

## **Orogenesis**

**Simple model**

**A P 5 min**

**Students are provided with 4 or 5 strips of felt 45cm by 10cm. If possible they also have a blue painted board 50 cm by 10cm and with a back 3cm high. They lay the pieces of felt one at a time on top of it. The blue board represents the sea and the felt layers of sediment. They then place their hands on the ends of the felt and squeeze them together. The felt folds and rises above sea level.**



**Using hands**

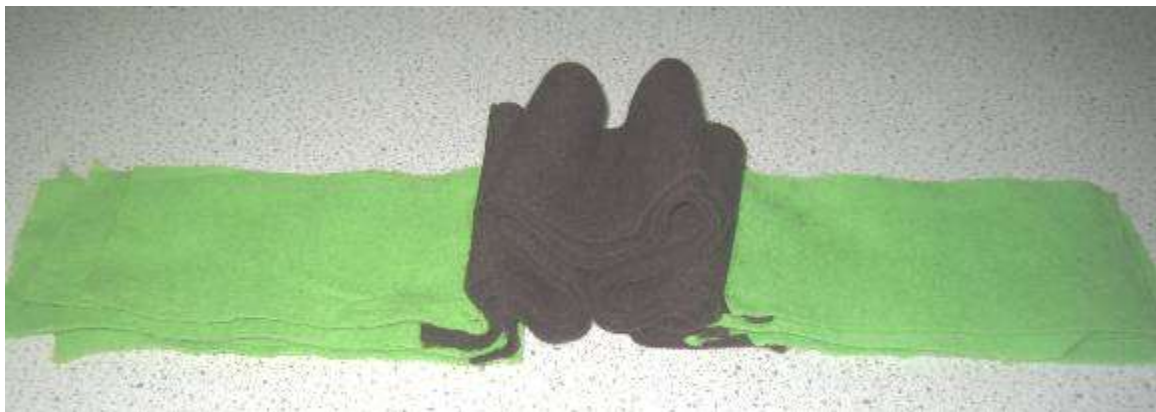
**I 1 minute**

**Students place their hands and arms on the desk with palms down and finger tips touching. They then push their hands together to form a mountain.**

**Geosynclinal theory**

**D**

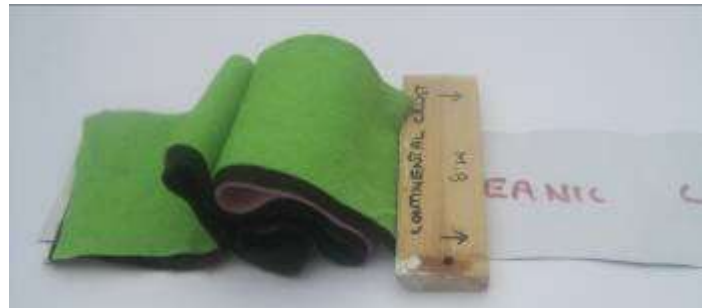
**Use dark felt strips with 10cm of light coloured felt glued onto each end. The light represents shelf deposits and the dark deep marine deposits. Lay them out flat and then squeeze the ends together by placing your hands on the ends and moving them together.**



### ***Mountains formed by scraping off sediment***

***A P 10 min***

***Each pair of students will need three pieces of felt 10cm by 45cm (=the strata) and one piece of cloth or paper 10cm by 60cm (=the oceanic crust) and a piece of wood 15cm by 5cm by 1cm (=the continental crust). Place the cloth on the table with the piece of wood close to one end at right angles to the cloth. Lay the strata down on the oceanic crust. Now hold the wood (continental crust) and pull the cloth (oceanic crust) underneath it. The strata will fold up into mountains against the continental crust.***



### ***Mountains formed by plate movement***

***D***

***This activity illustrates how the sediment is scraped off a subducting plate and formed into mountains and explains why sediments deposited on shelves are only gently folded. You will need a piece of carpet 10cm wide and 1.8m long and two blocks of wood 5cm by 10cm by 35cm labelled continental crust. Attach one to the end of the carpet and place the other on the edge of the desk. The carpet is laid on a desk with the other end pushed down the gap between two desks. Pieces of dark coloured felt 45cm long and 10cm wide have a light piece 22cm long glued onto one end. The felt is laid out on top of the carpet in two piles; each pile with the light coloured felt on the wooden blocks. The carpet is pulled down between the desks and the dark felt representing deep water sediments is scraped off forming "mountains". The light felt on the blocks representing shelf deposits is only gently folded. First there are "mountains" on only one side (Andes) and then with further pulling the continents come together and both sides are folded (Himalayas).***



**Accretionary wedges**

**D E**

*Use the same model as above but instead of adding felt layers add pieces of card. When the carpet is pulled down the cards pile up as a series of thrust slices. Students can use this to explain the sequence of rocks found exposed in the Southern Uplands.*



**Margarine**

**D or P 1 minute**

*To show how scraping will result in folding provide students with a small packet of margarine. Students use a knife to scrape margarine from a flat surface of the margarine. The margarine is folded as it comes onto the knife. You can pass a packet around the class or use several packets or transfer a small amount to a small container for them to scrape. Holding the knife still against the margarine and moving the margarine*

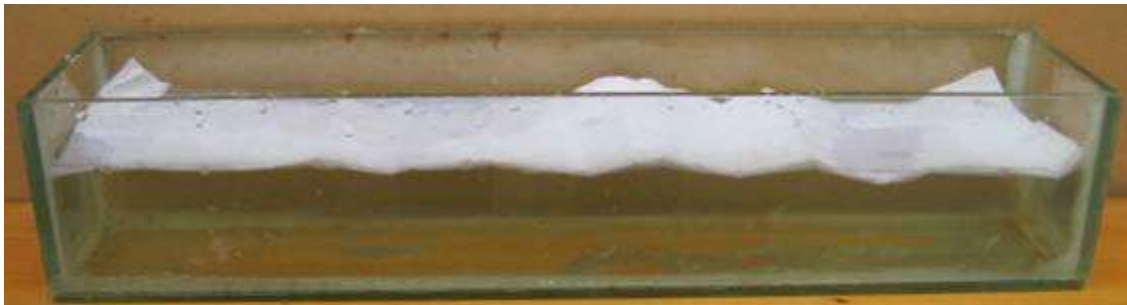
*packet downwards at 30° represents the sediments being folded as they are scraped off during subduction.*



#### **Mountain roots**

**D**

*Lay a strip of one-sided corrugated paper or tissue paper into a glass tank 10cm by 10cm by 50cm. Push the strip into a series of folds at one end. It will float in the water with about 80% submerged. (Do not leave visible to the students for too long because the paper will eventually sink below the water).*



#### **Erosion and isostatic uplift of mountains**

**D**

*Painted and labelled blocks of wood 20cm by 10cm by 2.5cm are placed on top of each other in water in a tank. The blocks are labelled from top downwards: sedimentary rocks, slate, schist, gneiss, migmatite. Removing*

*the blocks one at a time shows how the migmatite which forms in the roots off mountains can be exposed at the surface.*



***Erosion of a mountain belt***

***Pa I E 15min***

***Students are given a cross section of a mountain. They cut the top part off to represent erosion and match the result to a part of the British Isles. This process is repeated until the zone of migmatites is reached.***