

Lesson 1

ROCK OBSERVATION AND IDENTIFICATION

Learning intentions



1. Be able to compare rocks, identifying similarities and differences.
2. Group rock samples according to their characteristics and be able to explain groupings.
3. Understand that rocks are composed of grains which can be closely interlocked or loosely cemented together.
4. Know how to use a decision tree accurately in order to identify rock samples.
5. Recognise some rock types commonly found in Northern Ireland.

Resources



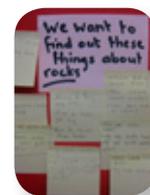
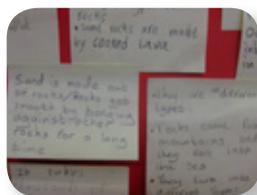
- One set of rocks for every group to include samples of granite, basalt, sandstone, slate, shale and limestone
- Magnifying glass (x5) per child, or one between two children
- Paper copies of the decision tree, provided with this lesson (one per group) (PE 1.1)
- Card labels used to identify the rock samples (children can easily create these themselves)
- Geological map of Northern Ireland (included) (PE 1.2)
- 'Match each rock to its characteristics' worksheet (one per child) (PE 1.3)

Introduction



Ask pupils what they collect/could collect – coins, stamps, stickers, shells etc. Ask 'What is the oldest thing of all that you could collect?' Hold up a rock/pebble and point out that most of the earth's rocks are extremely old, even millions and billions of years old. Remind pupils that the Earth we live on (the whole of the Earth's surface in fact) is covered in rocks, both on land and underwater.

Provide pupils with a post-it note each and ask them to write down anything they know about rocks, e.g. 'what they think a rock is', 'what rocks are like', 'whether they think rocks are all the same' etc. Provide a second post-it note and ask them to write down any questions they have about rocks. Stick the post-it notes up for everyone to see, under the two headings 'What we know, or at least think we know, about rocks' and 'what we would like to know/find out about rocks' **KWL grid format**. Spend a few minutes reading out and discussing/commenting on the ideas and questions the children have come up with.



Lesson 1 *continued*

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Development



Set a selection of rocks on each table to include samples of the following – **granite, basalt, sandstone, slate, shale and limestone** and provide each pupil with a magnifying glass **magnification x5 or greater is best**. Give the groups a few minutes to handle/observe the rocks and without any teacher input ask the children to group the rocks in any way that makes sense to them. Make children aware that they must be able to explain their groupings, but that there is no right or wrong answer. Allow children to feedback their ideas. Collect the words they use to describe the specimens and talk with them about the similarities and differences they observe between the rock samples.

Point out that earth scientists use the term 'grains' for the particles rocks are composed of. Pick up a piece of granite **without naming the rock – it is sufficient to call it the speckled rock** and ask the class to describe the grains. Do the same with a piece of sandstone **again not naming the rock at this point – it is sufficient to call it the red/brown rock**. Knock the sandstone against the piece of granite, while holding the samples above a sheet of white paper and ask the children what they notice, i.e. the grains from the sandstone easily break off, whereas the granite remains intact, due to the fact that its grains are interlocked. Conclude with the children that not all rocks are the same – there are clear differences between them.

Ask if anyone knows the names of any of the rock samples and explain that we are going to use a KEY to help us identify the rocks. Provide each group with a paper copy of the KEY (PE 1.3) **which identifies the following five rocks – sandstone, limestone, granite, shale and slate – it does not identify the basalt so at this point remove the basalt sample so as not to confuse the children and card labels for each of the five rocks.**

Criteria traditionally used by geologist's to identify rocks are:

- colour
- shape of particles
- particle size
- density or 'heaviness'
- texture
- hardness or softness

Children likely to suggest words such as:

- crystals
 - grainy
 - hard
 - heavy
 - layers
 - powdery
 - rough
 - sandy
 - smooth
 - sparkly
 - speckled
- to describe the rock samples.

Lesson 1 *continued*

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Explain the use of the KEY (PE 1.1), i.e. take each rock sample in turn and ask the five yes/no questions for each one, in order to identify the sample. Give each group time to do this and expect them to attach a label to each of their five rocks.



Plenary



After taking feedback from the groups and making sure that all have identified their samples correctly, explain that all of these rocks are commonly found in Northern Ireland. Show the basalt sample which was not identified using the key and ask if anyone has been to Giant's Causeway. Explain that **basalt** is the rock of which the **Giant's Causeway** and the **Antrim Plateau** are composed. Similarly explain that if anyone has ever visited the **Mournes**, then the rock that these wonderful mountains are composed of is in fact **granite**. If it is felt at this point that the pupils are interested or able enough to look at a simple geological map of Northern Ireland, then one is included in resources (PE 1.2).

Finally draw the pupils attention to the samples of slate and shale and ask what is the same and what is different about them, i.e. both have layers, but the shale breaks apart easily between the layers whereas the slate does not. Explain the link between these two rocks (see box above) and point out that many of the differences between our rock samples can be explained due to the way in which the rocks are formed, something which we will look at in another lesson.

If desired complete the 'Match the photos of the rocks to their names and descriptions' worksheet provided with this lesson. (Please note that after cutting out and matching the rocks to their descriptions, children must complete their own description of granite in the empty box).

The difference between slate and shale

At this time it is sufficient to say that shale is a rock composed of very fine grains (sediments that became compacted together after being deposited at the bottom of lakes or oceans) The rock has very visible layers and breaks apart easily. Slate looks similar and is basically the same rock transformed by great pressure into a much harder rock. It cleaves easily into thin sheets or plates but try breaking it across these layers and it is extremely difficult to do so. Basically shale is the parent rock from which slate is formed.