North Pennines Geology and Landscape

Secondary Education Pack

The North Pennines Geology and Landscape Primary Education Pack aims to highlight fieldwork opportunities across the North Pennines to encourage schools to use the North Pennines as a learning environment. The pack is aimed at the science and geography curriculum at Key Stage 3 and at GCSE Science, GCSE Geology and GCSE Geography at Key Stage 4. Elements may also be adapted for AS/A2.

North Pennines Geology and Landscape

CONTENTS

North Pennines Geology and Landscape

1. Aims of the Secondary Education Pack

- What are the aims of the education pack?
- Fieldwork areas
- Fieldwork codes

1. Aims of the Secondary Education Pack

WHAT ARE THE AIMS OF THE EDUCATION PACK?

The North Pennines Geology and Landscape Secondary Education Pack is aimed at the science and geography curriculum at Key Stage 3 and at GCSE Science, GCSE Geology and GCSE Geography at Key Stage 4. Elements may also be adapted for AS/A2.

The pack identifies the best sites across the North Pennines for the study of Earth sciences and details fieldwork days that can be undertaken, provides resources for the fieldwork described, suggests follow-up work and identifies the hazards at each site as a basis for a risk assessment.

In addition, case study material is provided from other European Geoparks that compliments the areas of study provided by fieldwork in the North Pennines.

Alongside the education pack a 'Rock Box' with suggested activities and a North Pennines Game are available for loan.

SCIENCE AND GEOLOGY

Geology is a multi-disciplinary subject that requires some knowledge of chemistry, physics, biology and geography. Geologists frequently use field sites as their laboratory and hence it is important to incorporate fieldwork into the science curriculum. This education pack has chosen the best field sites for demonstrating important aspects of the current National Curriculum. Table 1 below identifies the fieldwork sites and their links to the National Curriculum.

GEOGRAPHY

The fieldwork days developed for this Secondary Education Pack cover 6 themes including rivers, rural settlements, limestone scenery and sustainable development, soils and vegetation and recreation pressure. Applied elements and issue-based studies have also been included where appropriate. The fieldwork has been developed to cover a full day of work but elements of a day may be used or days mixed and matched where appropriate.

Table 2 below details the locations of the fieldwork days and outlines the knowledge, understanding and skills that each day will incorporate.

FIELDWORK SITES AND DETAILS OF WORK

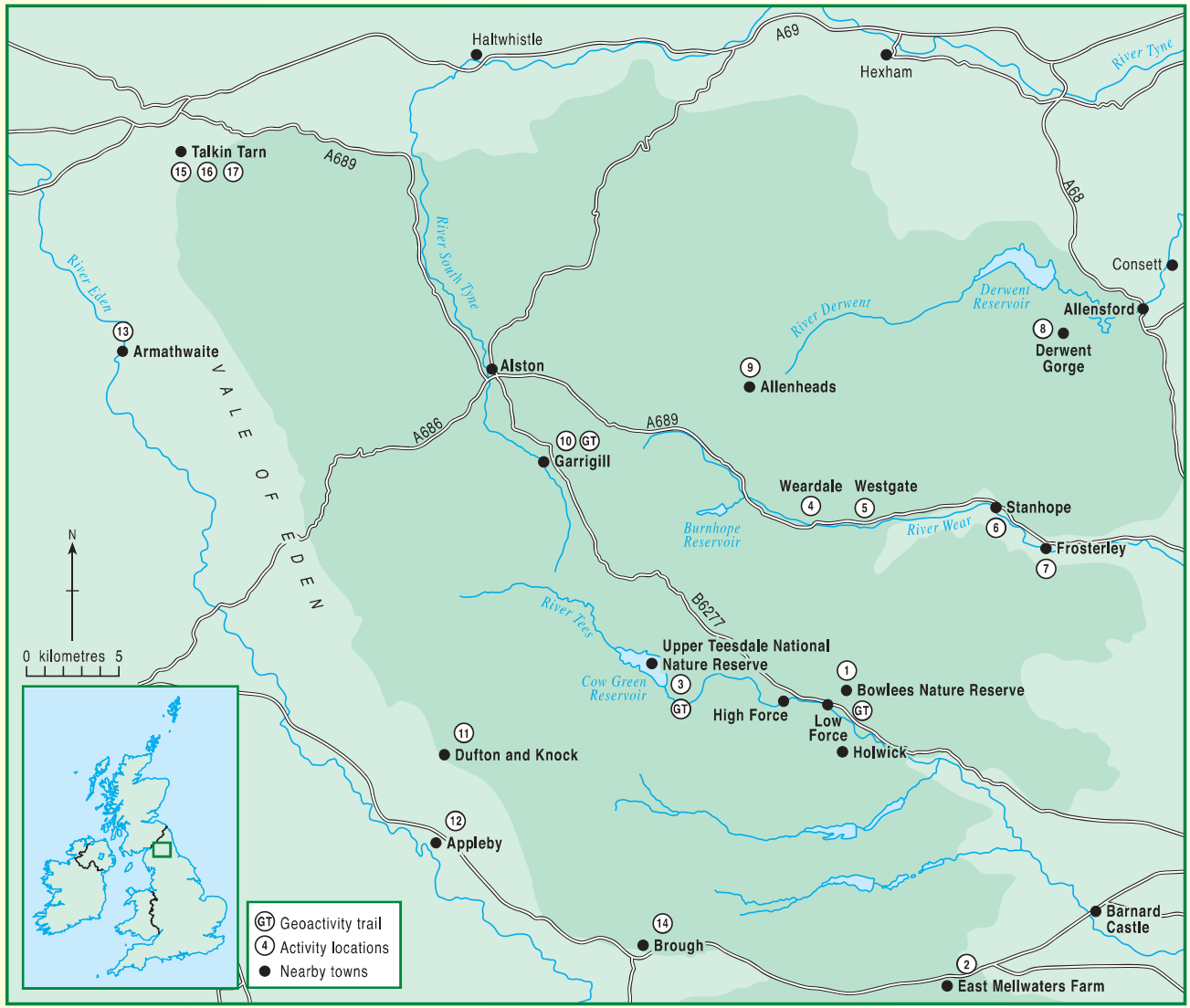
Fieldwork sites	Field activity
Cow Green reservoir and Cauldron Snout, County Durham	The rock cycle, identification of 3 main rock types in the field and processes of formation.
Bowlees Nature Reserve, Teesdale, County Durham	Identificiation of rocks in the field, processes of formation and construction of ancient environments.
Harehope Quarry, Frosterley, Weardale, County Durham	Geological time, identification of rocks and fossils in the field, the construction of ancient environments and an introduction to cyclothems.
Stanhope town centre, Weardale, County Durham	Setting up hypotheses, identifying rocks and looking at the economic importance to cyclothems
Westgate, Weardale, County Durham	Identification of rocks and minerals in the field, processes of formation and the environmental impact of mineral extraction.
Brough, Pennine escarpment, Cumbria	The study of sedimentary rocks and their fossils, the reconstruction of ancient environments and climatic change.
Dufton and Knock, Pennine escarpment, Cumbria	Identificiation of rocks in the field, processes of formation and construction of ancient environments both sedimentary and igneous.
Appleby, Pennine escarpment, Cumbria	Developing hypotheses, recognition of sedimentary rocks in the field and the reconstruction of ancient environments.
Armathwaite, Pennine escarpment, Cumbria	Identificiation of rocks in the field, the construction of ancient environments and the intrusion of igneous rocks
Forest Head Quarry, Talkin Tarn area, Cumbria	The folding of rocks and their relationship to plate tectonics

