

## Y3 Science: Rocks and Soils

## Half Termly Planner

<b>Term: Autumn 2</b>	<b>Teacher:</b>
Differentiation and support (Detailed differentiation in weekly plans.)	ICT: Children will use laptops to research
SEN: write up investigations on writing frames. Support from more able partners in mixed ability work. Additional adult support.	Numeracy: Children will be categorising/sorting objects, measuring time and drawing bar charts
GT: provide headings for experiment sections. Send off to experiment sooner than rest of group. Provide with equipment, but provide less scaffolding on how to conduct the experiment. Encourage conclusions that draw on scientific knowledge and enquiry skills.	Design and Technology: Children will be thinking about suitable materials to use for objects.
Vocab: clay, peat, sand, granite, marble, slate, chalk, magnifying glass, filter, measurement.	Literacy: children will be writing up experiments in sequence using technical language.
	Display: variety of rocks in a tray with magnifying glass. Volcano, rock and soil books.

The schools that I have worked at in London have access to Collins Virtual Experiments through the London Grid for Learning (LGFL). If you are in London, and google LGFL virtual experiments, from your school you should be able to automatically access them. From home you need your frontier log-in and password.

W	Learning Objective	Skills/knowledge/activities	Resources	Assessment: Success criteria	Evaluation
1	<p>Self-assess knowledge of rocks and soils</p> <p>(15 mins)</p> <p>Know that rocks can be man-made or natural</p> <p>(30 mins)</p>	<p>Children complete a mind map on what they already know about rocks and soils.</p> <p>Intro: Explain the difference between natural and man-made.</p> <p>Main: Children need to drag and drop six different images of rock (brick, breeze block, concrete road, cliff, pebble and pumice) under the heading of 'Natural' or the heading 'Man-Made'.</p> <p>Extension: Next to the image of a quarry and a man mixing concrete the children need to explain what is happening in the images, by looking at the image and looking up the word quarry and concrete in the dictionary.</p> <p>Plenary: Go through correct answers on IWB. Explain what a quarry is and how concrete is made.</p>	<p>Mind map frames</p> <p>Worksheet</p> <p>Laptops / ICT suite</p>	<p>MUST: know that rocks can be man-made or natural</p> <p>SHOULD: be able to sort some rocks into natural and man-made</p> <p>COULD: explain sources of main rocks used in human activity</p>	

