Year 3

Rocks, soils and fossils

Background Knowledge
Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different size of grains or crystals. They may absorb water. Rocks can be different shapes or sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed up with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the properties of the soil. Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the bottom of the sea bed. They became covered and squashed by other material. Over time, the dissolving animal and plant matter is replaced by minerals from the water. Common misconceptions • Rocks are all hard in nature. • Rock-like man-made substances such as concrete or brick are rocks. • Materials which have been polished or shaped for use, like old bits of pottery or coins, are fossils. • A fossil is an actual piece of the extinct animal or plant. • Soil and compost are the same thing. **For suggestions for activities and resources, see** https://www.hamilton-trust.org.uk/browse/science/y3/year-3-spring-1-rocks-rocks-and-fossils/116653 https://www.stem.org.uk/resources/elibrary/resource/26719/rocks-rocks-and-fossils https://www.teachwire.net/teaching-resources/characteristics-of-rocks-worksheet-for-year-3-science

What children already know/ can do
I can distinguish between an object and the material it is made from. I can explain the materials an object is made from. I can name wood, plastic, glass, metal, water and rock. I can describe the properties of everyday materials. (hard, soft, stretchy, stiff, shiny, dull, rough, smooth etc.) I can group objects based on the materials they are made from. (year 1 materials) I can identify and name a range of materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard. I can suggest why a material might or might not be used for a specific job. (year 2 materials)

National Curriculum objectives	Children's objectives
<u>Scientific knowledge</u> Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Describe in simple terms how fossils are formed when things that have lived are trapped within rock Recognise that soils are made from rocks and organic matter	I can compare and group rocks based on their appearance and physical properties giving a reason. I can describe how fossils are formed. I can describe how soil is made.
<u>Scientific enquiry</u> Asking relevant questions and using different types of scientific enquiries to answer them Setting up simple practical enquiries and comparative tests. Making careful observations. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	I can ask simple questions using different question stems. I can set up a test to compare. I can make a prediction giving a reason. I can sort and classify objects according to their properties. I can use and spell appropriate scientific language. I can explain my findings both orally and in writing.

Assessment
Sort objects into different groups. Explain how you sorted them. Sort rocks into groups. What property did you use? Where would you find rocks in our environment? What does permeable mean? Name a rock that's permeable and one that's impermeable. What rock was the hardest? The softest? Why is chalk used for writing on a blackboard? Why is slate used on roofs? Sequence the pictures to explain how fossils are formed. What are soils made of?

Working towards	Expected	Exceeding
I can compare rocks and group them in different ways by observing closely. I can investigate different properties of rocks by setting up simple comparative tests with support. I can make sensible predictions. I can record my findings and start to explain what I have found out. I can sequence the stages and start to describe how fossils are formed. I can start to describe how soils are made.	I can compare rocks and group them in different ways by observing closely explaining my reasons. I can investigate different properties of rocks by setting up simple comparative tests. I can make sensible predictions. I can record my findings clearly explaining what I have found out. I can explain how fossils are formed. I can describe how soils are made.	I can compare rocks and group them in different ways by observing closely explaining my reasons. I can investigate different properties of rocks by setting up simple comparative tests independently describing how I ensure it is a fair test where appropriate. I can make sensible predictions giving reasons behind my thinking. I can record my findings explaining clearly what I have found out. I can explain how fossils are formed in detail. I can describe how soils are made and explain the different layers.

Key Vocabulary	
*Vocabulary associated with size of rocks (**boulder, pebble**), properties of rock (**hard/soft** etc.) and type of rock (**limestone, chalk, slate** etc.)* **Durable**; something that doesn't wear away easily. **Fossil**-The hardened remains or imprint of an ancient living thing, which has been preserved in rock. **Igneous**- rocks formed by the action of a volcano. **Impermeable**- doesn't allow liquids or gases through it. **Metamorphic**- rocks that are changed by heat or pressure. **Minerals** – minerals come from broken down rock. **Organic matte**r- living and dead animals and plants. **Permeable**; allows liquids or gases to pass through it. **Rock;** a naturally occurring material often found under the soil. **Rough**- has an uneven or irregular surface. **Sedimentary**- rocks formed from layers of sand, stones or mud. **Smooth**- has an even surface without marks or roughness. **Soil;** a mixture of tiny particles of rocks, organic matter from animals and plants, as well as air and water.	Working scientifically **Classify**- sort into groups according to properties. Comparative test; an investigation where you compare one factor with another Conclusion; To look at our results and explain what we have found out. Investigation – to find something out Observe – to look at something closely Predict – to say what you think might happen Properties- a way of describing an object Result – to record what we have found out

