Back in time "Alligators spotted in London" @ELI_Earth - July 1

Retrieving and communicating information

For this activity pupils need access to the British Geological Survey's '*Climate through time*' poster. This can be downloaded for projection on to a screen or used as a pdf file. Posters can also be obtained from:-

http://www.bgs.ac.uk/climatethroughtime/

Tell the pupils they are going back in time to wherever they want to go. They will have to send back reports for social media, describing what it was like - so they need to collect some information.

Ask the pupils to:

1. Choose a place on the map and note the colour around it.

2. Look for that colour in the key to the right of the map, read and make notes of the information provided. This will tell them the **environment** that existed in their chosen area when the rocks were deposited. It also gives the evidence for this environment and lists other areas in the British Isles where there are similar rocks.

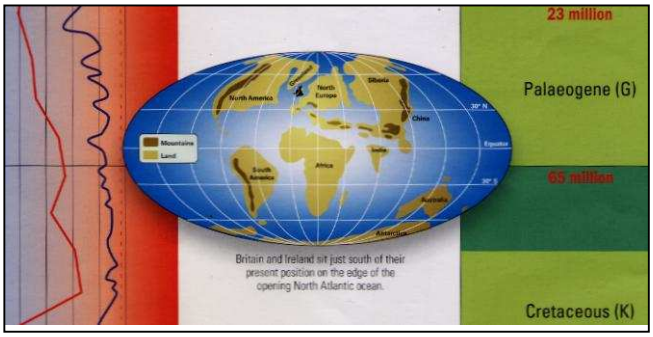
3. Look for the letter on the map within the coloured area near the chosen place. Now look at one of the vertical columns, **'Geological periods and environments'** to the left of the map. Here the ages of the rocks are shown. Pupils should make a note of the dates at the beginning and end of the geological period when the rocks in their chosen place were deposited.

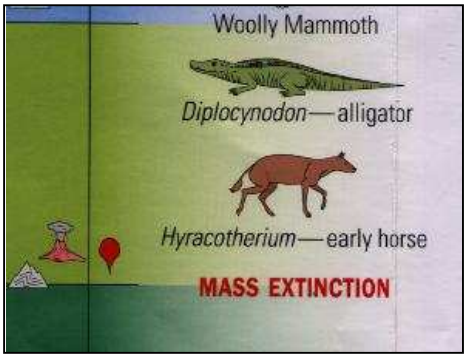
In this section there are also two symbols, one for mountain building and one for volcanic eruptions. In some geological periods there is more than one colour. These indicate the environment that was dominant at that particular time. If relevant, all these data should be noted.

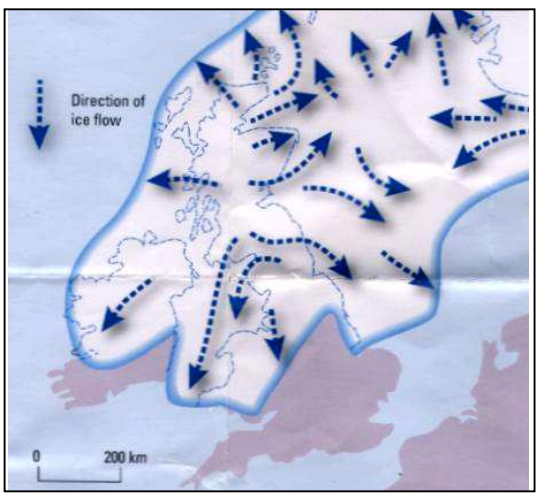
4. Look at the second vertical column, **'Fossil evidence'.** Make a note of the evidence.
Also in this section, red symbols are used for igneous intrusions where magma was injected into the rock deep underground.

5. Look at the next column to the left, **'Position of Britain and Ireland through time'.** Make a note of the approximate latitude of their chosen place.

6, Look at the column on the left of the poster, **'Temperature and sea level through time'**. The central black line indicates today's temperature and sea level. The red line shows changes in temperature and the blue line shows how sea level moved up and down. The key to the differences is at the bottom of the graph.
This column also gives an indication of when the area was much colder, during **Ice ages**.







Diagrams above are extracts from the poster

7. Read the **'Ice ages'** information in the key to see if their chosen area was covered by ice during the last glacial event.

