Video question script – Atmosphere and ocean in a tank

Question/Activity	Likely response	Rationale
When teaching about the Earth we often use practical activities to explore Earth processes. This example explores the 'Atmosphere and ocean in a tank'		Preparation for bridging from the model to real Earth processes
What is this? – and this?	A plastic tank, water, a pipe, etc	Concrete preparation = asking them to describe the apparatus
What will happen if I boil some water, put it in a small container, add some red colouring and stir, then pour the hot red water into the vertical pipe, stir and un-stir it and then remove the pipe? [then mime this] Discuss this with your neighbours and suggest several different answers. Explain your reasoning.	Red will rise and spill over the top of the tank (it has lower density than the tank water) Red will rise, spill over and then sink forming a convection current Red will stay in a column (same density as tank water) Red will gradually disperse across the tank (same density as tank water)	Concrete preparation = explaining what is to be done and miming it Construction = suggesting different ideas Metacognition = people give rationale for their answers
Do the activity	Watch red spilling across the top of the tank	
What will happen if I take some iced water and remove the ice, put it in a small container, add some blue colouring and stir, then pour the cold blue water into the vertical pipe, stir and un-stir it and then remove the pipe? Discuss this with your neighbours and suggest different answers. Explain your reasoning.	Blue will sink and flow across the bottom of the tank bouncing off the other side (lower density than tanks water), Blue will stay in a column Blue will gradually disperse across the tank	Concrete preparation = explaining what is to be done Construction = suggesting different ideas Metacognition = people give rationale for their answers
Do the activity	Watch blue flowing across the floor of the tank	
What will happen if I take a small container of milk, and pour it into the vertical pipe, stir and un-stir it and then remove the pipe? Discuss this with your neighbours and suggest different answers. Explain your reasoning.	Milk contains fat – will flow over the top of the tank Milk is more dense even than cold water, will flow over the bottom of the tank Milk is more dense than room temperature water, but not as dense as cold water – will flow across above blue layer Milk will gradually disperse across the tank	Cognitive conflict = discussion of an unknown fluid based on past experience Construction = suggesting different ideas Metacognition = people give rationale for their answers
Do the activity	Watch milk flow across the floor of the tank, bouncing off the side and returning	
Summarise	The demonstration is density driven	
Apply	Explain application to oceans (and lakes) - liquids Explain application to atmosphere – gases Explain application to solid Earth - solids	Bridging = transfer of ideas to new situations

Summarise	You thought this was a tank – but it is a model of the whole Earth.	
What thinking strategies have we used?	Concrete preparation Construction Cognitive conflict Metacognition Bridging	Metacognition = thinking through your thinking