

## Isostasy in the kitchen - 2 “Bouncing back”

We can model how the Earth’s crust “bounces back” when a load is removed from its surface. This is the principle of isostasy as shown in the Earthlearningidea, *Isostasy 2: modelling the state of “balance” of the Earth’s outer layers* and the Earthlearningidea extension, *Isostasy in the kitchen - 1*.

Here we model the Earthlearningidea, *Isostasy 2: “Bouncing back”* in the kitchen using a bowl of water, a wooden block and some coins.

Float the wooden block in water and note its height and depth. Then add coins to make a pile, as shown in the photographs:



(Photos: Chris King)

We used a wooden block large enough not to ‘capsize’ of 12 x 7 cm and 2 cm thick, and a pile of eight coins.

As you add the coins one by one, the top of the coins rises higher but the wooden block sinks lower.

The same thing happens in two situations on Earth:

1. When plate collision forms a new mountain chain, as it is steadily pushed up, the mountain roots become deeper and deeper. Later during erosion of the mountain chain, as the mountains are eroded, the crust “bounces back” as the roots steadily rise until, when all the ‘coin mountains’ are removed, the crust is back to where it was in the beginning. This is shown in the “Hooray and up she rises” Earthlearningidea at:

[https://www.earthlearningidea.com/PDF/265\\_Rising\\_mountains.pdf](https://www.earthlearningidea.com/PDF/265_Rising_mountains.pdf)

2. When thick ice sheets cover the crust, they have a high elevation, but their mass steadily makes the crust below sink. Later, when the ice melts (the coins are removed), the crust “bounces back” again, until eventually it is back where it started. This is explored in the ‘Isostasy – 2: “bouncing back” after the ice’ Earthlearningidea at:

[http://earthlearningidea.com/PDF/206\\_Isostasy\\_2.pdf](http://earthlearningidea.com/PDF/206_Isostasy_2.pdf)

All this happens because the rigid crust ‘floats’ on the solid mantle beneath, which is able to flow. So the mantle acts like the water in the model, the wooden block like the rigid crust, and the coins like a new mountain chain or ice sheet.

**Source: Chris King of the Earthlearningidea Team**, based on

[http://earthlearningidea.com/PDF/206\\_Isostasy\\_2.pdf](http://earthlearningidea.com/PDF/206_Isostasy_2.pdf)

© **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.