Character opportunities	Possible STEM careers linked to unit
Curiosity - asking questions about the world around us Collaboration - working together to solve problems and find solutions	Archeologist (studies history using artefacts geologist (studies earth and what it is made of) Palaeontologist (studies fossils) Seismologist (studies earthquakes)

Activities/Learning objectives in italics are non statutory

Lesson Objectives	Working Scientifically	Activities	Thinking skills / metacognition opportunities and creative *suggestions*
• To consider a range of different rocks •	• Identify differences and similarities and changes related to simple scientific ideas and processes	Hard Rock challenge file:///C:/Users/user/Downloads/_resource_lks2_science_y3_spring_1_rocks_and_fossils_session1_resource_0.pdf Hamilton Trust activity 1	
• To know that rocks have different properties • To know that there are 3 different types of rocks, **igneous, metamorphic and sedimentary**	• Identify differences and similarities and changes related to simple scientific ideas and processes	Show children images of the earth from space investigate the work of James Hutton, a Scottish geologist from 300 years ago (p156 scholastic science lessons • Rock detectives - See Hamilton Trust PP presentations on how rocks are formed and how to test hardness test for ideas for testing rocks (Rock Detectives Also see 'A Rock is Lively' here https://www.youtube.com/watch?v=K9qOs-w7BWs The video here https://www.pbs.org/video/d4k-geology-basics-o1a1qo/ explains some geological features How to dig to the other side of the world - a fun book reading here	Use the information sources to tell the story of how different rocks are formed. Give each type of stone a 'super character' and tell the story of its formation using a comic strip Tell the story of the rock formation using drama Make a model of the earth using a ping pong ball for the centre and plasticine showing the layers (see scholastic science lessons p 157

• To understand what volcanoes are and how they are formed • To know that igneous rocks are formed fron heating rocks at high temperaturek	• Gathering, recording , classifying and presenting data in a variety of ways to help answer questions	Build model volcanoes and watch videos of eruptions Investigate undersea volcanic activities More able look at maps of earth's crust and compare with volcanic activity around the world	Making generalisations ' where tectonic plates meet is the area where there is most volcanic activity
• To learn about the wa in which humans use rocks	Identify differences and similarities and changes related to simple scientific ideas and processes Gathering recording classifying and presenting data in a variety of ways help answer questions	• Go on a rock hunt around the school, or in the local area. Take photos of different rocks and consider how they are used due to their characteristics • 'Rock Quest' Hamilton Trust https://www.hamilton-trust.org.uk/science/content/2100-planning-and-activities/	Write a report/ make a poster for the scienti on the types of rocks used in the area
		• Read the poem 'Stones' by Jean Kenward (see below) • Show the children a fossil. Encourage them to bring their own fossils into school	Discuss the meaning of the poem and what Jean Kenward might mean by her use of certain phrases
To know what fossils are and how they are formed To know how important discoveries have been made by scientists	Gathering recording classifying and presenting data in a variety of ways help answer questions	• Find out about Mary Anning and her importance to the study of fossils (se Hamilton Trust resources) • Children should NOT use plaster of paris to make fossils due to the chanc of burns. Explore the use of air drying clay or other modelling materials instead	
• To know what is meant by a fossil fuel • To understand that fossil fuels are non renewable	Gathering recording classifying and presenting data in a variety of ways help answer questions	• Look at how we use fossil fuels such as oil, coal and gas, and showing that they are non-renewable and will run out one day	
• To know that soil lies top of rock • To know that there ar different kinds of soil • To know that differen soils have different	Asking relevant questions Setting up simple practical enquiries comparative and fair tests Gathering, recording, classifying and presenting data in a variety of ways help in answering questions	Investigate different soil samples using hand lenses Mix different soil samples with water and observe settlement https://kidsgeo.com/geology-for-kids/the-earths-soil/ for information on soils See you tube https://www.youtube.com/watch?v=ysIm7ImsK6c And others for description of layers of soil	

sized particles and are different colours			

Stones I like stones

I like to touch
Their shape and colour:
such, and such.
Lift one up
and you may find
Tiny creatures
There confined
Hidden safely
Out of sight
In a small
Private night.
Stones are quiet
Stones are cold
some of them
Are old – so old
That upon
Their surface clings
A pattern of
The strangest things:
leaves, and fish,
and shells and seas
and birds from different
skies than these
when the earth had just begun.
Stones know more
Than anyone

Jean Kenward

Rocks and soils

Name _____ Date _____

This is a fossil of a fish from millions of years ago. What kind of rock would it have been be found in?

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Can you explain how it got in the stone?

What is soil made of?

What type of rock is formed by volcanoes and what is it like?

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