Fieldwork: the 'All powerful' strategy
Discussing geological histories in imaginative ways

Ask your pupils to examine a rock exposure in the field in the normal ways. Bring together their thinking in a plenary activity at the end, by asking: **'If I were 'All Powerful' what would I have to do to re-create the view you see before you?'**

To give them an idea of how 'All powerful' your powers are, you will probably have to explain how you would begin, as in the examples below.

The 'All Powerful' strategy – a Jurassic Quarry example in the UK

The pupils have examined a small quarry into Jurassic limestone and have found some well-bedded cream-coloured rocks containing lots of broken shells; some of the layers are made entirely of small balls of calcium carbonate, called ooids. To answer the 'All powerful' question, pupils would need to know that most limestones are deposited in tropical and subtropical seas, that ooids form in shallow sandbanks and that tropical shells are broken up by waves on sandbanks and beaches.

Coombs Quarry, Buckinghamshire, England. *Photo: Nikki Edwards.*

Begin with, 'If I were 'All Powerful' and wanted to re-create the view you see before you, I would move the land we're standing on today near to latitude about 30°N and would push it down until it was just below sea level – what should I do next?'

Some suitable answers might be:

- flood the area with a shallow sea;
- ensure that lots of shelly animals were living in the shallow sea (there was lots of food and oxygen – a good environment for life);
- build banks of carbonate sand in several areas, with a few tropical islands;
- create storms to smash up and deposit broken shell fragments;
- cause the area to sink, allowing more and more sediment to build up on top;
- make the area sink so far that the pressure of the overlying sediments and the liquids flowing around the grains change the carbonate sands into limestones;
- move everything thousands of kilometres to its current latitude in England (some 52°N);
- make the land rise, and slowly remove (erode) the overlying sedimentary rocks;
- make the surface rise to its current altitude, around 100m above sea level;
- show humans that the rock is valuable as a building stone;
- encourage them to excavate a quarry.

The 'All Powerful' strategy – an example of a view of the Deccan Traps in India

View of the Deccan Traps, India. *Photo: Chris King.*

Begin, 'If I were 'All Powerful' and wanted to re-create the view you see before you, I would move the land we're standing on today over a 'hot spot' producing lots of fast-flowing lava that, when it cooled, recorded the latitude at which it formed (30°S) – what should I do next?'

The answers might be:

- ensure that the lava keeps flowing, to build up one of the thickest and widest sequences of lava flows on Earth;
- move the area thousands of kilometres north to its current position (18°N);
- push the land up so that rivers start cutting down into the lavas;
- keep pushing the land up and create rain storms so rivers cut down, making valleys;
- ensure the land reaches its current height (around 1000m or 1 km);
- encourage humans to build a dam to make a reservoir, to build settlements and to farm the land;
- encourage the Indian government to build a sight-seeing area on the edge of the road.

The 'All Powerful' strategy – an example of an unconformity at Siccar Point in Scotland

Siccar Point, Berwickshire, Scotland.

Begin as, 'If I were 'All Powerful' and wanted to re-create the view you see before you, I would move the land we're standing on today below sea level so that lots of layers of sediment built up on it – what should I do next?'

Answers might be:

- make the sea floor subside so that more and more sediment builds up;
- use the pressure of the layers above and the circulating fluids to change the sediments into sedimentary rock;
- squeeze the rocks from the side so that they became tightly folded into mountains, making some of the layers near vertical;
- erode the mountains down to sea level;
- make the surface sink and flood it with water;
- lay down lots more layers of sediment;
- bury these in even more sediment;
- change the sediments into sedimentary rocks;
- squeeze them again until the layers are tilted and forced up into mountains;
- erode away the overlying rocks to that we can see the view today.

The back up

Title: Fieldwork: the 'All powerful' strategy

Subtitle: Discussing geological histories in imaginative ways

Topic: A plenary activity to help pupils to imagine the geological history of a rock exposure or landscape.

Age range of pupils: 7 – 100 years

Time needed to complete activity: 10 minutes

Pupil learning outcomes: Pupils can:

- imagine the stages of a geological history;
- describe the processes necessary for that geological history to have taken place;
- begin to visualise the scope, scale and time spans of the processes involved.

Context:
This activity uses a 'deep questioning' approach to a plenary fieldwork activity, by asking what series of events would be necessary for the view before the pupils to be recreated. The activity can be used at a range of scales from a small quarry to a landscape-wide interpretation.

Following up the activity:
Try the 'What was it like to be there - in the rocky world?' Earthlearningidea or some of the other fieldwork Earthlearningideas.

Underlying principles:

- All rock sequences and their characteristics can be explained as a series of discrete events.
- Many geological events happen on a landscape-sized scale, that are often most easy to visualise in the field.

Thinking skill development:
This activity uses an imaginative and creative approach to the visualisation of geological histories, involving construction of past patterns and a metacognitive approach to explanations.

Resource list:

- a suitable site and imagination

Source: Devised by Chris King of the Earthlearningidea Team.