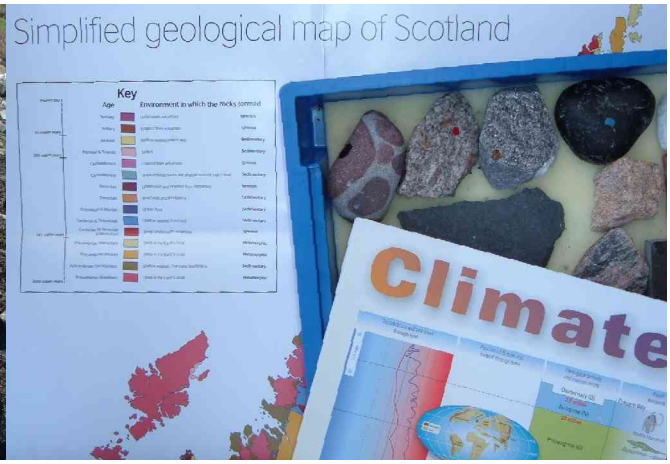
Primary Earth Science Outdoors Guide for Teachers and Group Leaders

RESOURCES

scottish earth science education forum



Introduction

Why outdoors? Why earth science? Curriculum for Excellence links

Ideas for Activities

Activities based around five Big Questions related to the landscape

Resources

Health & safety, getting help, books, maps and rock kits

The Scottish Earth Science Education Forum (SESEF) is an association of educators and scientists established to promote understanding of planet Earth in Scottish schools and colleges.

Membership of SESEF is free – visit www.sesef.org.uk for further information.

Scottish Earth Science Education Forum, Grant Institute, School of GeoSciences, University of Edinburgh, West Mains Road, Edinburgh EH9 3JW 0131 651 7048

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Planning a safe and enjoyable outdoor activity

In using SESEF resources and undertaking outdoor activities, it is important to be aware that responsibility for the safety of group members lies primarily with the group leader. Individual members of the group should also be expected to take some responsibility for their own safety and that of others. **It is essential that group leaders are familiar with and follow the procedures laid out by their education authority or governing body for outdoor activities.**

In planning an outdoor activity, you should consider:

- The suitability of the site you intend to visit for the group: taking into account the level of responsibility that participants can take for themselves and other people, their fitness and ability to cope with hazards, likely weather conditions and the clothing and footwear that group members will have available.
- Ratio of leaders to group members to comply with applicable health & safety procedures and to allow your objectives to be met.
- Equipment that will be needed: first aid kit, mobile phone (check availability of signal), emergency contact numbers, spare clothing, emergency shelter, extra food and drink
- Availability of food and drink, access to toilets.
- Transport, parking, safe access to vehicle, access to vehicle in an emergency.
- For coastal sections, the state of the tide when you intend to visit – so that the rocks are accessible and you do not risk getting cut off by an incoming tide (www.bbc.co.uk/weather/coast/tides/ or easytide.ukho.gov.uk).
- Briefing for participants in advance, to consider all these issues and ensure that participants are aware of their responsibilities to the group and members of the general public.

Here are some generic hazards that need to be considered, and some appropriate control measures.

Generic Hazard	**Control Measures**
party getting split up / individuals getting lost	Clear safety briefing at start of excursion that emphasises importance of staying together and following safety instructions. Regular head counts. All leaders/helpers aware of plan and emergency procedures.
slips and falls	Appropriate footwear. Choose route to avoid unnecessary exposure to risk.
rock fall	Avoid steep slopes and cliffs where possible. Provide and wear hard hats when working under cliffs.
traffic hazards	Plan safe parking places and access routes in advance.
injuries / infection from beach debris	Avoid touching material unnecessarily. Provide hand wipes or gel for cleaning hands at end of activity and before eating, if toilet facilities are not available.
tides	Check tide times in advance. Plan route to avoid visiting enclosed bays or islands on a rising tide.
exposure / hypothermia / heat stroke	Plan for inclement weather. Include details of appropriate clothing in pre-trip briefing. Carry spare clothing, gloves etc. Ensure children bring sunscreen to apply when needed.

existing medical conditions / fitness	Obtain information in advance on medical conditions. Plan excursion within the abilities of the group, monitor conditions on the day and adjust plan if necessary.

