Video question script: Rock, rattle and roll: erosion

Question/Activity	Likely response	Rationale
In teaching about the Earth we use practical activities to explore Earth processes. This example explores erosion, with the title of: 'Rock, rattle and roll: investigating the resistance of rocks to erosion'		Preparation for bridging from the model to real Earth processes
We have several specimens of four different rock types, some sandstone, limestone, granite and basalt. We also have some sandpaper, a metal file and a wide-necked plastic container with a screw-on lid. Ask how these things can be used to put these rocks in order, from the toughest to the weakest.	Fair tests can be devised as follows: • file each rock onto paper using similar pressure and a similar number of file strokes; compare the results • sandpaper each rock similarly • put the rocks into a container and shake it for a few seconds (being sure to hold the top on); pour out and compare the results (do not breathe in the rock dust) (Whether it is fairer to put a selection of rocks into the container and shake, or shake specimens of the same rock together individually can be discussed – in reality, mixed rocks are 'shaken' in storms on beaches or in rivers)	Concrete preparation = showing them the rock specimens and explaining what apparatus we have available Construction = based on the clues they have been given, they need to devise one or more fair tests to rank the rocks in order of toughness
Ask them to carry out the tests	They are likely to find that the weakest rock is the sandstone; the other rocks may be equally tough (this could be checked by weighing them before and after shaking, if there is time)	
Show them a map and cross section of an area of geology with these rock types, a straight coastline and a horizontal surface. Ask what the area might look like in 10,000 years	Most will say that the sandstone will be eroded fastest, making bays and valleys; the other rocks will form headlands and hills	Construction = applying the pattern of learning to the geology on the map Cognitive conflict = when they are unsure
Show then a second map, as the area might look in 10,000 years – confirming they were right		Bridging = to new map
Ask whether their country has headlands and bays – if so which of these is made of the toughest rocks?	Most will say headlands	Bridging = from the investigation to reality
Ask whether their country has hills /mountains/ uplands and valleys/ lowlands – if so which of these is made of the toughest rocks?	Most will say hills/ mountains/ uplands	Bridging = from the investigation to reality
Ask, if they are walking uphill, are they more likely to be walking from tough rocks to weak rocks or from weak rocks to tough rocks?	Most will say walking uphill from weak rocks to tough rocks	Bridging = from the investigation to reality
If they went to the coast and played on the sand, would they be playing on tough rocks or weak rocks? If they played in the rock pools are these tougher or weaker rock areas?	Beaches form on weaker rocks, rock pools on tougher rocks	Bridging = from the investigation to reality
Conclude by saying that from this simple activity we have explained all the ups and downs and all the		

coastal ins and outs of the Earth. But note that these things are true for maybe 80% of the time; where they are not true, then more geological reasoning is needed to give the correct explanation.		

Note: the terms ‘weak’ and ‘tough’ rocks are used in this activity instead of ‘hard’ and ‘soft’ rocks, since there is a hardness scale (Mohs’), but this applies to only minerals and not to rocks. Also some geologists describe all sedimentary rocks as ‘soft rocks’ (when many of them are actually fairly tough) and all igneous and metamorphic rocks as ‘hard rocks’ (when some are fairly weak).