



# SCIENCE YEAR 3-4 Cycle A – Unit 3

## *Materials: rocks and soils*

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### **RANGE**

#### ***The sustainable Earth***

3. a comparison of the features and properties of some man-made and natural materials
4. the properties of materials relating to their uses
5. how some materials are formed or produced

### **KEY VOCABULARY**

texture  
rough  
smooth  
absorbent  
waterproof  
igneous (e.g. granite, basalt)  
metamorphic (e.g. slate, marble)  
sedimentary (e.g. chalk, sandstone, mudrock)  
**tally**  
**table**  
**bar chart**  
**observe**  
**prediction**

### **Developing thinking**

(Plan-Develop-Reflect integrated into activities)



### **LNF – Main Numeracy Strands covered\***

#### **Strand:**

*Developing numerical reasoning*

#### **Elements:**

*Identify process and connections*  
*Represent and communicate*  
*Review*

#### **Strand:**

*Using data skills*

#### **Elements:**

*Collect and record data*  
*Present and analyse data*  
*Interpret results*

*\*Refer to LNF numeracy framework for details of specific skills within each element.*

### **LNF – Literacy (writing) opportunities**

**Element:** Organising information and ideas  
Writing accurately

Writing to inform, instruct and find out

### **Developing ICT**



*School to identify and provide opportunities for developing this skill within the scope of the unit.*

### **Curriculum Cymreig**



*School to identify and provide opportunities for developing this skill within the scope of the unit.*

### **Personal and social education**



*School to identify and provide opportunities for developing this skill within the scope of the unit.*

## Science – Medium Term Planning (half term)

Year Group	3/4	Term	Cycle A – Unit 3	Unit Title	<i>Materials – rocks and soils</i>
<b>Range: <i>The sustainable Earth</i></b> 3. a comparison of the features and properties of some man-made and natural materials 4. the properties of materials relating to their uses 5. how some materials are formed or produced					
<b>Cross Curricular Links:</b>					
Skills (Principal skills in bold italics)	Suggested activities			Resources and web links	Assessment Opportunities
<b>COMMUNICATE</b> <i>Communicate clearly using science vocabulary</i>  <b>PLAN</b> <i>Identify gaps in prior knowledge</i>  <b>REFLECT</b> Suggest how the method could have been improved	<b>1. Big Question: What do you know about materials?</b>  Introduce the topic and discuss what pupils understand about materials and their properties related to their uses. What do pupils know about rocks. What is soil?  Record diagnostic assessment – mind map, KWL grid or ideas poster etc.  <b>Introduce the skill – Communicate ideas &amp; identify gaps in prior knowledge</b> <ul style="list-style-type: none"> <li>Use landscape photos and/or rock/soil specimens to trigger debate and discussion.</li> <li>Allow pupils to select items from a feely bag/box and describe rocks/soils. List new and/or key vocabulary.</li> <li>Consider using the Year 3/4 target card for science. Discuss key science enquiry skills and ask pupils to identify a small number of 'next steps' targets for themselves.</li> </ul> <b>Big Question: What do you know about rocks and soils?</b>  <b>Practise the skill – Communicate ideas &amp; identify gaps in prior knowledge</b> <ul style="list-style-type: none"> <li>Allow pupils to handle specimens of rocks and fossils.</li> <li>Discuss similarities and differences – choose any three and play 'odd-one-out'.</li> <li>What can pupils find out about fossils?</li> <li>Can groups record/explain several facts about a chosen fossil type? Consider writing a science postcard to Mary Anning (famous 19<sup>th</sup> Century amateur fossil hunter) explaining what we now know about some interesting fossils, e.g. trilobites, dinosaurs etc.</li> </ul> <b>To write to inform and explain</b> <b>Text type: non-chronological report/postcard/letter</b>			<a href="http://resources.hwb.wales.gov.uk/VTC/2009-10/science/crispsat/e23-properties-and-uses/index.html">http://resources.hwb.wales.gov.uk/VTC/2009-10/science/crispsat/e23-properties-and-uses/index.html</a>  <a href="http://www.bbc.co.uk/learningzone/clips/">http://www.bbc.co.uk/learningzone/clips/</a>  <a href="http://www.sciencekids.co.nz/sciencefacts/earth.html">http://www.sciencekids.co.nz/sciencefacts/earth.html</a>  <a href="http://www.oum.ox.ac.uk/thezone/rocks/index.htm">http://www.oum.ox.ac.uk/thezone/rocks/index.htm</a>  <a href="http://www.lymeregismuseum.co.uk/exhibitions-and-events/in-the-museum/mary-anning">http://www.lymeregismuseum.co.uk/exhibitions-and-events/in-the-museum/mary-anning</a>	Use preferred diagnostic strategy/tool  <i>Can pupils organise their findings and display these in a given format? (Level 3)</i>  <i>Can pupils organise findings and use relevant scientific vocabulary? (Level 4)</i>

