

Earth Science Outdoors: Project Overview



SESEF's Earth Science Outdoors project aims to inspire people to get outdoors, explore Scotland's wonderful geodiversity and appreciate how it links to our natural and human heritage, resource use, landscape and climate change.

We are developing resources to support outdoor activities for school and community groups, working in partnership with a wide range of organisations, including science centres, countryside ranger services, Geoparks and volunteer groups to ensure that our materials are relevant, will reach a wide audience, and can be adapted for different purposes. One of our key partners is the UKRIGS Scotland (Regionally Important Geological Sites). We also offer training to teachers, rangers and group leaders to support them in leading educational outdoor activities.



The Earth Science Outdoors project aims to bring the rocks of Scotland to life and to tell stories of Scotland in the past: of volcanoes and tropical seas, of mountains and vast rivers, of hundreds of millions of years of changing climates and environments, and make links from the rocks to many different aspects of life in Scotland in the past, present and future.

The pilot phase of the project began in summer 2008, developing resources for 10 sites in Grampian and Fife/Lothians. Funding has been provided by Scottish Natural Heritage and a science engagement grant from the Scottish Government. We hope to obtain further funding to expand to all areas of Scotland.

Our resources are suitable for different levels of interest. For schools, Teachers' Guides linked to the curriculum are designed to support learning in Primary and lower Secondary school (Curriculum for Excellence levels 2-4), and for Intermediate and Higher Geology. The resources promote the Curriculum for Excellence by encouraging learning through experience and an interdisciplinary approach, and will also we hope support more teachers to start teaching geology at Intermediate or Higher level.

Resources for the general community, such as leaflets, information boards and scripts for guided walks, are being developed in partnership with organisations such as RIGS, science centres and ranger services.

The resources are free, can be freely used and adapted for any non-commercial purpose. They are available as downloads from the SESEF website www.sesef.org.uk. The resources include information about safe and responsible access, ideas for activities that can be done before, during and after a site visit, background information and links to further information.



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.

An understanding of how planet Earth works should be an essential part of every young person's education and is necessary for the sustainability of Earth environments and resources.

Through development officers and forum members throughout Scotland we work with teachers, schools, colleges, public institutions, science centres, museums, industry and universities to address the challenges facing Earth Science education.

Membership of SESEF is free – visit www.scottishgeology.com/SESEF/ for further information.

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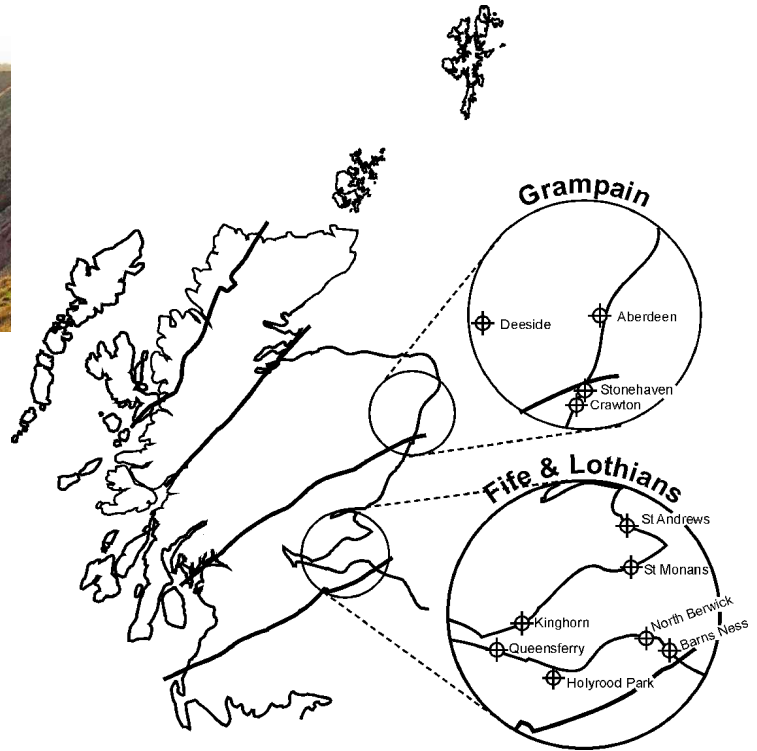


Project Sites

The pilot phase of the project (2008-2009) has developing resources in the Fife/Lothians and Grampian areas. Ten sites were identified and resources prepared for each site at different educational levels (not all sites are suitable for all levels).

The table below shows the pilot sites, the curricular levels that the resources are aimed at, and the key themes that can be explored at each site.

In the pilot phase of the project we have experimented with different types of resource; some sites have a single resource aimed at a range of levels and others the guide is aimed at one level. For Primary Schools we recognise the value of local exploration and have produced a generic guide, but some sites also have guides pitched at this level.



