

5. Coastal processes – cliffs

Aim

This activity introduces the processes involved in cliff development, including different forms of erosion.

Materials

- Resource sheet: Geological formations of Port Campbell National Park.
- Workbook, drawing pencils and pens.

Activities

1. Draw up a table with headings as shown below.
2. Referring to the resource sheet: Geological formations of Port Campbell National Park, complete the table with brief notes.

Feature	How this was formed	What will happen next
Twelve Apostles		
Loch Ard		
Thunder Cave		
The Blow Hole		
The Arch		
London Bridge		

5. Coastal formations of Port Campbell National Park

The Twelve Apostles

These are the most famous rock formations in the park. These isolated rock features just offshore from the coastline are known as **stacks**. The tallest rock stack is approximately 65 metres high. All these rock stacks were once part of mainland Australia - constant erosion by rain and wave action over millions of years have separated them from the landmass.

There are 16 main rock stacks in this part of the park, nine of which are clearly visible from both the viewing platform and the boardwalk.

London Bridge

London Bridge was initially a narrow headland that was a little more resistant to wave erosion than the same rock immediately either side of the headland. Once the headland formed, concentrated wave action on the easily eroded lower layers behind the headland caused the formation of two magnificent looking arches.

Arches such as these are constantly being enlarged by erosion and between 1977 and 1984 some sections of the London Bridge's landward arch collapsed into the sea. Dramatically, on a summer's day in 1990 this arch completely collapsed when the weight of the limestone became too great for the arch to support. The sudden collapse of the arch left two very surprised people stranded on the isolated rock stack!

Today, London Bridge looks like the Island Arch found east of Loch Ard Gorge. In time the remaining arch will collapse forming two isolated rock stacks (like the other Twelve Apostles).

Loch Ard Gorge

This area is a series of narrow **gorges, stacks and arches**. The area developed because deep vertical cracks (known as **joints**) extending down through the limestone allowed easy access for wave action to carve out lower level caves that extended some distance inland. Rainwater seeping down the joints (rainwater acts like a weak acid dissolving the limestone) probably helped form the gorge by weakening the limestone along the joints and causing the collapse of the underground caves.

Thunder Caves

The name comes from the sound of waves crashing into the cave. The rougher the seas, the louder the roar as waves crash into the cavern. The cave started as a crack or joint that extended down through the limestone rocks. Assisted by rainwater widening the crack, the sea eroded large blocks at sea level allowing the poorly supported upper layers to collapse and be removed by the action of the waves. This is also how the cave is continuously being enlarged.

As you move down the steps to the cave the layers of limestone have very distinctive colours and features. The layers of limestone that appear to be similar are grouped into what is known to geologists as the **Port Campbell Limestone** and the **Gellibrand Marl** (marl is a conglomerate of marine material). There is a recognisable difference between these two groups and this is seen in places by the different ways and rates at which they weather and erode in the coastal cliffs.