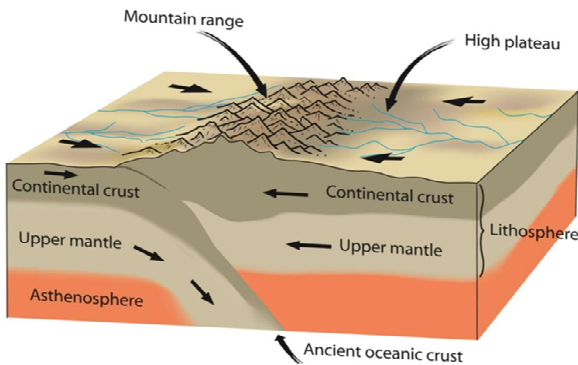


Margarine mountain-building Making mountains every time you make a sandwich

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!



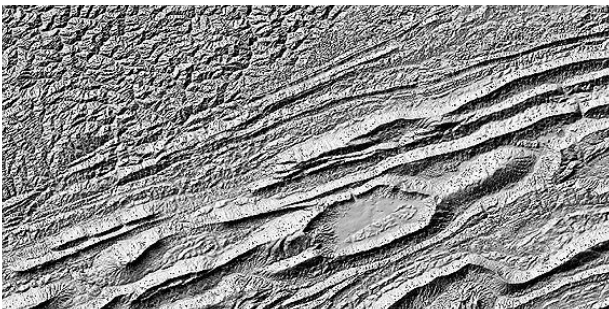
A mountain range being ‘scraped up’ from a subducting plate.

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 Arabia collided with Asia

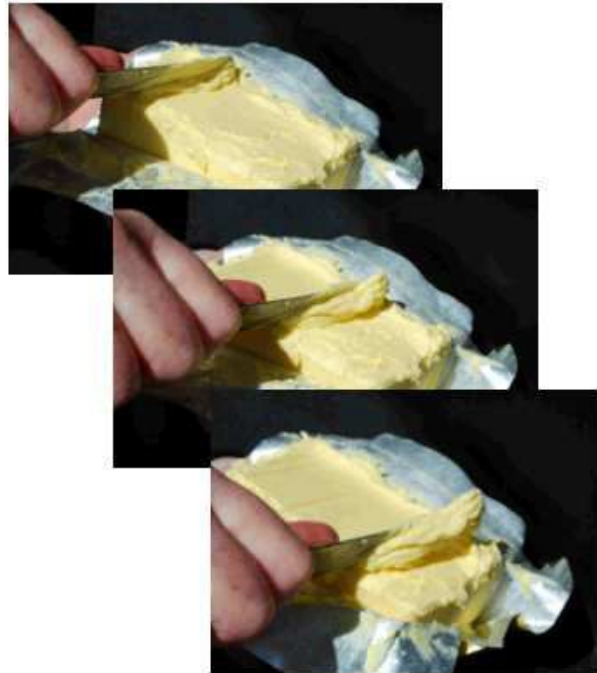
This file is in the public domain - it was created by NASA.



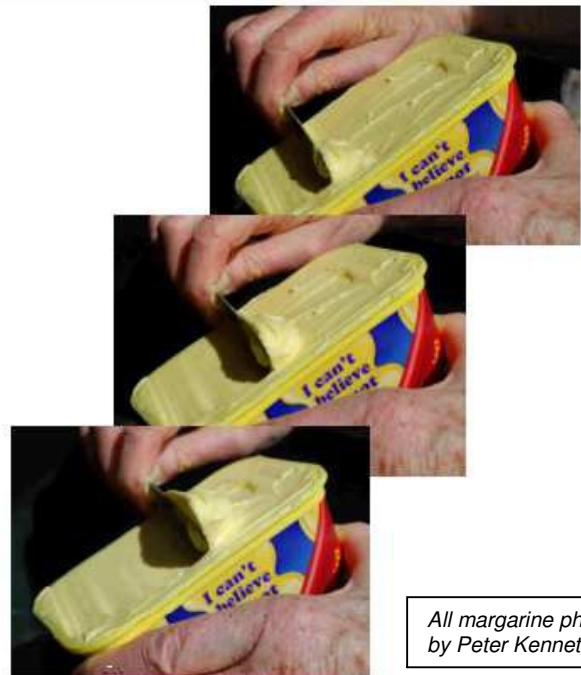
An aerial view of the ‘Ridge and Valley’ region of Virginia, USA, showing the eroded roots of ancient mountains.

This image is in the public domain because it came from the United States Geological Survey.

‘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 and keep the margarine clean, it can be recycled when you 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

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

© Earthlearningidea team. The Earthlearningidea team seeks to produce a teaching idea regularly, at minimal cost, with minimal resources, for teacher educators and teachers of Earth science through school-level geography or science, with an online discussion around every idea in order to develop a global support network. 'Earthlearningidea' has little funding and is produced largely by voluntary effort.

Copyright is waived for original material contained in this activity if it is required for use within the laboratory or classroom. Copyright material contained herein from other publishers rests with them. Any organisation wishing to use this material should contact the Earthlearningidea team.

Every effort has been made to locate and contact copyright holders of materials included in this activity in order to obtain their permission. Please contact us if, however, you believe your copyright is being infringed: we welcome any information that will help us to update our records.

If you have any difficulty with the readability of these documents, please contact the Earthlearningidea team for further help.

Contact the Earthlearningidea team at: info@earthlearningidea.com