THE ERCALL: KS2 PREPARATION AND FOLLOW-UP IDEAS

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A. Recommended preparation prior to field work:

At an early stage, a preparatory visit is essential, not only to familiarise yourself with the Earth science aspects but also the wildlife potential of the site.

It is assumed that, prior to this visit, schools will have already undertaken class-based activities related to rocks and possibly soils. The following packs, published by ESTA, were written to support the QCA Guidance, Unit 3D **Rocks & Soils**. These, and the additional activities listed, will give teachers and pupils a useful vocabulary and introduce Earth science concepts in a practical way. Many can then be put into context by investigating the ancient world largely hidden in the rocks beneath our feet. "**Working with Rocks**" provides useful background on the rock cycle and explains the terms igneous, sedimentary and metamorphic rocks. In both packs porosity and permeability are clearly defined. The UK Geology Wall Map, published by the Ordnance Survey would be useful additional reference material. Teachers may wish to introduce soils as part of the field visit, collecting samples for later investigation.

'***Working with Rocks'*** includes the following activities:
1. Sequencing – story of a marble gravestone [literacy].
2. Sorting rocks – using different criteria, incl texture, colour.
3. Rock identification – using key terms as clues, introducing names of common rocks.
4. Testing rocks – testing for porosity, permeability and "hardness". Making wells.
5. Weathering – how to weather your own rock by freeze/thaw.
6. Use of rocks – devising a town trail & showing the use of building materials.

'*Working with Soil'* includes the following activities:
Science/Geography:
1. Looking at soil - see, feel, smell, content & properties.
2. Separating soils - by sieving dry.
3. Separating soils - by settling in water.
4. Porosity - water held in pore spaces.
5. Permeability - rate of water draining through.
6. Soil erosion - with or without vegetation cover?

There are also four Literacy and five Numeracy activities based on a storybook about a family of worms! Work on maps includes scale and compass points.

Additional activities:

1. A demonstration to model layering in sedimentary rocks by settling in water –
Collect samples of different coloured sand, silt, and a few broken shells. Mix each sample with water in a beaker. Half fill a transparent tank or plastic jar with water. Ask the children to predict what will happen when material is tipped in. Carefully pour one beaker at a time into the larger container. Observe the settling of the sediment. Do not disturb. Pour in another beaker and observe. Repeat, using shells and the remaining samples. Note that clay in any of the samples will remain in suspension, make the water cloudy and take ages to settle. The sediment will be layered. Ask the children which is the oldest layer (the one on the bottom). Which is the youngest layer? (the one at the top).

Geologists call this 'the **Law of Superposition'** and it helps them to work out the order of a sequence of events as shown by the rocks.

2. Fossils
It is unlikely that fossils will be seen on the visit, but children are interested in them and they are a significant part of interpreting Earth science.
"A fossil is the remains or trace of an animal or plant which lived in the distant past and is now found preserved in rocks. A body fossil is the altered remains of an animal or plant itself, eg shell, bone, leaf. A trace fossil is the trace left behind by an animal, eg footprint, burrow".
Your local museum may have specimens to loan to schools. There are also many reference books available for children.

See also: **Teaching Primary Earth Science Issue 1 – Fossils**; and **Issue 22 – Putting Fossils into the National Curriculum.**
Making plaster casts of fossils is one activity children enjoy.

3. To model geological time
There are several ways of demonstrating the immensity of geological time.
The Earth was formed about 4,600 million years ago. Use a paper roll or string to make a time line. At a scale of 1cm to 1 million years it will be 46 metres long. To fit your classroom, you may need to reduce the scale in the oldest part. The names and dates of the geological periods of the last 570 million years, with significant events, are illustrated in column form on the UK Geology Wall Map, published by the Ordnance Survey. The advantage of a column is that older are below younger!

Other comparisons involve using a 24 hour clock or a calendar year.
See also: **Teaching Primary Earth Science**, **Issue 43 – Geological Time**.

4. Modelling igneous rocks
This can best be done as part of "Changing materials" – liquids to solids by cooling. Children are likely to have some first-hand knowledge from home, school, holidays, with additional input from TV , including news.
Examples include water to ice - see the crystals
Chocolate, toffee & sugar-based sweets show solidification on cooling & may show crystallisation.
Industrial melting in furnaces and subsequent cooling e.g. iron & steel making, glass making.
Magma [underground molten rock] comes from volcanoes at the surface as flows of lava, often full of gas bubbles. It cools rapidly on land or under water as a glass or pumice [glass froth]. Such rapid cooling results in microscopic crystals. Magma cooling slowly at depth beneath mountain chains produces rocks with larger crystals eg granite.

