Questions for any rock face 12: potential of the quarry or cutting
What questions about the potential of the site might be asked at any rock exposure?

The ELI* series of 'Questions for any rock face' helps teachers to plan investigative fieldwork at any rock exposure**. In each case some possible questions are given, with some likely answers, to help you to decide whether the questions might work well at your site, or whether they would be asked better elsewhere.

Site potential
Take your pupils to an abandoned quarry or cutting and ask these questions to debate the potential of the area for use today. Some uses may be highly viable, others should not be considered.

Possible questions	Possible answers
Could this quarry/cutting be used to dispose of high-level nuclear waste material? If so, why? If not, why not?	Quarries or cuttings would not be used to dispose of high-level nuclear waste; they are too shallow and most are too near urban centres
Could this quarry/cutting be used to dispose of household waste material? If so, why? If not, why not?	If the rock is permeable or cracked, waste fluids or gases could escape and damage water supplies or buildings. It could be lined, for example with a plastic membrane, but this is very expensive. There may also be problems with transport of the waste, blowing rubbish or scavenging birds. But places to dispose of the huge volumes of waste we produce do have to be found, unless it can be recycled
Could this quarry/cutting be used to dispose of demolition rubble? If so, why? If not, why not?	Most quarries or cuttings could safely be filled with rubble and then landscaped to match the surrounding countryside; they would need monitoring to ensure that dangerous chemicals or gases did not leak
Could this quarry/cutting be used as a water reservoir? If so, why? If not, why not?	It is unlikely to be large enough, and any permeable rocks would leak
Could this quarry/cutting be used as part of a public path or cycleway? If so, why? If not, why not?	Quarries and particularly cuttings can be used for paths and cycleways, but they need to be made accessible and safe beforehand
Could this quarry/cutting be used as a nature reserve? If so, why? If not, why not?	Quarries and cuttings can be made safe and made to blend in with the landscape, but this can be expensive; they do contain a wide range of habitats for plants and animals
Could this quarry/cutting be used as part of a golf course? If so, why? If not, why not?	Most golfers would be unwilling to climb down into, and back out of a quarry/cutting, although it could provide a number of interesting golf course hazards
Could this quarry/cutting be used as part of an orienteering course? If so, why? If not, why not?	There are probably only one or two access points and the rock walls would be dangerous, so probably not
Could this quarry/cutting be used as a Local Geological Site (LGS) or Regionally Important Geological/geomorphological Site (RIGS) for its scientific or educational interest or its beauty? If so, why? If not, why not?	• It clearly has educational value, because we are here • It also has scientific value because … • It is beautiful/not beautiful because … • I think there are better quarries elsewhere • It would need to be made safe by …
Could this quarry/cutting be opened or re-opened to supply building material? If so, why? If not, why not?	Since the quarry/cutting is now closed, there are probably cheaper or more accessible alternatives elsewhere, so opening/ re-opening is unlikely, but it would depend on demand; some quarries have been re-opened for the restoration of historic buildings to supply more of the original building stone
Which of these options would be the best one? Might different groups of people have different points of view?	Different groups would have different opinions, but the pupils should be able to justify their own views

* ELI = Earthlearningidea
** An exposure is where rocks can be seen at the Earth's surface, exposed by natural or artificial means; anywhere where a rock reaches the surface, even if it is covered by soil, etc. is an outcrop, so an exposure is also part of an outcrop.

Pupils assessing the potential of a quarry. Apes Tor, Staffordshire, UK. *(Chris King).*