2	<p>Know the structure of the Earth (30 mins)</p> <p>Know the structure of a volcano (30 mins)</p>	<p>Intro: Ask the children what they think they would find if they dug miles and miles under the ground. Explain that we are going to be learning what is actually a long way under the Earth's surface.</p> <p>Main: Watch video explaining the structure of the Earth: <a href="http://videos.howstuffworks.com/hsw/5929-geology-the-structure-of-the-earth-video.htm">http://videos.howstuffworks.com/hsw/5929-geology-the-structure-of-the-earth-video.htm</a> Read through sections on structure of the Earth from <a href="http://www.kidsgeo.com/geology-for-kids/0021-earths-crust.php">http://www.kidsgeo.com/geology-for-kids/0021-earths-crust.php</a> Children to make notes on a diagram of the Earth from these sources</p> <p>Plenary: Children share and compare their diagrams, adding any extra information that they wish to add.</p> <p>Give children the opportunity to ask any questions that they have.</p> <p>Intro: Ask the children to think, pair, share what they already know about volcanoes and the Earth's surface. Take ideas as a class.</p> <p>Watch video on 'Plate tectonics' at: <a href="http://www.youtube.com/watch?v=GYVS_Yh6dT&amp;feature=related">http://www.youtube.com/watch?v=GYVS_Yh6dT&amp;feature=related</a> Show map of the Earth split into its tectonic plates at: <a href="http://www.enchantedlearning.com/subjects/volcano/ringoffire/">http://www.enchantedlearning.com/subjects/volcano/ringoffire/</a>. Read information at <a href="http://www.geography4kids.com/files/earth_tectonics.html">http://www.geography4kids.com/files/earth_tectonics.html</a>.</p> <p>Watch video of volcanic eruption available at: <a href="http://www.youtube.com/watch?v=OowFvniWI90">http://www.youtube.com/watch?v=OowFvniWI90</a> Show diagram with the structure of a volcano at: <a href="http://www.enchantedlearning.com/subjects/volcano/">http://www.enchantedlearning.com/subjects/volcano/</a> and explain the various parts of the volcano</p> <p>Main: Children need to label the parts of a volcano from worksheet available at: <a href="http://www.enchantedlearning.com/subjects/volcano/labelvolcano.shtml">http://www.enchantedlearning.com/subjects/volcano/labelvolcano.shtml</a></p> <p>Extension: add information on each part of the volcano</p> <p>Plenary: Go through correct answers and revise plate tectonics</p>	Worksheet	<p>MUST: know that the Earth and volcanoes have different layers and parts</p> <p>SHOULD: correctly label the layers of the Earth and the parts of a volcano</p> <p>COULD: add information to their labelled diagrams</p>	
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3	<p>To know that there are different types of rock</p> <p>To know that different rocks have different uses</p> <p>(1 hour)</p>	<p>Intro: Ask children to think, pair, share the names of rocks that they know and any words they know to describe them. Take ideas as a class.</p> <p>Main: Sheet with two columns – one has the names and images of rocks and key vocabulary associated with rocks. The other column has definitions. The two columns do not match up. The children need to cut them up in their house groups and rearrange them so they match. Give children the actual rocks as well if you have them.</p> <p>Children complete task as house competition.</p> <p>Plenary: Go through correct answers</p>	<p>Sheets (jumbled up)</p> <p>Sheets (correct)</p> <p>Scissors</p> <p>Glue</p> <p>A3 paper</p>	<p>MUST: realise that there are different types of rock</p> <p>SHOULD: realise that different types of rock have different uses</p> <p>COULD: learn the characteristics of several types of rock and make the link between these characteristics and their uses</p>	
4	<p>To know that there are different types of rock</p> <p>To know that different rocks have different uses</p> <p>(1 hour)</p>	<p>Intro: House competition to remember as many of the names of rocks that we learnt in previous lesson as possible.</p> <p>Main: Explain task: children need to play game on the BBC website to complete a table on the properties of some different rocks, and to find out what those rocks are used for and why they are suitable for the different purposes.</p> <p>Plenary: Children share their findings with the people on their table and discuss any differences.</p>	<p>Hyperlink in pupil folders on network</p>	<p>MUST: find out the properties of several rocks</p> <p>SHOULD: find out the uses of several rocks and why they are suited to their uses</p> <p>COULD: help their partner to understand the above</p>	
5	<p>Know that rocks are formed through different processes</p> <p>(1 hour)</p>	<p>Intro: Revise terms igneous, sedimentary and metamorphic, what they mean and show examples of each type of rock.</p> <p>Main: Children to make 3 different 'rock cakes' with 3 different recipes to show how each type of rock has different characteristics and is made by different processes. (instructions on Primary Resources website)</p> <p>Plenary: Children taste the various 'rock cakes'. As they eat, encourage them to feel the difference in texture and hardness of the different 'rocks'.</p>	<p>Ingredients</p> <p>Cling film</p>	<p>MUST: know that rocks can be formed through 3 different processes</p> <p>SHOULD: know the names of these 3 processes and how each one works</p> <p>COULD: link the 'rock' cake baking with the processes in real life</p>	

