draw those in our pukapuka to remind us how important they are. I will make some dots for the bacteria and a squiggle for ngā noke - earthworms. You can pop in others, if you’d like.We now know what’s in soil, but what does soil look like? We saw some topsoil in the ice cream container, but if you look at my dirt dessert, you’ll see I go down a lot further than the topsoil.I have an idea. Have you seen things like this before? Sometimes we see road cuttings when we are driving in the car. This is where a bank of soil has been cut away so the road can go through. I bet that you’ve got a picture of one in your head now, don’t you?Here’s a photo of a road cutting near me. There’s a lot to look at in this picture. If we look carefully, we can see:* grass and trees at the top of the soil
* lots of exposed tree roots where the soil has been washed away
* a bit of the soil at the top is brown
* then the soil is reddish brown
* going further down, the soil almost looks stripey

Hmm. That’s not like my dirt dessert at all! I thought that soil was always a dark brown. I’ve learned something!You asked a question earlier. You wondered whether the soil at your house is the same as the soil at my house. Do you think you are closer to answering that question? Āe, I agree. I think they might be different.Let’s observe this photo. It shows us three different soils. The white strips are similar to metre rulers, so these soil cuttings are quite deep - they go down a long way. [Model a 1 m length with your arms, holding them vertically like in the image.] We can see grass at the top and then some darkish soil, but look at how the colour changes as it gets deeper. Different soils have different colours because of what’s in them. Soils contain minerals. The reddish soils we see in the photo have iron in them. Have you seen a rusty iron roof? It’s a similar colour to the soil. Soils that have lots of calcium in them are lighter and whiter. We have calcium in our teeth and bones - and they are white, too.If you’ve got red or white crayons, do some colouring to the soil page in your book to remind you that soils can be different colours. [Kōkōwai](https://maoridictionary.co.nz/search?idiom=&phrase=&proverb=&loan=&histLoanWords=&keywords=kokowai) is the dark red ochre that is so familiar on waka and marae. It has its origins in the soil. In this video, we see how kōkōwai is washed from the hills to the beach. Rangatahi from Wainui collect and use the kōkōwai to create some beautiful artwork. There’s no talking in the video, and you’ve been sitting for a while. Why don’t you stand up and do some quiet dancing with the gentle video music.[For translation of the kupu in the video - see Kōkōwai Kupu Māori document in Drive folder.][Wrap up video with a comment, e.g., about the art work that’s created.]I wonder if you feel inspired by that art work? Maybe you’d like to draw something like that using some soil paint when we’re finished here. Aotearoa must have seemed like a strange place when Māori first arrived. They’d migrated from a warm climate to a much cooler one. They had to develop mātauranga - knowledge of this new place. Finding kōkōwai to use for decoration is one thing, but learning how to successfully grow crops in this new location took real ingenuity. They discovered that the soils around Tāmaki Makaurau, Auckland were good for growing crops, but the cool temperatures and strong westerly winds weren’t ideal. Māori living there got to work. They used innovation and lots of muscle to cut stones and build walls to trap heat and protect the crops from wind. They placed stones in the soil to warm the land and keep the weeds down. There aren’t many of the walls left, because the city of Auckland now covers the land. This picture is of the Otuataua Stonefields, which is now an historic reserve. [Show image.]Early Māori explorers brought kūmara with them. Kūmara grows best in light, sandy soil. If the soil was too heavy, Māori mined gravel and sand, from areas called borrow pits, and added it to soil. They also added burnt wood/charcoal to keep the soil moist and to help keep it warm. The kūmara were planted into puke - mounds - and arranged into rows. If we look at this photo from Te Parapara Garden in Hamilton, we can see the kūmara growing in little puke of stony soil. We can also see the [pātaka](https://maoridictionary.co.nz/search?idiom=&phrase=&proverb=&loan=&histLoanWords=&keywords=pataka), the storehouse, painted with kōkōwai.Shall we get to the last question that you asked? Why plants grow better in your koro’s garden than yours? There’s lots of reasons and soil might be one of them. There’s a reason that so many of our vegetables are grown in Pukekohe, that millions of cows' graze pastures in the Waikato, that we grow apples in the Hawke’s Bay and peaches down south. Farmers and growers have learned to match different crops with the best soils and climate to grow them.Great – we've got some more answers to our questions.  |
| **Share**: Learner and parent reflection on learning and engagement and what they can do next | Returning to the simple model of soil and using it to repeat what we’ve learned about soil and some of its properties.Soil jars offer tamariki and whānau the opportunity to observe soil components. Gathering soil from different locations may enable tamariki to see how soils do differ from location to location.Slide 10:FILE NAME: JS08\_Soil jars.JPGSlide 11:FILE NAME: JS09\_KokowaiSNAP.png**SLIDE 12: SLH logo** | So, does my dirt dessert actually look like real soil? Let’s look at what we’ve drawn in our pukapuka and see if we can answer that question.Does soil grow grass? ĀeCan we have a picnic on soil? ĀeDoes soil have rocks and worms in it? ĀeIs soil the same colour all the way from the top to the bottom? Not usually.So, what’s in the soil at your place? Perhaps later you can ask for a jar and take a look. Put some soil in a jar, add water and then give the jar a really good shake. The heavy bits like stones and sand settle first. Then the lighter particles settle on top. [You can model this if you like, or you can use the image.] If you go for a walk, take a jar with you and collect soil from different places to see if the soil is the same or different to yours!If you’re feeling creative, you could also mix some soil to make a paint paste, like we saw the tamariki doing in the video we watched together. [Show image as a reminder][Sign off - shout out to the Science Learning Hub for support preparing this episode.]Ka kite ano. |