The back up

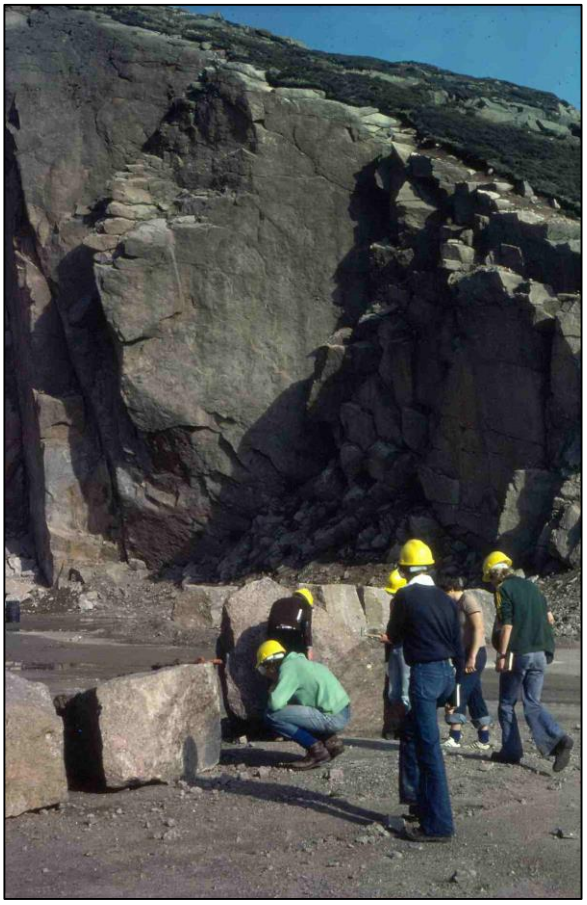
Title: Questions for any rock face 12: potential of the quarry or cutting.

Subtitle: What questions about the potential of the site might be asked at any rock exposure?

Topic: Questions helping pupils to assess the future uses and prospects of a quarry/cutting site.

Age range of pupils: 9-16 years

Time needed to complete activity: 10 minutes



Evaluating Shap Pink Quarry, Lake District, UK. *(Peter Kennett).*

Pupil learning outcomes: Pupils can:

- evaluate the potential uses of a quarry/cutting site, based on a series of focussed questions;
- determine the most appropriate use(s) from the range of alternatives.

Context:
Abandoned quarries and cuttings can be used for a range of purposes after closure – this Earthlearningidea explores some of the possibilities.

Remember to carry out a risk assessment before taking anybody to any rock exposure.

Following up the activity:
Continue with other 'Questions for any rock face' Earthlearningideas

Underlying principles:

- Abandoned quarries and cuttings can be used for a range of purposes.
- When the range of potential purposes has been debated, the most appropriate use(s) can be determined.

Thinking skill development:
Pupils have to have wide lateral thinking skills to consider potential uses for a quarry or cutting, and then have to bridge these to the site in question.

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"*

Useful links:
See a map of the nature parks developed in old quarries in England at:
http://www.mineralproducts.org/nature_map.php

Source: Devised by Chris King of the Earthlearningidea Team.

The 'Questions for any rock face' series of Earthlearningideas and the sites where they may be applicable

'Questions for any rock face' Earthlearningidea	Site
Planning for fieldwork	Preparation in school beforehand
1: weathering	Any exposure (cliff, coastal exposure, quarry, cutting) or weathered constructions (wall, gravestone, monument)
2: erosion	Any exposure and many walls
3: soil	Some exposures have a useful soil profile at the top (but many do not)
4: rock group (igneous or sedimentary)	Any exposure of igneous or sedimentary rock or both; also applicable to sedimentary and igneous building stones, gravestones or monuments
5: sedimentary grains	Any exposure of sedimentary rock and also building stones, gravestones or monuments
6: fossils	Any exposure containing readily found and obvious fossils, including some building stones, gravestones or monuments
7: tilted or folded rocks	Any exposure of clearly tilted or folded rocks
8: faults	An exposure where rocks are clearly faulted, preferably where beds can be matched up on either side of the fault
9: metamorphism	An exposure where metamorphic features are clearly visible and preferably, where there is also evidence of the former rock type
10: sequencing	An exposure where a sequence of geological events can be relatively dated using 'Stratigraphic Principles'

11. tectonic plates	An exposure of sedimentary rocks containing evidence of deposition in different climates and altitude/depths from today, with further evidence of plate margin processes
12. quarry/ cutting potential	An exposure in any quarry or cutting
13: quarry economics	An abandoned (or working) quarry
14: recording	Any exposure