Useful illustrations include active volcanoes, ancient lava flows [Giant's Causeway etc], granite tors on Dartmoor etc. See also ***Working With Rocks.***
Crystallisation from a watery solution by evaporation is slightly different.

For Teacher Reference
The following issues of Teaching Primary Earth Science provide useful background information for a visit to Ercall:
1- Fossils, 2 – Introducing Rocks, 3 – Soil, 5 – Using Rocks, 9 -Minerals, 10 – Out and About 1, 12 – Out and About 2, 20 – Out and About 3, 24 – Out and About 4, 25 – Out and About 5, 37 – Organising Field Trips.

The Ercall KS3 animated sequence [See Index, **ercall 05.exe**] could be used as a KS2 teacher resource to be viewed before the visit.

Cut and varnished samples of the four common rocks found at Ercall would be useful for detailed identification.

B. Suggested Follow-up work
Much material could go into a folder on Ercall Nature Reserve, being the first part of a wider study, adding later sections on soils, vegetation, wildlife, conservation, recreation and quarrying.

1. Completion of all activity sheets: *Map of Ercall Quarries
1. Site A pupil activity sheet - identifying four rocks.
2. Site B pupil activity sheet - sketch from viewpoint to NE.
3. Site C pupil activity sheet - sketch from stile.
4. Site D/E pupil activity sheet - two different rocks.
5. Site E pupil activity sheet – sketch of boundary [unconformity].
6. Site F pupil activity sheet - from Rock to Soil.
7. Summary.

2. Classroom display of all aspects of the field visit, including maps, diagrams and photographs. Samples of granophyre, quartzite, conglomerate and dolerite could be displayed, showing a broken, fresh face, suitably labelled. Sample may be cut [by an adult with a DIY tile cutter] and varnished to bring out the detail, possibly showing layering within the sedimentary rocks and random crystal orientation in the igneous rocks.

3. Demonstrate layering in sedimentary rocks – as described in preparation, including some coarse material, especially small pebbles. Put results into the display, with samples of conglomerate and quartzite from Ercall [as in 2, above] and other sedimentary rocks you may have to hand. Include photographs from Ercall and elsewhere[incl postcards].

4. The display could include the UK Geology Wall Map. Ercall is in the purple shading SSW of Telford, and North of the River Severn. Samples of other Precambrian and Cambrian rocks could be included, with slate being the obvious one. Rock samples that children collect from further afield could be added to the display, with labels and markers linking the sample to the location on the map.

5. Make a model of the quarries - use plaster to cement corrugated card and sand into hard beds of sedimentary rocks, with plaster and reddish sand for the granophyre. Half of the model could show a working quarry with small machinery, lorries etc, with the other half as landscaped today [with "vegetation" purchased from toy/model shops].

6. Research into quarrying and uses of these rocks - in the local area and further afield. Early use as a building stone in churches and houses throughout the area, as well as for rough walls. More recently, because the rocks from the Ercall Quarries are among the few hard rocks easily available in the Midlands, they have been used as aggregate for roads and concrete, with M54 being the last major project. Quarrying ceased in the 1960s and the land eventually purchased by Shropshire Wildlife Trust. The display board at the entrance gives some details of Conservation.
Take photographs of any examples of these rocks being used and include in the classroom display.

7. Sequencing exercise on the story of Ercall quarries. The KS3 animated sequence [**ercall 05.exe**] could be viewed. The story could also be illustrated in cartoon form uisng the followijg seven prompts.
1. Magma forced into an ancient mountain range from deep in the Earth's crust, where is cooled and solidified 560 million years ago.
2. Twenty million years of weathering and erosion wore away the landscape to sea level.
3. Deposition of pebbles and quartz sand sediment in the sea 540 million years ago.
4. Hardening as layers are compressed and cemented with quartz.
5. Rocks are uplifted, tilted & fractured by Earth movements.
6. Weathering and erosion remove the tops of these later mountains over millions of years.
7. The present landscape is used by Mankind for farming, quarrying, building and tourism.

Working with Soil
If not done prior to the visit, it would be appropriate for the Soil topic to follow the visit even if the school isn't following the QCA guidance, Unit 3D –Rocks and Soils. The notes on preparation for the visit give details of ESTA's ***Working with Soil*** pack. It is anticipated that soil samples will be collected during the visit from a selecton of localities.