Pioneer Federation
Medium term plan
Cycle 1, Term 5
Science LKS2

Subject: Science				
Key Concept/ Theme: Rocks and soils 2				
Prior Learning links: Year 3 and 4 – Cycle 2 – Term 3- Rocks and soils				
Vocabulary: rock – a solid material that makes up the surface of the Earth soil – a black or dark brown material on the upper layer of the Earth where plants grow fossil – the remains of a prehistoric animal embedded in rock Sandy soil - a pale coloured soil that has large particles. Clay soil – is a usual sticky and has small particle soil Chalky soil - is a light brown soil. Peat - does not contain any rock particles. It's made from very old decayed plants and is dark, crumbly and rich in nutrients.				
Working Scientifically skills: Observing, Classifying and sorting, Measuring, Conclusions, Present results				
School specific areas to cover (Add in any local areas of study, trips and people)				
CP		**EH**	**SMV**	**PM**
1.	Prior learning reconnection (year group, cycle & term): Year 3 and 4 – Cycle 1 – Term 3- States of Matter LO: I can recognise that soils are made of rocks and organic matter. **Working Scientifically Skill:** observing, presenting results, conclusions **Enquiry skill:** Comparative and fair test *Activity ideas to achieve the LO:*			

Pioneer Federation
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Starter: Get the Year 4 children to recall to the Year 3 children what they learnt about rocks and soils when they were in Year 3- what can they recall.
Show the class https://www.bbc.co.uk/bitesize/articles/ztvbk2p to discuss what they already know about soils.
Using soil samples from your own area, your class will get up close and see what they can find inside different soils.

1. Setup. Select two or more locations around your school grounds or in your local area (with permission!) where soil can be accessed and dug up temporarily. Give each of these locations a name such as 'Flower bed', 'Roadside' or 'Edge of school field' etc. Using a trowel, dig up a small sample of soil at each location and place it in a tray with that location labelled. Bring back to the classroom or take a picture of each sample. If you lack nearby natural soils to take from, purchased compost soil and sand can be good alternatives.
2. Discussion. Back in the classroom, begin by discussing what is meant by 'soil' and what you might expect to find in it. Consider both living and non-living things.
3. Observation. Look closely at the different soil samples. This can be done in groups with magnifying glasses or as a whole class if you have a whiteboard visualiser. Think about what you see.

What can you see in the soil?

- Is there anything that animals such as earthworms would like to eat (organic matter such as leaves)?
- Which sample(s) would you expect to see lots of animals living in? Why might they be living here?
- Which ones would you not expect to see many earthworms in? Why would they not like to live here?
- Which sample(s) would you expect to see plants living in? Why? (The presence of earthworms makes soil better suited to plant life - see background science section below.)
- Do you think all soils are the same? Why/Why not?
- Do you have any evidence from looking at the samples to support this? (Differences observed in samples eg finer grains, wetter etc.)
- If you looked at soil from a very different location such as a beach, riverbed, volcano or a rainforest, what differences might there be compared to the soil you looked at today?
- The soil you looked at today was from near the surface. How could you get a different sample from the same place? (Depth)
- If conducted in groups, each group could report back their findings and attempt to answer the questions with any evidence they have considered.

Optional activity you could do to observe soils over the term:

- *Become a soil scientist and discover more about what lives in the soil and why healthy soil is essential for living things and the environment: Dig a small hole about 20cm deep. Remove the soil and place it to one side. 2. Use the trowel to fill the hole with a sock nearly to the top with the soil you have dug up. 3. Place the sock into the hole and cover it with the remaining soil. 4. Gently place the stick into the soil as a stake. 5. Take the piece of card and write the children's group onto it. 6. Attach your sign to the stick with tape to keep it secure. 7. Dig up the sock every week for the term to see what has happened. 8. Get the children to record their prediction and observations. Did their prediction match what happened? What can the sock help us learn about soil and why soil is important.*

End point: To be able to identify that rocks are made up of different organic matter