Table 1: Science and geology fieldwork sites

Fieldwork locations	Theme	Knowledge and understanding	Skills
Bowlees Nature Reserve, Upper Teesdale, County Durham	Rivers	• Features of the upper course of a river, with extended details on waterfalls. • River processes • Factors controlling velocity and river processes • Case study on the causes and effects of flooding and a flood alleviation scheme	• Identification of geographical questions and issues • Collection of data and employment of fieldwork techniques • Use of instruments • Data interpretation using O.S. maps • Analysis of data using basic statistics and graphical presentation • Evaluation of methods
East Mellwaters Farm, Teesdale, County Durham and North Stainmore, Cuumbria	Limestone scenery and sustainable development	• Processes of weathering • Features of limestone scenery • Sustainable development • Case study from Marble Arch Caves and Cuilcagh Mountain Park, Northern Ireland, UK	• Identification of geographical questions and issues • Collection of data and employment of fieldwork techniques • Use of instruments • Data interpretation using O.S. maps and thematic maps • Analysis of data using basic statistics and graphical presentation • Evaluation of methods
Weardale, County Durham	Settlements	• Settlement function, location and structure • The hierarchy of services and population in a rural area • Sphere of influence • A rural development study	• Identification of geographical questions and issues • Collection of data and employment of fieldwork techniques • Data interpretation using O.S. maps • Analysis of data using basic statistics and graphical presentation • Evaluation of methods
Broadwood Quarry, Frosterley, County Durham	Limestone quarrying and reclamation	• Rock types and limestone • Case study of a limestone quarry looking at the advantages and disadvantages • Reclamation of a quarry • Case study of the reclamation of a quarry	• Identification of geographical questions and issues • Collection of data and employment of fieldwork techniques • Use of instruments • Data interpretation using O.S. maps and a range of secondary source materials • Analysis of data • Communication through a role-play scenario • Evaluation of methods
Derwent Gorge, County Durham	Soils and vegetation relationships	• Rock types and landscape formation • Soil and vegetation relationships • Case study of a National Nature Reserve	• Identification of geographical questions and issues • Collection of data and employment of fieldwork techniques • Use of instruments • Data interpretation using O.S. maps and aerial photographs • Analysis of data using basic statistics and graphical presentation • Evaluation of methods