<p><b>PLAN</b> Plan the method to be used</p> <p><b>DEVELOP</b> <i>Use equipment and make careful observations</i></p> <p><b>REFLECT</b> Suggest how to improve the method</p>	<p><b>2. Big Question: Rocks, bricks and concrete - natural or man-made?</b></p> <p>Allow children to explore a collection of rocks, bricks and other man-made objects to observe and group in terms of texture eg size, shape and arrangement of particles and appearance and range of colours.</p> <p><b>Introduce the skill – Observing and making comparisons</b></p> <ul style="list-style-type: none"> <li>• ‘Post-it note challenge’ – ask groups of pupils to quickly examine and note the key features of each object/material on a post-it note. List ideas/vocab on the board.</li> <li>• Ask children to choose criteria for grouping and ask other children to guess what this is.</li> <li>• What is the most effective method for sorting the objects/materials? What categories did pupils choose?</li> <li>• How did pupils record the features of each specimen?</li> <li>• Review outcomes and confirm pupils’ understanding of natural and man-made objects.</li> </ul> <p><b>Practise the skill – Observing and making comparisons</b></p> <ul style="list-style-type: none"> <li>• Focus on the rocks from the previous task.</li> <li>• Challenge pupils to sort samples of rocks according to colour, texture, hardness etc.</li> <li>• Suggest pupils use a range of sorting criteria.</li> <li>• Gather pupils’ findings and either: <ul style="list-style-type: none"> <li>- explore the properties of each rock type in turn with pupils and assign a rock name, or</li> <li>- challenge more able pupils to use their observations to identify key rock types using an online source.</li> </ul> </li> <li>• Consider constructing a simple classification key using A3 paper and/or a simple parents’ guide to the three rock groups (igneous, metamorphic and sedimentary).</li> </ul> <p><b>To write to inform and explain</b> <b>Text type: non-chronological report</b></p>	<p><a href="http://resources.hwb.wales.gov.uk/VTC/rocks/eng/Introduction/default.htm">http://resources.hwb.wales.gov.uk/VTC/rocks/eng/Introduction/default.htm</a></p> <p><a href="http://www.bbc.co.uk/learningzone/clips/">http://www.bbc.co.uk/learningzone/clips/</a></p> <p><a href="http://www.sciencekids.co.nz/sciencefacts/earth.html">http://www.sciencekids.co.nz/sciencefacts/earth.html</a></p> <p><a href="http://www.oum.ox.ac.uk/thezone/rocks/index.htm">http://www.oum.ox.ac.uk/thezone/rocks/index.htm</a></p> <p>Selection of everyday materials and examples of main rock groups (igneous, metamorphic and sedimentary)</p>	<p>Can pupils organise their findings and display these in a given format? (Level 3)</p> <p><i>Can pupils make observations using simple equipment? (Level 3)</i></p> <p><i>Can pupils begin to identify simple patterns and trends? (Level 3)</i></p>
<p><b>PLAN</b> <i>Plan the process/method to be used</i></p> <p>Plan the observations and measurements to take</p> <p><b>DEVELOP</b> Make careful observations</p> <p>Make comparisons and identify patterns in data/findings</p>	<p><b>3. Big Question: Which is the best rock type to use as a building material?</b></p> <p>Discuss the features of building materials. Discuss features of rocks that can be tested, e.g. scratch test, water repellence etc.</p> <p><b>Introduce the skill – Plan method/approach to be used.</b></p> <ul style="list-style-type: none"> <li>• Challenge pupils to select a test and map out their ideas.</li> <li>• Model an example of a planning template</li> <li>• What makes a ‘good’ science plan? This may form pupils’ success criteria.</li> </ul> <p><b>Practise the skill – Plan method/approach to be used.</b></p> <ul style="list-style-type: none"> <li>• Pupils plan and write-up a simple method/approach.</li> <li>• Are there any aspects of ‘fair testing’ in these tests?</li> <li>• How will pupils record their findings? Will they be recording numbers or recording qualitative observations in words?</li> <li>• Pupils carry out test and record findings.</li> </ul> <p><b>To write to inform and explain</b> <b>Text type: science write-up/report</b></p>	<p><a href="http://resources.hwb.wales.gov.uk/VTC/rocks/eng/Introduction/default.htm">http://resources.hwb.wales.gov.uk/VTC/rocks/eng/Introduction/default.htm</a></p> <p><a href="http://www.bbc.co.uk/learningzone/clips/">http://www.bbc.co.uk/learningzone/clips/</a></p> <p><a href="http://resources.hwb.wales.gov.uk/VTC/2009-10/science/crispsat/e23-properties-and-uses/index.html">http://resources.hwb.wales.gov.uk/VTC/2009-10/science/crispsat/e23-properties-and-uses/index.html</a></p> <p>Selection of everyday materials and examples of main rock groups (igneous, metamorphic and sedimentary)</p>	<p><i>Can pupils plan with some independence? (Level 3)</i></p> <p>Can pupils follow a simple series of instructions to gather findings? (Level 3)</p> <p>Can pupils make decisions by weighing up evidence? (Level 3)</p>

