Picturing Landforms – 4: Mass Movement A
Visualise and draw landforms from a verbal description

Encourage pupils to look carefully at landforms and to describe them verbally so that another person can visualise them from the description.

Seat pupils in pairs, with each person holding half of the photograph cards showing landforms, printed and cut up from those shown below. The photographs are all taken in the British Isles. Pupils should NOT show each other what cards they have in their hands.

Pupil A then examines one photograph and describes it as fully as possible to Pupil B, who listens carefully and then tries to draw it. Pupil B must listen in silence and not ask any questions. Pupil B then takes a turn with another card, with Pupil A doing the drawing, also in silence. Pupils should then compare their hand-drawn efforts with the photographs.

This first round should be tried without any guidance. Then give each participant the Prompt Card, to encourage them to be more specific in further descriptions, and ask them to work through the remaining photographs, comparing their drawings with the photographs after each round. Some landforms may be repeated on different photographs, and some photographs may show more than one landform.
Note that in this activity, all the photographs show features which originated through processes of mass movement (or mass wasting). This is where weathered rock and soil move downslope under gravity. In contrast to transportation in water, wind or ice, material is moved *en masse* under its own weight. Water, air or ice may well be mixed in with the rock debris but not in sufficient quantity to be regarded as the main means of transportation.

(If drawing the landscape from a partner's verbal description proves too difficult, the speaker could help by drawing a simple cross-section of the feature which is being described. Both pupils could then draw a "field sketch" from the same photo before reverting to the game).

When all have finished, give out the descriptive cards and ask pupils to match the descriptions to the photographs which they have been using.

A

B

C

D

E

F

G

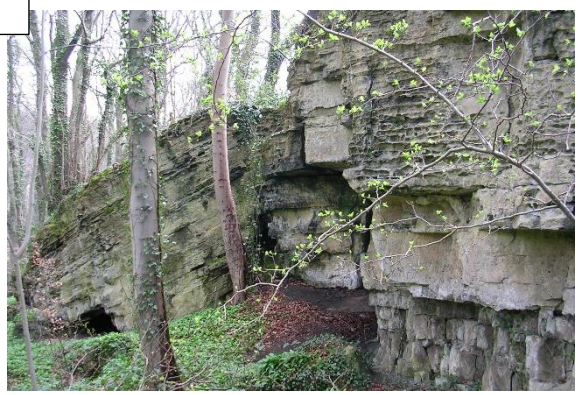
H

I

J

K

L



Prompt Card

Use this card as a check list to aid your verbal description of your photograph to your partner.
Is the photo showing:

- *an upland area, a lowland area or a coastal area?*
- *any evidence of the structure of the rocks – folding, faulting, joints, igneous features?*
- *any evidence of the strength of the rocks?*
- *any evidence of what processes might have moved rocks from their original positions?*

Can you draw a simple cross section of the photo to help your partner to visualise the scene?

Descriptions of the photographs

1. Block slide: The strata here clearly dip towards the right. One large block has become detached and has slid bodily along a bedding plane into the sea. Such potential block failure needs to be guarded against when road and railway cuttings are being constructed.	**7. Landslide:** This "landslide in miniature" shows how blocks rotate about a curved surface at the back, leaving a backward-tilted top surface. This is part of a major landslide, which was active for decades, resulting in the surface of the A625 main road being constantly topped up, in order to keep the road open – seen in the many layers of asphalt. The road finally closed in the 1970s. See Photo H.
2. Rock fall: The large sandstone block (about 2m long) has fallen from a thick sandstone unit, high up in the face (most of which is composed of weaker siltstones) and has crashed through the trees, damaging the strong wire mesh fence which protects the road below, along with the heavy concrete blocks. .	**8. Terracettes:** These are commonly known as "sheep tracks", but although sheep may indeed make use of them, the miniature terraces are produced by gradual hill creep of weathered rock and soil. They are most common in areas of thin soils, which are not sufficiently deep for large-scale hill creep to develop.
3. Solifluction: The large block and the many smaller ones have not rolled off from the free face in the background, but have slid down the slope behind them. This took place during periglacial conditions, when the ground was frozen, apart from the top metre or so thawing each summer. This saturated the soil and allowed the blocks to slide readily over the permafrost below.	**9. Scree (Talus):** Weathered fragments of rock have tumbled down from the exposed rock face above, and have settled at their natural angle of rest (about 30^0). Larger fragments tend to travel the furthest under their own momentum and end up at the foot of the scree.
4. Rock fall (Cliff fall): A large section of this sea cliff has suddenly fallen onto the beach, and the debris is now being eroded away by marine action. The people who are walking close to the base of the cliff are in a very dangerous position!	**10. Hill creep:** Trees usually grow straight upwards towards the light. As these trees grew, the soil beneath was gradually creeping down towards the stream, taking the young trees with it, until the roots were big enough to prevent this from happening. The trees have a marked concave side on opposite sides of the valley.
5. Landslide: The exposed strata in the background form the long-established back wall of a massive landslide. In the middle ground, the land is sliding downhill and tilting backwards along rotational slip planes. In the foreground, the land is rising at the toe of the landslide. (see Photo D)	**11. "Sand flow":** This occurred on the sides of a commercial sand pit. Heavy rain had liquefied the loose sand and caused it to slump down the slope. However there was not enough rainwater to carry the load in suspension, so this counts as mass movement, rather than fluvial transportation.
6. Cambering: The curvature of the bedding in these dolomitic limestones is not due to tectonic folding. Instead, removal of softer rocks from the valley floor (off to the left of the photo) has reduced the support for the more competent limestones, which have gradually collapsed under their own weight, but have not yet tumbled off down the slope.	**12. Landslide:** Although no rocks can be seen, the church, which is still in use, was not built like that! The underlying geology consists of sandstones overlying mudrocks. The slope in this view is in the middle section of a huge landslide, where the slipped material became tilted backwards into the slope, taking the church with it. This probably took place intermittently over several centuries.