SITE	LEVELS	THEMES
Grampian:		
Crawton	2, 3-4, I/H	Variety of local rocks; contrast between sedimentary and igneous rocks; erosion by the sea; lava flows.
Cowie, Stonehaven	2, 3-4, I/H	Sedimentary rocks: sandstone and conglomerate, ancient environments; modern sea erosion and deposition; use of local stone for building.
Aberdeen Granite Project	2	Local industry; granite; use of resources; environmental impact of past industries.
Fife/Lothians:		
St Monans, Fife	I/H	Variety of local rocks; sedimentary rocks: ancient environments; volcanic activity; folding and faulting.
Kinghorn, Fife	I/H	Range of sedimentary and volcanic rocks; contrast between lava flows and intrusions; raised beach and wave-cut platform.
Rock and Spindle, St Andrews, Fife	I/H	Range of sedimentary and volcanic rocks; volcanic vent with intrusions; recent erosion and landslipping.
North Berwick, E Lothian	3-4, CR	Shape of local landscape controlled by different kinds of igneous rock; different parts of volcanic field visible.
Barns Ness, E Lothian	3-4, I/H, CR	Contrasting environments past and present; use of limestone for agriculture & cement; record of climate change in the past
Arthur's Seat, Edinburgh	3-4, I/H	Shape of local landscape controlled by contrasting igneous and sedimentary rocks; evidence of glacial erosion; volcanic features.
South Queensferry, Edinburgh	3-4, I/H	Clear links between the shape of the land and types of bedrock; interrelationships between people and the environment; seashore and forest habitats.
Generic Resource: Primary Earth Science Outdoors	0-2	Explore your local landscape; Find a pet rock; make connections between rocks and landscape; Explore active processes and how people have used local rocks.

Curriculum for Excellence level 2 will be completed by most pupils by P7; levels 3-4 by most pupils in S1-3.

I/H: Intermediate / Higher Geology CR: sites where we hope to work with partners to develop a community resource.

Using the Resources

What's in the Teachers' Guides

The Teachers' Guides are designed to highlight the main features of the site, give basic background information and an outline itinerary, with suggested activities. We give some general health and safety advice, but teachers/schools will need to assess the risks themselves and put appropriate safety measures in place for a visit. For most sites, a range of activities and themes are suggested, to give teachers the flexibility to design a field visit to meet their desired learning outcomes. It is expected that the teacher will make a site visit in advance.

Each pack contains information under the following headings:

- Introduction to the site, how to use the guide and the geological background
- Links with the curriculum
- Sources of further information & support
- Location maps, directions & local facilities
- Safety & conservation
- Suggested pre- and post-visit activities
- Overview of geology / stratigraphy; glossary
- Description of the suggested localities to visit, with suggested activities
- Additional information on local heritage

Safety and Risk Assessment

In using the 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 *your* 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.
- Ratios of leaders: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, 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.

Each Teachers' Guide includes notes on access and specific hazards associated with the site. The table below lists 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. 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 wipes / hand gel for cleaning before eating.
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 pretrip briefing. Carry spare clothing, gloves etc. Provide sunscreen.
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.
use of geological hammers	Avoid unnecessary hammering. Eye protection must be worn. Keep other people at a safe distance.

Conservation

Many of the Earth Science Outdoors sites are frequently visited by groups, and some are protected by statutory designations such as Sites of Special Scientific Interest. Therefore it is incumbent on visiting groups to treat the sites with respect, to avoid damage and to ensure that materials will be available for future generations. Use of geological hammers is often unnecessary and with a quick look around you can usually identify a reasonably fresh surface; if hammering needs to be done, only one person needs to use a hammer and they should wear eye protection and make sure other people are not too close.

The [Scottish Fossil Code](#) was published by Scottish Natural Heritage, following the The Nature Conservation (Scotland) Act 2004. The Code provides advice on best practice in the collection, identification, conservation and storage of fossil specimens found in Scotland. The Code also aims to enhance public interest in the fossil heritage of Scotland and promote this resource for scientific, educational and recreational purposes. You should follow the recommendations on responsible collecting in the Code, and also any guidance on sample collecting that is included in the relevant Teachers' Guide.

All of the Earth Science Outdoors sites have public access, and you should follow the [Scottish Outdoor Access Code](#). The Code explains your access rights and responsibilities. The key points are to :

- take responsibility for your own actions;
- respect the interests of other people;
- care for the environment.

You should contact the land owner or manager (e.g. Countryside Ranger Service) to let them know that you intend to visit a site. This helps them to plan their work and they can let you know of any safety issues, for example. Relevant contact details are included in the Teachers' Guides.

Sources of Further Information

People

There may be a local guide who can help facilitate your visit. You can contact SESEF (see page 1 for contact information), or try your local RIGS Group or Geological Society. RIGS stands for Regionally Important Geological/Geomorphological Sites and there are a network of voluntary groups across the country who are concerned with designating local sites of interest and helping to promote them for educational purposes. They are members of UKRIGS - www.ukrigs.org.uk.

Publications

Your local library or bookshop will contain lots of general books that are excellent for exploring earth science topics. Publications focusing on the story of Scotland's rocks include:

- The 'Landscape Fashioned by Geology' series is published by Scottish Natural Heritage and the British Geological Survey, and includes around 15 introductory guides to different areas of Scotland.
- A free simplified geology of Scotland map is available from SESEF (see page 1 for contact information).
- The British Geological Survey 1:625,000 scale Bedrock Geology of the UK: North (Map & booklet) 2008, ISBN 9780852726051
- Con Gillen, Geology and Landscapes of Scotland, Terra Publishing, 2003. ISBN 1-903544-09-2.
- McKirdy, A, J Gordon and R Crofts, "Land of Mountain and Flood", Birlinn, 2005. ISBN 1-84158-357-X.
- Brian Upton, Volcanoes and the Making of Scotland, Dunedin Academic Press, 2004. ISBN 1-903765-40-4.
- McKirdy, A and R Crofts, "Scotland: The Creation of its Natural Landscape", SNH, 1999. ISBN 1-85397-044-2.

Websites

- British Geological Survey education pages www.bgs.ac.uk/education/
- www.scottishgeology.com
- www.earthlearningidea.com collection of simple practical activities using minimal resources to explore earth science topics.



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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.

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