Table 2: Geography fieldwork sites and curriculum details

Fieldwork locations	Theme	Knowledge and understanding	Skills
Allenheads, Northumberland	Rivers	• Features of the upper course of a river • River processes • Factors controlling velocity and river processes • Case study on the causes and effects of flooding and a flood alleviation scheme	• Identification of geographical questions and issues • Collection of data and employment of fieldwork techniques • Use of instruments • Data interpretation using O.S. maps • Analysis of data using basic statistics and graphical presentation • Evaluation of methods
Talkin Tarn, Cumbria	Landscape and recreation pressure	• Glacial landscapes • Investigation of recreation pressure • Visitor survey • Future planning and development	• Identification of geographical questions and issues • Collection of data and employment of fieldwork techniques • Use of instruments • Data interpretation using O.S. maps, photos and flow charts • Analysis of data using basic statistics and graphical presentation • Communication through a decision-making exercise • Evaluation of methods
Geltsdale, Cumbria	Rivers	• Features of the upper course of a river • River processes • Factors controlling velocity and river processes • Case study on the causes and effects of flooding and a flood alleviation scheme	• Identification of geographical questions and issues • Collection of data and employment of fieldwork techniques • Use of instruments • Data interpretation using O.S. maps • Analysis of data using basic statistics and graphical presentation • Evaluation of methods
Geoactivity trails: • ***Holwick Scar and Low Force*** • ***Cow Green*** • ***Tynehead***	Landcape features and processes	• Geology, glaciation, rivers, weathering and people • Geology, glaciation and human use • Geology, landscape and human use	• Identification of geographical questions and issues • Data interpretation



Map 1: Map of the fieldwork locations

Site number	Site name	Summary of site activities
1	Bowlees Nature Reserve, Teesdale	Geography - Rivers Science and geology - Let's Rock: The Carboniferous Period of Teesdale Start of Holwick and Low Force Geo-activity trail
2	East Mellwaters Farm and North Stainmore, Teesdale	Geography - Limestone scenery and sustainable development
3	Moor House - Upper Teesdale National Nature Reserve, Teesdale	Science and geology - Cauldron Snout: Baked Rocks Start of Cow Green Geo-activity trail
4	Weardale	Geography - Settlements
5	Westgate, Weardale	Science and geology - Getting to grips with minerals and mining
6	Stanhope, Weardale	Science and geology - Getting to grips with minerals and mining
7	Frosterley, Weardale	Geography - Limestone quarrying at Broadwood Quarry Science and geology - Cycles and bicycles at Harehope Quarry
8	The Derwent Gorge	Geography - Soils and vegetation relationships
9	Allenheads, East Allendale	Geography - Rivers
10	Garrigill, Pennine Escarpment	Start of Tynehead Geo-activity trail
11	Dufton and Knock, Pennine Escarpment	Science and geology - Ancient rivers and even older volcanoes
12	Appleby, Pennine Escarpment	Science and geology - Hot and arid deserts
13	Armathwaite, Pennine Escarpment	Science and geology - Hot and even hotter: deserts and volcanic activity!
14	Brough, Pennine Escarpment	Science and geology - Tropical seas, fossils and climate change
15	Talkin Tarn	Geography - Landscape and recreation pressure
16	Geltsdale, Talkin Tarn area	Geography - Rivers
17	Forest Head Quarry, Talkin Tarn area	Science and geology - Bendy rocks

Table 3: Fieldwork sites

FIELDWORK CODE

Whilst undertaking fieldwork in the North Pennines it is important to observe the Countryside Code and ensure the safety of those participating in the fieldwork. A code for fieldwork in the North Pennines is presented in bookmark form here:

North Pennines Fieldwork Code

- Fieldwork is potentially dangerous. Make sure you are properly prepared.
- Don't visit any site without prior permission of the owner.
- Leave others with your intended route and don't depart from your plan.
- Wear strong and waterproof footwear with non-slip soles.
- Wear a hard hat when working near steep faces.
- Do not hammer or collect rock samples in the North Pennines Geopark.
- Do not climb on steep faces.
- Take sensible safety precautions at all times - always carry appropriate safety equipment, including a compass and First Aid kit.
- Avoid disturbing plants and wildlife.

North Pennines Fieldwork Code

- Fieldwork is potentially dangerous. Make sure you are properly prepared.
- Don't visit any site without prior permission of the owner.
- Leave others with your intended route and don't depart from your plan.
- Wear strong and waterproof footwear with non-slip soles.
- Wear a hard hat when working near steep faces.
- Do not hammer or collect rock samples in the North Pennines Geopark.
- Do not climb on steep faces.
- Take sensible safety precautions at all times - always carry appropriate safety equipment, including a compass and First Aid kit.
- Avoid disturbing plants and wildlife.

North Pennines Geology and Landscape

3. Fieldwork sites

- Teesdale
- Weardale
- The Derwent Gorge
- East Allendale
- The Pennine Escarpment
- Talkin Tarn and the surrounding area

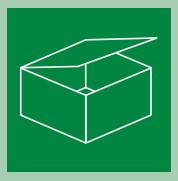
Guide to Symbols

Science and geology (field or classroom based)

Geography based activity
(field or classroom based)

Car parking near to start of field based activity

Sign posting to other related local activities



Rock box (extra resource linked to the Education Pack and available fom the North Pennines AONB Partnership)