Video question script: Seismic evidence and potty putty mantle

Question/Activity	Likely response	Rationale
An exploration of the evidence from seismic waves on how plate tectonics works. It uses the 'Bouncing, bending breaking' Earthlearningidea		A summary of the seismic evidence and its important for plate tectonics

Seismic evidence		
Explain: Seismic waves are shock waves …		Concrete preparation: explanation of seismic wave properties
Explain: a graph of the speeds of seismic waves shows that: • there are no S-waves between around 3000 and 5200km depth = liquid outer core • there are S-waves beneath this = solid inner core • the S-waves travel through the crust and mantle = solid • seismic waves slow down in the low velocity zone = plastic – can flow		Concrete preparation: explanation of seismic wave graph in the context of previous information
Summarise: crust/ mantle boundary – nothing to do with plate tectonics; lithosphere/ asthenosphere boundary – lithosphere = plates; asthenosphere = weak sphere which can flow allowing plate movement		

Solids that flow		
Ask: Can anyone think of a common solid that flows?	• ice	Cognitive conflict: Which solids flow?
Introduce silicone gel = 'potty putty'. Demonstrate: • elastic behaviour = bouncing • plastic behaviour = bending, stretching or plastic flow • brittle behaviour = breaking		Concrete preparation: investigation of 'potty putty' properties
Ask: What's the difference? Why is it that sometimes the material bounces, sometimes it breaks and sometimes it flows?	• the answer is 'time'; a short sharp shock causes it to break, pressure over a longer time causes bouncing, whilst pressure exerted over an even longer time causes flow	Cognitive conflict: What's the difference?
Ask: How are 'potty putty' and the mantle similar?	**Potty Putty** / **Mantle** bounces / transmits S-waves breaks / earthquakes bends / flow over time The difference is time – mantle flow is over geological time, with enormous temperatures and pressures	Bridging: applying the properties of one material to another

Skateboard summary		
Explain that a skateboard can be a simulation of the lithosphere/ asthenosphere	• trainers = crust • skateboard = rigid extreme upper mantle • wheels = asthenosphere that can flow, allowing plate movement • tarmac = more rigid mantle below	Bridging: between the skateboard and the Earth Consolidation