Fieldwork: the view from the site
Using the view of the local area to tune yourself into the local geology

Use the view from any viewpoint, or the view from the geological exposure you are visiting, to ask these questions that will help your pupils to pick out any landscape-scale evidence for the local geology and its structure.

- Where are the toughest and the weakest rocks in the area?
- Do the tough rocks form shapes that gives clues to the underlying rock structure?
- Do the tough rock features link together to suggest the local geological structure?
- What evidence is there from human activity for the local geology?

Where are the toughest and the weakest rocks in the area?

In general, the toughest rocks will be forming the higher points and the weaker rocks the lower areas. Where there is little variability, the land is likely to be flat, where there is great variability there will be a lot of hills and valleys. In coastal areas, tough rocks form headlands and cliffs, weaker rocks form bays sloping gently to the sea.

View of Edinburgh, UK. Where are the toughest rocks here? *A. Beneath the castle in the foreground, under the ridge in the background and under the high area from where the photo is taken. (Peter Kennett).*

Do the tough rocks form shapes that give clues to the underlying rock structure?

Flat-lying tough rocks overlying weaker rocks tend to form plateaus; gently dipping rocks (usually less than 10^{o} downward slope from the horizontal) form cuestas (escarpments); steeply dipping rocks form ridges. On coasts, flat-lying tough rocks and rock dipping (sloping downwards) away from the coast tend to form cliffs; rocks with shallow dips towards the coast form gentle slopes towards the sea, whereas steeply dipping or vertical rocks tend to form alternating headlands and bays. Faulting may have brought a tougher rock against a weaker one, so that erosion may have formed a straight fault scarp.

Ingleborough plateau, formed of near-horizontally-bedded tough rocks overlying weaker rocks, North Yorkshire, UK.

A cuesta, formed of gently-dipping tough rocks underlain by weaker rocks. Abel Erasmus Pass, Limpopo Province, South Africa.

A ridge of steeply-dipping tough rocks between the Segla and Hesten summits on the island of Senja, Troms, Norway.

The Southern Uplands fault scarp, Scotland, UK.

Do the tough rock features link together to suggest the local geological structure?
Two cuestas with opposing dips might suggest a downfold (syncline) or upfold (anticline); parallel cuestas may suggest a sequence of gently dipping rocks.

The opposing cuestas of a downfold (syncline), The Roaches, Staffordshire, UK.

What evidence is there from human activity for the local geology?
Is the nearby exposure natural or has it been cut as part of a quarry or cutting? If quarrying, what was quarried and why? Is the exposure in a country park developed in an old mining area? If so, what was mined and why? Are the nearby walls/ buildings made of local stone? What other clues can be found?

Millstones cut out below the rock face that they came from, before being abandoned. Stanage Edge, Derbyshire, UK.

Vent to release potentially dangerous methane from landfill filling an old quarry, Severn Way, near Hempsted, Gloucestershire, UK.

The back up

Title: Fieldwork: the view from the site

Subtitle: Using the view of the local area to tune yourself into the local geology

Topic: Questions asking pupils to use the local landscape features as evidence for the underlying geology.

Age range of pupils: 9-19 years

Time needed to complete activity: 10 minutes

Pupil learning outcomes: Pupils can:

- explain the link between the toughness of rocks and landscape features such as hills and valleys, headlands and bays;
- explain how the shapes of landscape features can reflect the underlying geological structure;
- use evidence from human activity to interpret the underlying geology.

Context:
All the ‘lumps and bumps’ of a landscape are either natural or the result of human activity; larger features can only be natural. This activity uses these features as clues to the underlying geology and geological structure. The photographs used

here focus on inland features, at the coast the link between the coastal features and the geological structure is even clearer.

This activity could be extended to include erosional features such as river, glacial and fault-bound valleys and also depositional features such as fenland and tidal flats.

Flat fenland formed by deposition of marsh deposits. Lincolnshire, UK.

A V-shaped small river valley, the Porter Valley, Sheffield, UK. *(Peter Kennett).*

Remember to carry out a risk assessment before taking anybody on fieldwork.

Following up the activity:
If the site is a geological exposure, follow this activity up with the 'Questions for any rock face' Earthlearningideas.

Underlying principles:

- Tough rocks usually form higher ground and coastal headlands; weaker rocks form valleys, lowlands and bays.
- The dip of the bedding in areas of alternating tough and weaker rocks can affect landscape features, such as plateaus, cuestas (escarpments), ridges, fault scarps and coastal features.
- Landscape features can sometimes be linked together to map out the underlying geological structure.
- Human activity can provide clues to the underlying geology.

Thinking skill development:
Pupils construct patterns linking landscape and geological features and apply these to the landscape through bridging.

Resource list:

- the resources needed for pupil fieldwork listed in the Earthlearningidea, '*Planning for fieldwork: preparing your pupils before setting out to "ask questions for any rock face"*'

Source: Chris King of the Earthlearningidea Team.