<p><b>PLAN</b> Plan the process/method to be used</p> <p>Select success criteria</p> <p><b>DEVELOP</b> Use apparatus and equipment correctly and safely</p> <p><i>Make comparisons and form considered opinions</i></p> <p><b>REFLECT</b> Begin to evaluate outcomes against success criteria.</p>	<p><b>4. Big Question: Which is the best rock type to use as a building material? Cont.</b></p> <p>Review findings from pupils' tests.</p> <p><b>Introduce the skill – Make comparisons and form considered opinions</b></p> <ul style="list-style-type: none"> <li>Discuss pupils' use of tables to record findings.</li> <li>How can we graph pupils' findings? Why can't we graph qualitative observations?</li> <li>How can we graph qualitative observations? (e.g. numbers of drops of water absorbed).</li> <li>Model how to draw simple conclusions from pupils' findings.</li> </ul> <p><b>Practise the skill – Make comparisons and form considered opinions</b></p> <ul style="list-style-type: none"> <li>Challenge pupils to create concluding statements that support their findings.</li> <li>Ask groups to swap findings and create conclusions for other groups' data. Compare findings.</li> <li>Produce group science ideas poster/graffiti board – pupils to list new knowledge/skills.</li> </ul> <p><b>To write to inform and explain</b> <b>Text type: poster</b></p>	<p><a href="http://www.echalk.co.uk/">http://www.echalk.co.uk/</a></p> <p><a href="http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/e23-properties-and-uses/index.html">http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/e23-properties-and-uses/index.html</a></p>	<p>Can pupils agree on basic success criteria? (Level 3)</p> <p><i>Can pupils make decisions by weighing up pros and cons? (Level 3)</i></p> <p>Can pupils link outcomes to success criteria? (Level 3)</p>
<p><b>PLAN</b> Plan the process/method to be used</p> <p>Select success criteria</p> <p><b>DEVELOP</b> <i>Use apparatus and equipment correctly and safely</i></p> <p><i>Make careful observations</i></p> <p><b>REFLECT</b> Begin to evaluate outcomes against success criteria.</p>	<p><b>5. Big Question: What is soil? Are all soils the same?</b></p> <p>Give pupils a selection of soils – clay, sandy and garden loam. Ask pupils to explore and predict what they expect to find with each type of soil. How will pupils plan to find out about these soils? What equipment will they need? Is this a fair test or a simple exploration enquiry?</p> <p><b>Introduce the skill – Use apparatus and make careful observations</b></p> <ul style="list-style-type: none"> <li>Review equipment, including sieves, digital microscopes, tweezers, petri dishes etc.</li> <li>Review sieving as a method for separating particles of different sizes.</li> <li>Set simple success criteria: what do pupils need to observe? Texture, colour, particles etc?</li> <li>How will pupils record their observations?</li> </ul> <p><b>Practise the skill – Use apparatus and make careful observations</b></p> <ul style="list-style-type: none"> <li>Pupils gather equipment and make observations.</li> <li>Record findings in a table.</li> </ul> <p>Review pupils' findings. What is soil made up from? Are all soils the same?</p>	<p><a href="http://resources.hwb.wales.gov.uk/VTC/phase4_20030801/Wales/Science/Keystage2/Lifeprocesses/Anonlineoilexp/Introduction/default.htm">http://resources.hwb.wales.gov.uk/VTC/phase4_20030801/Wales/Science/Keystage2/Lifeprocesses/Anonlineoilexp/Introduction/default.htm</a></p> <p>Selection of main soil types: sandy, loam and clay soil.</p> <p>Sieves Measuring cylinders Magnifying lenses Digital microscope</p>	<p><i>Can pupils make observations using simple equipment? (Level 3)</i></p> <p><i>Can pupils make observations using standard equipment and record using SI units? (Level 4)</i></p>

