

Mapping “structures” on the playing field An exercise in measuring strike and dip

Set up at least a dozen pieces of slate, plywood or MDF to represent a geological structure on the school field. Each piece should be partially embedded in the grass but enough should be exposed for students to be able to take strike and dip measurements, using a compass and clinometer. Explain that the slates are all parts of the same bed, which is only exposed here and there.

Provide students with a map showing the location of the slates and ask them to measure the strike and dip of each one, and plot them on the map as they go. When the map is completed, students may join up the locations with a line and state what geological structure is represented. Our example shows a plunging antiform.

Note that our example is in a back garden where it is too easy to visualise the structure at a glance. An area of at least 30m square will make the exercise more challenging. It may help to use a rope when laying out the structure, which is removed once this is done.

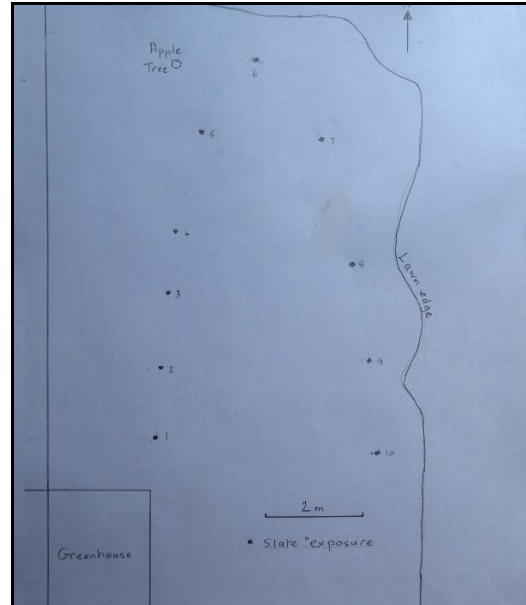


Fig 3. Sketch map of the back garden, showing positions of slates



Fig 1. The layout of slates in a back garden

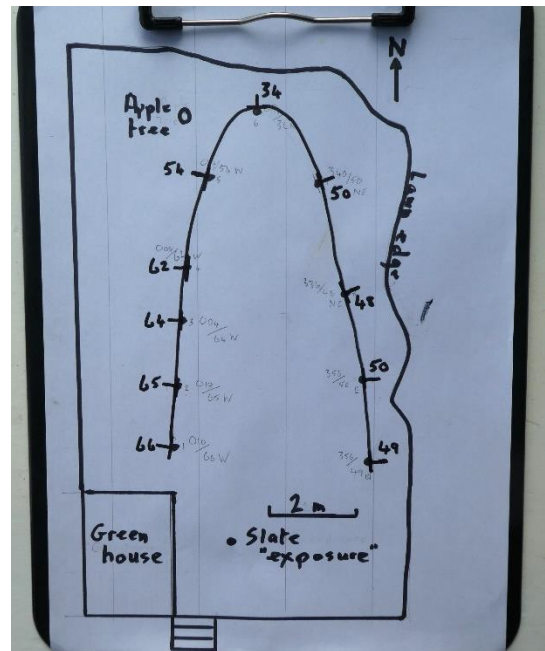


Fig 4. The completed map and its interpretation



Fig 2. Strike and dip data on an embedded slate



Fig 5. The foreshore at Saundersfoot, South Wales, where strike and dip measurements would enable the overall structure to be worked out

The back up

Title: Mapping “structures” on the playing field

Subtitle: An exercise in measuring strike and dip

Topic: How to use a school field for practice in measurements in order to elucidate a geological structure

Age range of pupils: 16 years and above

Time needed to complete activity: 45 minutes

Pupil learning outcomes: Pupils can:

- make accurate measurements of strike and dip of beds;
- plot strike and dip data on an outline map;
- explain the meaning of the terms strike and dip;
- use the measurements to suggest a geological structure.

Context: A useful early exercise in developing skills of measurement outdoors, prior to visiting a real geological site.

Following up the activity:

- Draw a cross section of the structure. Label parts of it as appropriate and show features such as an axial plane trace.
- Ask one half of the class to devise and set out a different structure for their peers to measure.
- Study published geological maps and see if outcrop patterns are related to any strike or dip data printed on the map.
- Remove all slates to avoid injury among the next rugby team to turn out!

Underlying principles:

- If measurements of strike and dip are taken on the same bed, its overall structure may be determined by plotting the results on a map.
- Plotting strike (as well as dip) makes it easier to “join up the dots” and visualise the structure.
- Sports field markings may be used as the basis for mapping the location of the slates.
- Although this small scale exercise is easily interpreted, large scale structures with intermittent exposure are often only revealed

where extensive dip and strike readings have been taken.

- This exercise should enable students to hone their skills of measurement in the field.
- Students should be encouraged to plot their strike and dip measurements as they work, a) to safeguard the data, b) to enable the structure to be unravelled as they work.
- There are several different ways of recording strike and dip.
- Note that this activity has used slate, which is strong and thin enough to be pushed into the turf, so we have really been measuring the cleavage planes, but the same principle applies when measuring sedimentary beds or any other planar structure.

Thinking skill development:

Taking strike and dip measurements is an activity in construction.

Cognitive conflict may arise if some measurements don't appear to fit.

Applying the experience to real geological structures involves bridging skills.

Resource list:

- Access to an open grassy space, preferably with identifiable markings such as a sports field
- About a dozen pieces of slate or flat pieces of plywood, MDF etc.
- Compasses and clinometers for groups of pupils
- Clipboards and prepared maps showing location of slates

Useful links:

https://www.earthlearningidea.com/PDF/136_Dip_strike_model.pdf

https://www.earthlearningidea.com/PDF/311_Jelly_babies.pdf

Video: A video of this activity will follow shortly.

Source: Written by Peter Kennett of the Earthlearning idea team. *Photos by P. Kennett*

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