Pioneer Federation
Medium term plan
Cycle 1, Term 5
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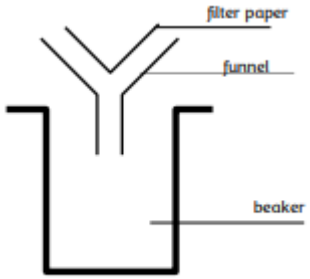
2.	LO: I can identify different soils. **Working Scientifically Skill:** Recording, **Enquiry skill:** *Activity ideas to achieve the LO:* - Starter: Get the Year 4s to recall when they learnt about this when they learnt about Soils in year 3: *Sandy soils form lightweight, free-draining soils; cannot hold on to nutrients* *Clayey soils hold water well; can become heavy and waterlogged when wet; can hold on to nutrients.* *Silty soil holds water, can be hard to drain, can hold limited nutrients.* Can you guess what I am describing with my five clues? Allow time to discuss with partners after each clue before sharing ideas as a class. Record any of the children's ideas on paper to display on the science display. - I am made of rock but I am not a building. - I am made of different layers but I am not sedimentary rock. - Half of me is made of air and water but I am not a wet sponge. - I am home to lots of different creatures but I am not a zoo. - Without me, there would be no life on Earth. What am I? Soil! Soil is a mixture of tiny particles of rock, humus, air and water. There are lots of different types of soils. Different soils have different propertie: Sandy soil is pale coloured and has large particles. These create lots of small air gaps. Water drains through them easily, so it usually feels dry. Clay soil is usually sticky and has small particles. They contain very few air gaps and water does not drain through it easily. Chalky soil is a light brown soil. Water drains through it quickly. Peat does not contain any rock particles. It's made from very old decayed plants and is dark, crumbly and rich in nutrients. What do we use soil for? Allow time to discuss with partners before sharing ideas as a class. Record any of the children's ideas on paper to display on the science display. Did you know that soil could do all of these things? - helping all kinds of plants grow. - helping 'clean' the atmosphere by emitting and absorbing gases and dust. - providing a habitat for animals that live in the soil - absorbing, holding and purifying water - processing recycled nutrients, including carbon, so that living things can use them over and over again. - being used for construction of foundations, roadbeds, dams and buildings - preserving or destroying artefacts - acting as a living filter to clean water. Introduce the word permeable. Permeable means that liquids can pass through it. Today we will be conducting an investigation to see which soil is the most/least permeable.

Pioneer Federation
Medium term plan
Cycle 1, Term 5
Science LKS2

	We are now going to investigate three different types of soil to see how permeable they are. You will need a beaker, a funnel, filter paper and a timer for each investigation. Set up each investigation as shown in the diagram below.  You will put the soil in the filter paper and pour water onto it. You will need to time it to see how long it takes for all the water to collect in the beaker. The less time it takes, the more permeable the soil is. Which soil was the most permeable? Why do you think that was? Which soil was the least permeable? End point: To be able to explain how the Earth is made up of different layers of rocks and soils
3.	LO: I can Understand that some soils are formed of organic matter ***Working Scientifically Skill:*** ***Enquiry skill:*** Observing, Measuring, Conclusions, Present results *Activity ideas to achieve the LO:* In this practical activity, your class will examine the importance of earthworms in breaking down organic matter to produce soil which helps plants to grow. You'll go looking for earthworms by using mustard water to bring them to the surface of bare soil. The class can compare the number of worms found in different locations and discuss what this means for soil quality. https://www.nhm.ac.uk/schools/teaching-resources/key-stage-2/rocks-fossils-and-dinosaurs/soil-experiment-summon-the-worms.html 1. Watch the video above. Afterwards, discuss with your class that earthworms eat organic matter (the dead parts of plants and animals) such as leaves and food waste. This provides nutrients in the soil that plants can use to grow. For more in-depth information see the background science section below. 2. Practical: go looking for earthworms. ● Following the video instructions, mix water with mustard or washing up liquid (1 large tablespoon of mustard per 1.5 litre bottle of water). ● Have groups of students pour on patches of soil in different locations. Give a name for each location and keep track of how many worms appear after a couple of minutes. ● Once finished, wash off the worms and the sample area with clean water. If possible, put the worms back under cover in nearby soilso they don't get accidentally stepped on or eaten. 3. Once everyone has collected the data, return to the classroom and display/present it to the whole class. Discuss why earthworms may prefer some soil types to others. Questions to discuss: ● Which soil locations had a lot of earthworms in them? ● Which locations only had a few?

Pioneer Federation
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- Why might there be different numbers at different locations?
- What might earthworms like in a particular soil? (easy to move in, not too rocky, wetter so they don't dry out, organic matter to eat)
- Based on the number of earthworms found, which location might you expect to see more plants in?
- How might earthworms (unintentionally) help plants?

The key to successful discussion here is the scientific reasoning behind responses. Even if suggestions may not seem 'correct' if they are well reasoned with evidence from this experiment this should be considered successful.

End point: To be able to recognise the importance of earthworms in improving soil quality for plants
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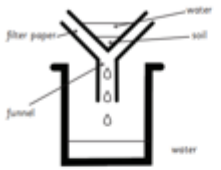
<tr><td>Assessment</td><td>

Science End of Term Quiz LKS2 – Term 5

1



Tick ONE box to show how Jenny can make sure she conducts a fair test.

- ☐ Use the same amount of water each time.
- ☐ Record her results in a table.
- ☐ Test each soil several times.
- ☐ See if the results match her predict

2

3 Can you name three types of soil?

1. _____
2. _____
3. _____

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<tr><td colspan="2">Things to note:
For a 5 week term 3 lessons and an assessment</td></tr>
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Pioneer Federation
Medium term plan
Cycle 1, Term 5
Science LKS2

For a 6 week term 4 lessons and an assessment
For a 7/8 week terms 5 lessons and an assessment

Adaptions:

- Learners at year three level may benefit from a simple word bank of relevant terms
- Using pupil voice to get recording of ideas
- Allowing pupils to present their findings in their books their own way- modelling a few examples
- Taking photos of the pupils conducting the experiments