<p><b>PLAN</b> <i>Plan the process/method to be used</i></p> <p><b>DEVELOP</b> Make careful observations and accurate measurements</p> <p>Use prior knowledge to explain</p> <p><b>REFLECT</b> Suggest how the method could have been improved</p>	<p><b>6. Big Question: Which is the best soil for a new sports pitch?</b></p> <p>Review the previous soils task. Introduce the big question to pupils and tell them they have been commissioned as scientists in order to identify the best soil to use for the new sports pitch. What determines a 'good' soil for a sports surface? Should it let water flow through easily or should it absorb and hold water? Discuss variables/characteristics using card sort activity.</p> <p>Suggest some ways in which pupils may investigate the question, e.g. time how long it takes a fixed amount of water to flow through different soils or measure how much water percolates through each soil type in a fixed length of time.</p> <p><b>Introduce the skill – Plan the method to be used</b></p> <ul style="list-style-type: none"> <li>• Discuss and model a class plan if necessary.</li> <li>• Emphasise aspects of fair testing.</li> <li>• Help pupils make a prediction based on some science observations.</li> </ul> <p><b>Practise the skill – Plan the method to be used</b></p> <ul style="list-style-type: none"> <li>• Challenge pupils to identify a simple plan/method from those discussed. Can they add to the plan?</li> <li>• Pupils carry out task and gather findings.</li> <li>• Tabulate results.</li> <li>• How can pupils' method be improved?</li> </ul> <p><b>To write to inform and explain</b> <b>Text type: science write-up/report</b></p>	<p><a href="http://www.echalk.co.uk/">http://www.echalk.co.uk/</a></p> <p>Interactive planning templates</p> <p>Selection of main soil types: sandy, loam and clay soil.</p> <p>Sieves Measuring cylinders Magnifying lenses Digital microscope</p>	<p><i>Can pupils plan with some independence? (Level 3)</i></p> <p>Can pupils follow a series of simple instructions to gather findings? (Level 3)</p> <p>Can pupils use standard equipment to gather findings, using a range of SI units? (Level 4)</p> <p>Can pupils suggest how the method could be improved? (Level 3)</p>
<p><b>COMMUNICATE</b> Communicate using tables and bar charts</p> <p><b>DEVELOP</b> <i>Make comparisons and identify patterns in data/findings</i></p> <p><b>REFLECT</b> Suggest how the method could have been improved</p>	<p><b>7. Big Question: How can we present our scientific work?</b></p> <p>Review the investigation from the previous task.</p> <p><b>Introduce the skill – Form considered opinions and make informed decisions</b></p> <ul style="list-style-type: none"> <li>• Help pupils construct a bar chart from their data/findings.</li> <li>• Focus on key features: independent variable on x-axis, gaps between bars.</li> </ul> <p><b>Practise the skill – Form considered opinions and make informed decisions</b></p> <ul style="list-style-type: none"> <li>• What simple trends/patterns can pupils elicit from their bar charts?</li> <li>• Model scientific language and concluding sentences.</li> <li>• Ask pupils to copy-and-paste their bar charts into a simple report template in which pupils form conclusions and make informed decisions.</li> </ul> <p><b>7a. Additional class and/or homework activity</b> – NGfL science: <i>The Stonehenge Challenge</i></p>	<p><a href="http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/e23-properties-and-uses/index.html">http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/e23-properties-and-uses/index.html</a></p> <p>Interactive planning templates</p>	<p><i>Can pupils say what they found out from their work and make decisions by weighing up pros and cons? (Level 3)</i></p> <p>Can pupils begin to organize findings, including simple tables and bar charts? (Level 3)</p> <p>Can pupils suggest how the method could be improved? (Level 3)</p>
<p><b>REFLECT</b> <i>Describe how they have learned, and identify the ways that worked the best.</i></p> <p>Link the learning to similar situations, within and outside school.</p>	<p>Revisit initial diagnostic assessment. Can pupils demonstrate understanding at end of topic and discuss new skills learned and/or practised?</p>	<p>Use preferred AfL strategy</p>	<p><i>Can pupils say what worked and didn't work? (Level 3)</i></p>
Evaluation			

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