6	<p>Investigate the hardness of different rocks (Moh's test)</p>	<p><i>If you can't get rock samples for this lesson, there is a virtual version of this experiment at Collins virtual experiments</i></p> <p>Discuss with the children how they could find out which rock is hardest.</p> <p>Plan a fair test fair: conditions the same.</p> <ul style="list-style-type: none"> <li>• Force with which you rub the rock</li> <li>• Timing (how long you rub for)</li> <li>• Paper you rub against</li> <li>• Surface you lean against to rub the rock on the paper</li> </ul> <p>Model how changing these things would be unfair and explain why this is the case. (15 mins)</p> <p>Emphasise need to be careful when rubbing rocks</p> <p>Children write aim, prediction and method, then carry out the investigation by:</p> <ol style="list-style-type: none"> <li>1. Selecting a rock</li> <li>2. Rubbing it against the sand / sugar paper</li> <li>3. Giving it a rank for how much of a mark the rock left (after rubbing all of the rocks) (45 mins)</li> </ol> <p>10 minute break</p> <p>Model recording of investigation in a bar chart and explain how to use tick list on investigation frame. Write conclusion, encouraging use of scientific words such as most / least, hardest and because (30 mins)</p> <p>Plenary: which rock was hardest and why? Did different groups get different results? Compare and discuss results. (15 mins)</p>	<p>Rock samples</p> <p>Sugar or sand paper</p> <p>Investigation frames</p> <p>Bar graph frame</p>	<p>MUST: plan and carry out an experiment by using an investigation frame, with adult support</p> <p>SHOULD: plan and carry out an experiment by using an investigation frame, without adult support</p> <p>COULD: link predictions and conclusions to scientific knowledge and use scientific language</p>	
7	<p>To know how soil is formed from rocks (1 hour)</p>	<p>Intro: Revise what we did last lesson – rocks can be eroded and broken into smaller pieces. Ask children to think, pair, share how they think soil is formed. Explain that soil is formed by rocks being broken into smaller pieces and by erosion of rocks. Watch video of 'Rock meets lichen' on youtube at: <a href="http://www.youtube.com/watch?v=zv2JNagnYxU&amp;feature=related">http://www.youtube.com/watch?v=zv2JNagnYxU&amp;feature=related</a> Explain that the sun, wind and river / the sea also erode and break rocks.</p> <p>Main: Children need to complete a storyboard to show how 'Rob the Rock' becomes 'Sam the Soil'. They can include speech bubbles if they like, and need to make sure Rob gets smaller and broken into more pieces progressively through the storyboard.</p> <p>Plenary: Children share and discuss their storyboards on their table.</p>	<p>Worksheet</p>	<p>MUST: understand that rocks are eroded to form soil</p> <p>SHOULD: remember some of the processes involved in soil formation</p> <p>COULD: remember all of the processes involved in soil formation</p>	

8	<p>Identify differences between soils</p>	<p><i>You will need soil samples for this lesson</i></p> <p>Intro: Explain that we will be comparing different soils. Children think, pair, share on what differences they might expect to find. Take ideas as a class. Show children various soil samples and tell them the names of each.</p> <p>Remind children of importance of not putting soil near their mouths, nose or ear. You may want them to wear gloves.</p> <p>Main: Compare the following properties of soils and record ideas in a table:</p> <ul style="list-style-type: none"> <li>• Colour</li> <li>• Texture</li> <li>• (how it feels)</li> <li>• Particle size</li> <li>• Moisture</li> <li>• (wet or dry)</li> <li>• Plant material in it</li> </ul> <p>Plenary: Children share and discuss their findings.</p> <p>Listen to information from <a href="http://www.soil-net.com/cms_test/">http://www.soil-net.com/cms_test/</a> and children choose which farmer will grow the best carrot: the farmers have sandy, clay or loamy soil. In fact, neither soil is better or worse, but they make the carrots grow in different ways. Continue with info from this website which explains differences in soil and how this affects plants</p>	<p>Soils samples</p> <p>Worksheet</p>	<p>MUST: make observations about different soils</p> <p>SHOULD: understand that plants need soil to grow</p> <p>COULD: understand that some plants prefer soil with particular properties</p>	
9	<p>Explain that different soil comes from different rocks</p> <p>(1hour)</p>	<p><b><i>Do this at the start of the day so that the constituent parts of the soil have time to separate.</i></b></p> <p>Intro: Explain to children what I will be doing. Ask them to think, pair, share on what they think we might see. Take ideas as a class.</p> <p>Put some of soil samples in clear drinking bottles and leave</p> <p>Main: Children need to draw and label what they see in the bottles.</p> <p>Extension: Children need to draw their own basic soil profile and annotate each section with bullet points, based on a fact sheet</p> <p>Plenary: Discuss why the different parts of the soil settled in different places. Ask children for suggestions on which type of rock might have made the different layers in the soil.</p>	<p>Soil samples</p> <p>Drinking bottles</p> <p>Soil profile fact sheet</p>	<p>MUST: draw the different appearances of the soil</p> <p>SHOULD: draw <b>and label</b> the different appearances of the soil</p> <p>COULD: draw and label a basic soil profile</p>	