Find a local earth scientist!

Need some expert help? There are plenty of professional earth scientists in Scotland, and many of them are keen to help in class or outdoors. Here are some places to try:

- Contact the SESEF office by phone or email (www.sesef.org.uk). We have a large membership across Scotland and may know of someone locally.
- Find out if there is a local geodiversity group. These are groups of volunteers and interested professionals who help protect and promote local sites of geological interest. The umbrella organisation is UKRIGS - http://www.scottishgeology.com/findoutmore/rigs_in_scotland/groups.html There are also several European Geoparks in Scotland, and staff or volunteers might be able to help – e.g. http://www.scottishgeology.com/outandabout/geoparks/geoparks.html
- Try your local geological society. There are five geological societies in Scotland: Edinburgh, Glasgow, Aberdeen, Highland and the Open University Geological Society which has members across Scotland. Contact your closest society and ask if they can put you in touch with someone local. Further details at http://www.scottishgeology.com/findoutmore/links/societies.html

What an earth scientist can do for you:

If you find a local specialist who is keen to help, feel free to share the notes below to help them help you most effectively. You might persuade someone to come into the class and talk to the pupils, or lead an excursion. Or the individual might be happier to just meet with you to help you understand your local area, rather than dealing with the whole class. Most earth scientists will have a collection of rocks and fossils that they can bring to show pupils, and they may have personal experience of working in exotic places that they'd be willing to share, which can help pupils to appreciate different environments and earth processes. Make sure the visitor understands what level your pupils are at, and what knowledge they already have.

Notes for earth scientists: how you can help

Earth science specialists can contribute a great deal to schools and groups. Your specialist knowledge is highly prized, as many teachers are understandably cautious about teaching earth science and have limited knowledge. Earth science is a tremendously exciting subject for young people and in visiting a school or a group you've got a great opportunity to make connections between popular subjects such as dinosaurs and volcanoes and the stories of Scotland's geology, landscapes and natural resources that can be seen in the local landscape. Here's some general thoughts to help you, but feel free to get in touch with SESEF and browse our online resources for ideas.

- Keep it simple! Find out in advance what the group have already covered, and aim to extend what they already know without losing them in too much detail
- Make it real. Groups will be fascinated by photos and rock samples of any exciting places that you've been to. You've got a great opportunity to enthuse and inspire them, and perhaps even encourage one or two to follow a geoscience career.
- If you are going outside, do a reconnaissance with the teacher first and don't over-estimate how far you can go and what you can see. Pupils walk very slowly and are easily distracted by the outside world! You might want to bring samples of the local rocks and photos of local geology and landscape features to the group rather than travelling a distance to find them. The teacher or group leader should take full responsibility for safety and discipline and you should clarify what your role is in advance.

Books

The Amazon Listmania *Rock on – great books about rocks for children* has a variety of factual and story books about rocks which can be used for sharing with children or as a basis for work in other curriculum areas.

http://www.amazon.co.uk/gp/richpub/listmania/fullview/R163S4FMUEC0SW/ref=cm_pdp_lm_title_1

There are lots of books that give more information about the geology and landscape of Scotland. A good starting point is the *Landscape fashioned by geology* series, published by Scottish Natural Heritage and the British Geological Survey. This is a series of short, well-illustrated books covering different areas of Scotland. See the full list at http://www.scottishgeology.com/findoutmore/publications/publications.html

You can download free pdf versions of many of thebooks in this series at http://www.snh.gov.uk/pubs/ but at the time of writing the search facility on this website doesn't allow you to see all the titles easily.

Maps

A “Simplified Geological Map of Scotland” is available from SESEF, and you can also view it here http://www.scottishgeology.com/geology/geology_of_scotland_map/scotland.html

BGS have produced a free map of the UK called “Climate through time: our rocks reveal the story of change”. Further information at http://www.bgs.ac.uk/education/climate_change/climate_through_time.html

Rock Kits

Peter Craig of Earth Science Education Services can source and supply a wide range of fossil, mineral and other rock specimens for use in teaching contexts. The two standard rock specimen collections described below are particularly recommended. He also is happy to offer advice and support on creating or procuring any educational resources needed to teach geology. He has helped to deliver school and science fair workshops to over 16,000 children over the last decade and is happy to design workshops to meet specific local requirements. Contact details are as follows:

