

Video question script: Metamorphism – Squeezed out of shape and Change of shape

Question/Activity	Likely response	Rationale
In teaching about the Earth we use practical activities to explore Earth processes. This example explores metamorphism by using two Earthlearningideas, 'Squeezed out of shape' and 'Metamorphism – change of shape'		Preparation for bridging from the model to real Earth processes
Explain that we are going to use modelling clay and plaster of Paris to make 'squashed fossils'		Concrete preparation = explaining method
They should soften the clay and make a mould of a shell before removing it. Then distort the mould to simulate the squashing by tectonic forces during metamorphism. Then they should make up some plaster of Paris as a runny cream, and pour it into the mould to set (taking around 20 minutes)		Concrete preparation = explaining method
When the plaster has set, they should remove the cast carefully from the mould and give it to a friend for the friend to work out the directions of the forces that were used to cause the metamorphism	The pressure directions are at right angles to the direction of squashing	Construction = linking type of deformation with force directions Cognitive conflict = which directions did the forces come from?
Show them the trilobite images, from the rocks of North Wales and ask the same questions about the directions of the forces.	The trilobite has been squeezed down by about a quarter, and so have the surrounding rocks and so has North Wales.	Construction = developing a pattern from the data
Explain that a vice big enough to do this squeezing is two former tectonic plates carrying continents (one carrying Scotland, the other England)		Bridging = from the data to the bigger picture
Explain that this deformation has taken place as a result of low-grade metamorphism in slates. If this is extraordinary, how much more extraordinary are the pressures that cause medium- and high-grade metamorphism.		Imaginatively envisaging enormous Earth pressures
Scatter some broken pieces of spaghetti (or spent matchsticks) randomly on a table, then move two rulers together from either side to show how long thin minerals become aligned in metamorphism. Ask what is the relationship between the pressure directions and the alignment	The spaghetti 'crystals' are aligned at right angles to the pressure directions	Bridging = from long thin minerals to slate
Show how the 'crystals' can readily become separated along the lines of weakness = cleavage in slate		Bridging = from separation planes to cleavage
Demonstrate how equidimensional minerals (i.e. not long and thin or platy) become deformed, by squeezing seven marshmallows together – representing the change from limestone to marble and sandstone to metaquartzite		Bridging = from equidimensional minerals to slate