The back up

Title: Picturing Landforms – 4: Mass Movement A

Subtitle: Visualise and draw landforms from a verbal description

Topic: Enhancing pupils' skills of description and interpretation using photographs of landforms

Age range of pupils: 16 years upwards

Time needed to complete activity: About 30 minutes, depending on depth of discussion

Pupil learning outcomes: Pupils can:
- examine photographs of landforms carefully and describe them intelligibly;
- listen carefully to a verbal description and interpret it in a drawing;
- enhance their observational skills as a prelude to field work.

Context: This could form a useful revision activity, once pupils have studied landforms. *Answers to the matching exercise are:*

A2, B9, C4, D7, E10, F1, G12, H5, I8, J11, K3, L6.

Following up the activity:
- Ensure that pupils use the same careful description and interpretation approach to geology in the field.
- Ask pupils to study the "mystery" photograph below. Tell them that it is the same type of landform as in one of their 12 photographs. Ask them to decide which landform it matches, and give their reasons. (Look carefully at the apparent dip of the rocks at each side of the gully. The gully is entirely natural and has not been cut out by people) (*See photo notes*)

"Mystery" photo

Underlying principles:
- This strategy provides training in careful observation and interpretation of all relevant features.
- Being obliged to give a verbal description encourages careful observation, to ensure that clues are not missed.

Thinking skill development:
Verbal dexterity and metacognition are encouraged by the need to give intelligible verbal descriptions and to interpret from them**.** Applying the activity to the field situation is a bridging activity.

Resource list:
- Card sets of Photographs, Prompt Cards and Description Cards, cut out from those shown above.

Useful links:
See the table below for other Earthlearningidea activities in the "Picturing" series. Also:
https://www.earthlearningidea.com/PDF/409_Coastal_erosion.pdf
https://www.earthlearningidea.com/PDF/406_Net_zero_Landslide_danger.pdf
https://www.earthlearningidea.com/PDF/Landslide_through_window.pdf
https://www.bgs.ac.uk/geology-projects/landslides/national-landslide-database/

Source: Written by Peter Kennett of the Earthlearningidea Team.

Photos:
F. Clacktoll near Lochinver, Scotland. H. Clark
H. Mam Tor, Peak District, Derbyshire. H. Clark
I. Morgan's Hill, Calne, Wiltshire. 1345952

All other photos. P. Kennett
A. Behind the Co-op! Banner Cross, Sheffield.
B. Monksdale, Peak District, Derbyshire.
C. Bridport, Dorset.
D. Mam Tor, Peak District, Derbyshire.
E. Trap Lane, Bents Green, Sheffield.
G. Cwm Yoy Church, South Wales.
J. Sand pit, East Cheshire.
K. Fiddler's Elbow, Burbage Valley, Sheffield.
L. Anston Stones Wood, South Yorkshire.

"Mystery" photo, taken in Anston Stones Wood, South Yorkshire. This shows another example of cambering, when competent dolomitic limestones have begun to bend and collapse as weaker rocks were removed by erosion from further down the slope. In this case, the crag on the left, with beds dipping gently to the left, is near the top of the plateau. The crag on the right, with beds dipping gently to the right, is just above the steep river valley side, off the photo to the right.

Picturing……

Earthlearningidea has compiled a series of activities involving examination of photographs of geological interest and their careful verbal description to others. This table will be updated as fresh activities are added. All titles begin with: “Picturing……”

Title	Sub-title
Puzzle structures	Visualise and draw sedimentary structures from a verbal description
Trace fossils and other strange shapes	Visualise and draw trace fossils and sedimentary structures from a verbal description
Igneous rocks – 1	Visualise and draw igneous rocks from a verbal description
Igneous rocks – 2	Visualise and draw igneous rocks from a verbal description
Metamorphic rocks	Visualise and draw metamorphic rocks from a verbal description
Tectonic structures – 1 faulting	Visualise and draw fault structures from a verbal description
Tectonic structures – 2 folding	Visualise and draw fold structures from a verbal description
Minerals -1	Visualise and draw minerals from a verbal description
Minerals -2	Visualise and draw minerals from a verbal description
Fossils -1	Visualise and draw fossils from a verbal description
Fossils -2	Visualise and draw fossils from a verbal description
Landforms 1	Visualise and draw landforms from a verbal description
Landforms 2	Visualise and draw landforms from a verbal description
Landforms 3	Visualise and draw landforms from a verbal description
Landforms 4A	Visualise and draw landforms from a verbal description
Landforms 5B	Visualise and draw landforms from a verbal description