

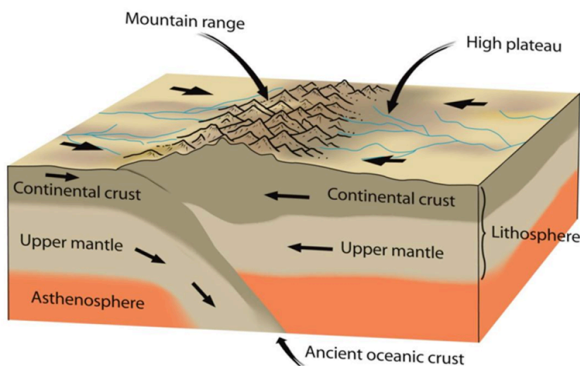
## Margarine mountain-building

### Making mountains every time you make a sandwich

Open a new container of soft margarine and make sure the surface is level. Then holding a knife at about 45° to the surface, scrape it slowly across the margarine – and watch ‘mountains’ build up in a series of folds.

Now, hold the knife still and move the container downwards past it at about 30°. The margarine represents the subducting plate and the sediment is scraped off by the other plate (knife), and folded into ‘mountains’, like the ones in the diagram and the satellite and aerial views below.

By using everyday materials to create Earth features like this, pupils will be reminded of mountain-building every time they have breakfast!



A mountain range being ‘scraped up’ from a subducting plate.

*This image is in the public domain because it came from the United States Geological Survey – redrawn by ESEU.*

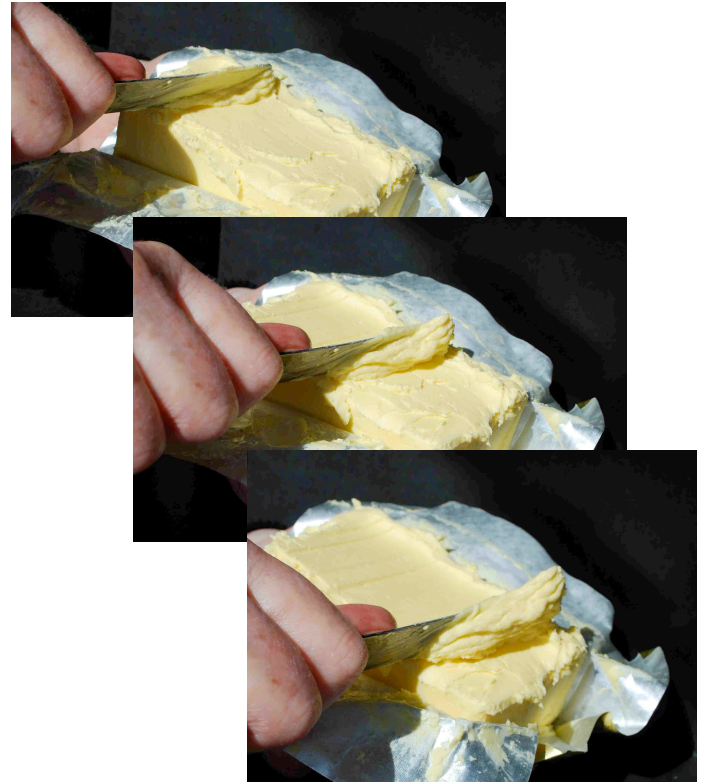


Satellite image of the Zagros Mountains in Iran and Iraq, formed by subduction of an oceanic plate as India collided with Asia.

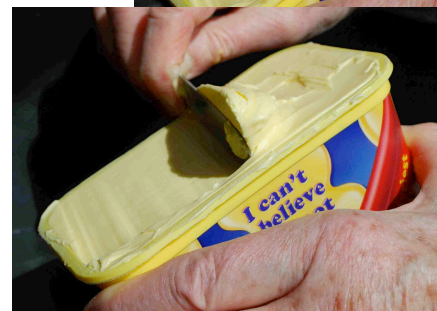
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‘Margarine mountains’ being created



‘Margarine mountains’ created by ‘subduction’.



All margarine photos by Peter Kennett

If you ask the pupils not to lick the knife the margarine clean, it can be recycled next make your own sandwiches.

## The back up

**Title:** Margarine mountain-building.

**Subtitle:** Making mountains every time you make a sandwich.

**Topic:** A breakfast-time reminder of how rocks can become folded and mountain ranges are formed.

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

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

**Pupil learning outcomes:** Pupils can:

- explain how flat materials can be scraped into folds as one surface moves across another;
- use the margarine model of subduction to explain how mountains are formed.

**Context:** The activity uses materials that pupils use every day to remind them how folds and mountain belts are formed, as surface and near surface materials are scraped up during plate subduction.

### Following up the activity:

Ask pupils to think of other food analogies for Earth processes and Earth materials – and let us know about them to publish as future Earthlearningideas!

### Underlying principles:

- The movement of one object over another causes compressional stress in surface materials.
- If the surface materials are ductile (plastic), the stress results in deformation by folding.
- A series of parallel margarine folds is an analogy for mountain ranges produced by folding in both the formation process and the appearance of the result.

### Thinking skill development:

Pupils are asked to 'bridge' between the processes and appearance of the model and 'real world' processes and their effects.

### Resource list:

Per group of pupils:

- a tub or block of soft margarine
- a table knife

**Useful links:** See the folding animation at:

[http://www.wiley.com/college/strahler/0471480533/animations/ch14\\_animations/animation2.html](http://www.wiley.com/college/strahler/0471480533/animations/ch14_animations/animation2.html)

**Source:** Activity devised by Mike Tuke and published as 'Mountain building at breakfast' (2011) in *Teaching Earth Sciences*, 36.1, 33.

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