10	<p>Investigate permeability of soils</p> <p>Plan and carry put a fair test</p> <p>(2 hours)</p>	<p><i>If you can't get soil samples for this lesson, there is a virtual version of this experiment at Collins virtual experiments</i></p> <p>Revise what permeable means. Discuss with the children how they could find out which soil is most permeable.</p> <p>Plan a fair test fair: conditions the same.</p> <ul style="list-style-type: none"> <li>• Height from which water is poured</li> <li>• Time for water to seep through</li> <li>• Same funnel</li> <li>• Same amount of soil</li> <li>• Same amount of water</li> </ul> <p>Model how changing these things would be unfair and explain why this is the case. (15 mins)</p> <p>Emphasise need to be careful not to be too messy with soil and water and not put fingers near mouth, nose etc. You may want to use gloves.</p> <p>Children write aim, prediction and method, then carry out the investigation by:</p> <ol style="list-style-type: none"> <li>1. Placing some permeable gauze paper so that it stays in the funnel</li> <li>2. Putting the funnel in a measuring jug</li> <li>3. Weighing an amount of soil, pouring it into the funnel and patting it down</li> <li>4. Pouring in water for a given amount of time and measuring how much passes into the measuring jug</li> </ol> <p>(45 mins)</p> <p>10 minute break</p> <p>Model recording of investigation in a bar chart and explain how to use tick list on investigation frame. Write conclusion, encouraging use of scientific words such as most / least, permeable and because (30 mins)</p> <p>Plenary: which soil was most permeable and why? Did different groups get different results? Compare and discuss results. (15 mins)</p>	<p>Soils</p> <p>Differentiated experiment plans</p> <p>Graph paper</p> <p>Graph frames</p> <p>Funnels</p> <p>Weighing scales</p> <p>Measuring jugs</p> <p>Timers</p>	<p>MUST: plan and carry out an experiment by using an investigation frame, with adult support</p> <p>SHOULD: plan and carry out an experiment by using an investigation frame, without adult support</p> <p>COULD: link predictions and conclusions to scientific knowledge and use scientific language</p>	
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11		Children return to their mind maps from the first week and add what they have learnt over the past few weeks to them in a different coloured pencil.  This will hopefully show me (and them) what they have learnt.	Colouring pencils	Mind maps from first lesson	
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### Assessment

Some children will not have made so much progress and will achieve	Most will achieve	Some will progress further and achieve
<ul style="list-style-type: none"> <li>• name one or two rocks</li> <li>• say that there are rocks under us</li> <li>• measure time and volume.</li> </ul>	<ul style="list-style-type: none"> <li>• name and describe characteristics of several rocks</li> <li>• explain rocks are used for different purposes</li> <li>• recognise that there is rock under all surfaces</li> <li>• explain that soil comes from rock</li> <li>• design a fair test</li> <li>• measure volume correctly</li> <li>• say what experiments show</li> </ul>	<ul style="list-style-type: none"> <li>• explain how to make a fair test</li> <li>• describe in detail a fair test methodology</li> <li>• explain what results show in terms of characteristics and uses of rocks and soils</li> </ul>