

Video question script: Deformation and uplift – the Himalayas in 30 seconds

Question/Activity	Likely response	Rationale
In teaching about the Earth we use practical activities to explore Earth processes. This example explores deformation and uplift through the Earthlearningidea: 'The Himalayas in 30 seconds'		Preparation for bridging from the model to real Earth processes
We have here ...	A transparent plastic box (a Ferrero Rocher box or a component drawer), a piece of board to fit the box, some loose dry sand and flour, a block to even out the layers	Concrete preparation = ensuring familiarity with the equipment
We are going to make even layers of sand with thin layers of flour at the edges – like this. Demonstrate how to make up box		
Show the made up box, add the piece of board at one end. Say that we are going to move the board slowly along the bottom of the box, keeping it vertical Ask what they expect to happen	The layers might buckle up The sand and flour might become mixed up together	Construction = applying previous experience of the patterns when things are compressed Cognitive conflict = working out what is likely
Move, or ask a class member to move the board along the box. Stop after about 3 cm of horizontal movement. Examine the results on both sides		
Move the board about another 3 cm and view the results again		
Point out the angular chevron folds and any reverse fault that forms Point out which direction the fold axes are running Ask how the direction of movement relates to the direction of the fold axes	The axes are at right angles to the pressures	Cognitive conflict = working out how stress (applied pressure) relates to strain (the result)
Note that the Himalayan mountain chain has folds and faults like this running roughly east-west. <ul style="list-style-type: none"> • What were the directions of pressures causing this deformation? • What might have caused the deformation? 	The pressure directions came from the north and south The Himalayan chain was deformed and uplifted by the plate carrying the continent of India colliding with the plate carrying the continent of Asia.	Bridging = applying the ideas from the model to the world
Note that the same principles can be applied to any mountain chains formed by folding and to any folded rocks		Bridging = applying the ideas from the model to the world

Note 1: The activity clearly shows how, as the 'Himalayas' (or any other mountain chain) are formed they are uplifted while being deformed.

Note 2: the stresses that cause the deformation, folding and faulting would also cause metamorphism deeper down in the roots of the mountains, as explored by the activities covered under 'metamorphism'

Note 3: the deformation is caused by equal and opposite forces, as the board is moved. The force from the board movement is opposed by the equal and opposite force from the end of the box. The folds are overturned towards the end of the box because that is where the space was for the sand and flour to move into.