Peter Craig, Earth Science Education Services
Cranbrook, The Square, TARLAND, Aberdeenshire, AB34 4YL

Tel - 01339 881 334

Email - pmcraig@gmail.com

The small (6 specimen) rock collection consists of six rock specimens selected as a basic sample of common Scottish rock types. The specimens are generally about 10 cm in their longest dimension and include granite, dolerite, gneiss, schist, mudstone and sandstone. A colour-coded spot system allows their identification using a laminated table of information about each rock type. The collection is supplied in a plastic box. The cost per collection is £18 plus a delivery charge of £6.50.

The large (13 specimen) rock collection is a long-standing favourite of Scottish teachers and pupils who want to explore the fascinating stories of Scotland's geological past as told by the very rocks of which it is made. There are thirteen hand-specimens in the collection, ten of which are also accompanied by bags of mini- specimens. The bags each contain around ten mini-specimens, except for the sandstone which contains twenty-five. The mini-specimens are supplied to enable pupils to engage in hands-on activities and destructive testing.

The specimens included in the Scotland's Journey collection have been carefully selected from across the country to represent the wide range of Scottish rock types. They have also been selected to illustrate the changing physical environments experienced by the piece of the Earth's crust now known as Scotland as it travelled from the remote parts of the southern hemisphere during the last 600 million years. The collection is supplied in a standard tote tray. It is accompanied by Teacher Notes as well as a laminated table of data about each of the thirteen rock specimens. Each collection costs £48 plus a delivery charge of £12.

Information and communication technology

Technology is rapidly changing. Many schools now have portable devices which can be used to enhance field studies work undertaken outdoors and provide a useful mechanism for information handling back in the classroom.

Children of all ages need opportunities to use ICT equipment rather than watch an adult at work. A little work is needed beforehand about:

- How to work a device.
- Rules around its use, e.g. how to pass a device from one person to another without dropping it, how to carry the device, safety considerations.
- Responsible use. This is especially important around the use of phones and devices which have internet access. Remember to include reference to this where necessary in a risk-benefit assessment and consider the amount of supervision a group or individual child will require with a particular device.

Useful devices include:

- Digital camera to complement field sketches, to aid discussions about what has been observed and to build upon the experience back inside.
- Video cameras. There are many suitable for use by children and are useful for capturing movement, e.g. the flow of a river, or wave action at a beach.
- GPS devices, e.g. Garmin. Locate the exact position of each landscape feature and use it back in the class to link to Google Earth.
- Digital voice recorder. Record children's thoughts about each landscape feature. This can be a focus on descriptive language for presentations, for example poetry or image related drama work.
- Mobile phones often have several built-in functions which can aid field studies work. Check your school's mobile phone to see if it has any of the following functions:
  Video recording function
  A digital camera which takes photos of a reasonable quality
  A voice recorder, for making oral notes

A notes function for jotting down ideas
Google maps with a built in GPS device where one's exact location can be noted
A built in compass
A calculator
Stopwatch and timer

iPhone apps

There are a number of apps which can be downloaded for free or at a minimal cost that add value to outdoor fieldwork. An iPhone or iTouch device is required. These are continuously added to and updated. It's worth looking at:

- Run Keeper (free): This app which locates your position via GPS and then collects an assortment of data on your walk. You can track duration, distance, pace, speed, total rise, elevation versus speed and path travelled on a map. The data is recorded on a website and can be accessed after your trip.
- Google Earth (free): Being able to access this out in the field is a really useful tool. For example, showing students the layout of the land when looking at glacial features. Whilst it does not replace a map and compass, it's a very visual way of showing how far a group has walked or how near to a destination a group is. The possibilities with, and potential of, this app are endless. For younger children this app helps make a direct link about location and how 3D objects are become 2D on a map.
- There is a whole section on weather apps which includes weather information gathered from satellites and instruments such as basic anemometers for measuring wind speed.

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If you have used this guide, we would like to hear from you! We value all comments and suggestions for improvement, and even a quick email to let us know you've used the guide is useful to help demonstrate the interest and demand for guides like this – please contact us through the SESEF website.