

## Modelling unconformity – by hand

### Using your hands to demonstrate how unconformities form

You can demonstrate the sequence of geological events that produces angular unconformities by using your hands.



An angular unconformity with near-horizontal upper beds - the Henry De La Beche unconformity, Vallis Vale, Somerset, UK. Grey Carboniferous limestone below; buff-coloured Jurassic limestone above. (*Alan Holiday*).



An angular unconformity with the whole sequence tilted down to the left - Siccar Point Berwickshire in eastern Scotland, UK. Near-vertical grey Silurian sandstones below; reddish Devonian sandstones above. (*David Bailey*).



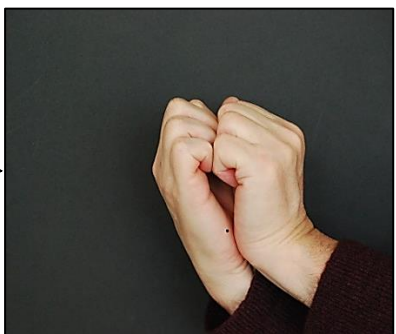
Single bed laid down horizontally.



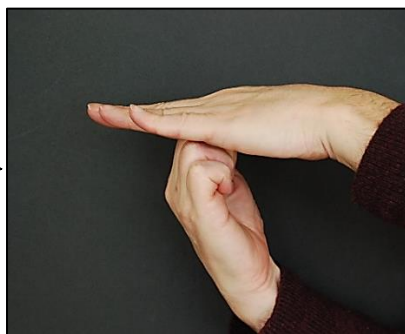
More beds laid down on top to form a horizontal sedimentary sequence.



Sedimentary sequence changed to sedimentary rocks; tilted in a mountain-building episode millions of years later.



Tilted rock sequence uplifted and top eroded into an irregular erosion surface.



More sediments laid down horizontally on top; sediment sequence builds up; sediments become rocks.



Millions of years later, whole rock sequence tilted in another mountain-building episode (some unconformities have not been tilted).

### The back up

**Title:** Modelling unconformity – by hand.

**Subtitle:** Using your hands to demonstrate how unconformities form.

**Topic:** Pupils use their hands to model unconformity processes.

**Age range of pupils:** 14+ years

**Time needed to complete activity:** 5 minutes

**Pupil learning outcomes:** Pupils can:

- explain the processes which form unconformities;
- model them with their hands.

**Context:**

The educational advantages of using your hands to model geoscience features and processes have been explained in the Earthlearningidea, *Rock cycle at your fingertips*.

The formation of angular unconformities involves a range of processes operating over different time spans. Modelling these with your hands, whilst explaining the processes and the timings involved, helps to consolidate learning.

Each unconformity marks a major break in the rock record, since there must have been time for the rocks beneath to have been buried, lithified into rock, be uplifted, and for the rocks above to be eroded away before a new sequence is deposited on top. This takes many millions of years.

**Following up the activity:**

Ask the pupils for other ways they could use to show unconformity processes. They may suggest:

- drawing sequences of diagrams on paper, a white- or black-board or a computer;
- making models in modelling clay.

**Underlying principles:**

- Unconformities are formed by a sequence of geological processes operating on a range of time spans.
- Unconformities mark major breaks in the geological record.
- You can model these processes with your hands.

**Thinking skill development:**

Understanding the rock pattern of unconformities involves construction, and modelling them with your hands also involves construction. Debate around the modelling may involve cognitive conflict and metacognition. These ideas must then be bridged to 'real world' rock formations.

**Resource list:**

- your hands

**Useful links:**

Try the '*Filling the gap – picturing the unconformity 'abyss of time'? Working out what happened during unconformity time gap*'

Earthlearningidea at:

[http://www.earthlearningidea.com/PDF/261\\_Filling\\_the\\_gap.pdf](http://www.earthlearningidea.com/PDF/261_Filling_the_gap.pdf)

Type '*unconformity animation*' into a search engine like Google™ to see a range of helpful animations.

**Source:** Devised by Peter Kennett; 'hand' photos also by Peter Kennett.

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| <b>The Earthlearningidea hand-modelling activities</b> |                                                                                                                                                           |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Modelling Earth processes                              | The rock cycle at your fingertips: modelling the rock cycle with your fingers                                                                             |
|                                                        | Plate margins by hand: modelling plate margins and plate movement with your hands                                                                         |
|                                                        | Modelling by hand 'when the youngest rock is not on top': illustrating how rock sequences can have older rocks on top of younger ones                     |
|                                                        | Modelling unconformity – by hand: using your hands to demonstrate how unconformities form                                                                 |
| Modelling structural geology nomenclature              | Modelling Earth stresses isometrically: using your hands to model Earth stresses                                                                          |
|                                                        | Modelling folding – by hand: using your hands to demonstrate different fold features                                                                      |
|                                                        | Right way up or upside down? - modelling anti- and synforms by hand: use your hands to show how folds can be the right way up or inverted                 |
|                                                        | Visualising plunging folds - with a piece of paper and your hands: using your hands and folded and torn paper to show the patterns made by plunging folds |
| Climate change activities                              | The Earth during Milankovitch cycles – by hand: modelling the Earth's squashed orbit, tilt and wobble using your hands                                    |
|                                                        | Modelling tipping points – by hands: demonstrating tipping points in the Earth's system with the hands of three pupils                                    |