

Video question script: Weathering: freezing and thawing

Question/Activity	Likely response	Rationale
<p>In teaching about the Earth we use practical activities to explore Earth processes. This example explores physical weathering by freezing and thawing</p>		<p>Preparation for bridging from the model to real Earth processes</p>
<p>This is the preparation needed during the week before you want to use this demonstration for the first time.</p> <p>Make up two sets of a mixed group of about six rocks in plastic trays deep enough to cover them with water, the same rocks in each set. Cover them both with water and leave one as a control. Put the other into a freezer to freeze, then take it out to thaw then repeat this several times. Pour the water from both trays away at the end.</p>		
<p>In the lesson, explain to the class what you have done and ask them to examine the trays to spot any differences</p>	<p>They will see that the tray that has been frozen and thawed several times, will have a lot of grains on the base of the tray, as well as the rocks – these grains are not found in the control tray</p>	<p>Concrete preparation= explaining what you have done beforehand</p>
<p>Ask them to look carefully at the grains and say from which rock have they mostly come?</p>	<p>They will see that it is the porous sandstone which has mostly broken down. If they don't spot this, point it out</p>	
<p>Ask why the porous sandstone breaks down faster than the other rocks</p>	<p>Water gets into the pore spaces, freezes and expands by 9%. When it thaws it trickles more deeply; this is repeated until grains are prised away from the rock and fall off (the prising apart is weathering, the removal of the grains by falling off is erosion under gravity)</p>	<p>Construction = they need to construct a pattern from their observations</p>
<p>Ask, where on Earth this might be happening on a large scale</p>	<p>The answer is:</p> <ul style="list-style-type: none"> • not polar ice caps, which are permanently frozen • not deserts, where there is not enough water • but anywhere that freezes and thaws frequently, e.g. mountain tops in many parts of the world, but also garden walls in areas that freeze in the winter 	<p>Cognitive conflict = considering the different options Bridging = from the activity to reality</p>
<p>Ask why mountain summits often have slopes of angular pieces of broken rocks (scree slopes or talus cones) beneath them</p>	<p>The rocks were weakened by freeze-thaw weathering until they broke off and fell, being eroded by gravity. There is no opportunity for the corners of the rocks to be removed during transportation, so they are angular with sharp edges.</p>	<p>Bridging = from the practical activity to reality</p>