An example report sent from 'London' in the Palaeogene may be seen below.
During this geological period, the environments varied from tropical swamps, to rivers to shallow seas. A date of 35 million years ago and a tropical swamp setting have been assumed from the information columns.
The pupils should realise that all the information is generalised. Any poster or atlas that gives past geological information like this could be used in a similar way.

To	**ELI Team, Time Travel Centre, London**
From	**G.O. Logist**
Subject	**'London' in the Palaeogene**
Date	**1st July 35,000,000 years before 21st Century**

Hi ELI-Team,
I'm writing this after an exhausting day exploring in this strange Palaeogene environment. When I opened the door of the time machine this morning, I found that it had landed on the marshy banks of a river in what looks like tropical rain forest. The vegetation is dense and I shall need my machete to cut my way through it. From what I remember, the plate I'm on has moved and I am now at about 40°N instead of 51·5ºN when I left. This is a bit further north than Greece is in the 21st Century. The temperature here was about 40°C at midday.

I could hear insects and birds but was very scared when there was splashing near my legs, and, to my horror, an alligator, I recognised as *Diplocynadon,* was trying to grab me. I ran away from the river in panic, chopping vegetation aside as I went. I climbed the nearest hill and realised I was very near the sea. Of course, sea level is about 100m higher now than in the 21st Century. Grazing near the shore, I could see a herd of horses but they were tiny and not like ours at all. From my research I know they were *Hyracotherium.* As I watched the horses, I could see a large predator prowling around them, clearly looking for lunch. This made me very wary of other large, fierce mammals that might be around. I was worried about the flightless terror-birds too and couldn't remember if their fossils had been found in the London area.

See you soon - hopefully,
Geo

…….

The back up:

Title: Back in time.

Subtitle: Retrieving and communicating information.

Topic: Pupils obtain information and use it to interpret past environments. The activity could be used in science, geography or environmental studies lessons. Writing the story involves a cross-curricular link with the arts.

Age range of pupils: 10 years upwards.

Time needed to complete activity: variable, depending on age.

Pupil learning outcomes: Pupils can:
- apply information from a key to a place on the map;
- interpret the evidence from the information on the key;
- read the ages of rocks and the fossil evidence from a key;
- interpret symbols from the key;
- interpret the position of the continents from drawings on the poster;
- analyse the temperature and sea level graphs compared to the present day;
- appreciate that humans have evolved in an ice age and that the planet usually does not have ice at the Poles;
- appreciate that the information is generalised and that more detailed information could be obtained from other sources.

Context:
This poster can be used in a variety of ways and for a variety of ages. Children can look at the map, choose a place and then describe the environment of that place when the sediments were laid down. They might need some help with the evidence that is given. Older pupils can, not only discover the past environment together with the evidence for it, but can also give an approximate age to the rocks with some fossil evidence. They can also interpret the plate tectonic movement of the continents through time and see the fluctuations of temperature and sea level. They can relate the changes of temperature and sea level to ice ages.

Following up the activity:
A search engine could be used to find out more details of the animal and plant life at the time the rocks were deposited.
Pupils could also find images of interpretations of past environments on the internet or they could draw their own.

Pupils could use Opengeoscience* from the British Geological Survey to find the exact rocks beneath their chosen place.

Underlying principles:
- Rocks contain evidence of the environment in which they were laid down.
- Some rocks can be dated accurately by radiometric means.
- Fossil evidence in rocks gives clues to animal and plant life at the time.
- Tectonic plates are constantly moving and their past movements can be reconstructed.
- Temperature and sea level have always fluctuated on this planet.
- The planet moves from greenhouse to icehouse and back, and is currently in an icehouse state.

Thinking skill development:
Applying the colours on the map to the coloured key develops a pattern. Discussion about past environments involves metacognition. Cognitive conflict occurs when places which are now cold and wet are shown to have had a desert environment. Applying the information to make a credible story involves bridging skills.

Resource list:
- access to the *'Climate through time*' poster or similar
- paper and pencils and/or mobile devices.

Useful links:
British Geological Survey - http://www.bgs.ac.uk
*Opengeoscience, British Geological Survey - http://www.bgs.ac.uk/opengeoscience/

Source:
Developed by Elizabeth Devon of the ELI Team.

Cross-curricular Earthlearningideas
Geo-art: paintings and sculptures inspired by all things 'geo'
Earthquakes and art: historic paintings of earthquakes
Geo-literature: poems and stories inspired by all things 'geo'
Geo-music: music inspired by all things 'geo'
Rocks music: create your own geo-instrument
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