



## 2.29 Coastal landforms created by erosion.

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THEME 2-TOPIC 29

# Learning objectives:

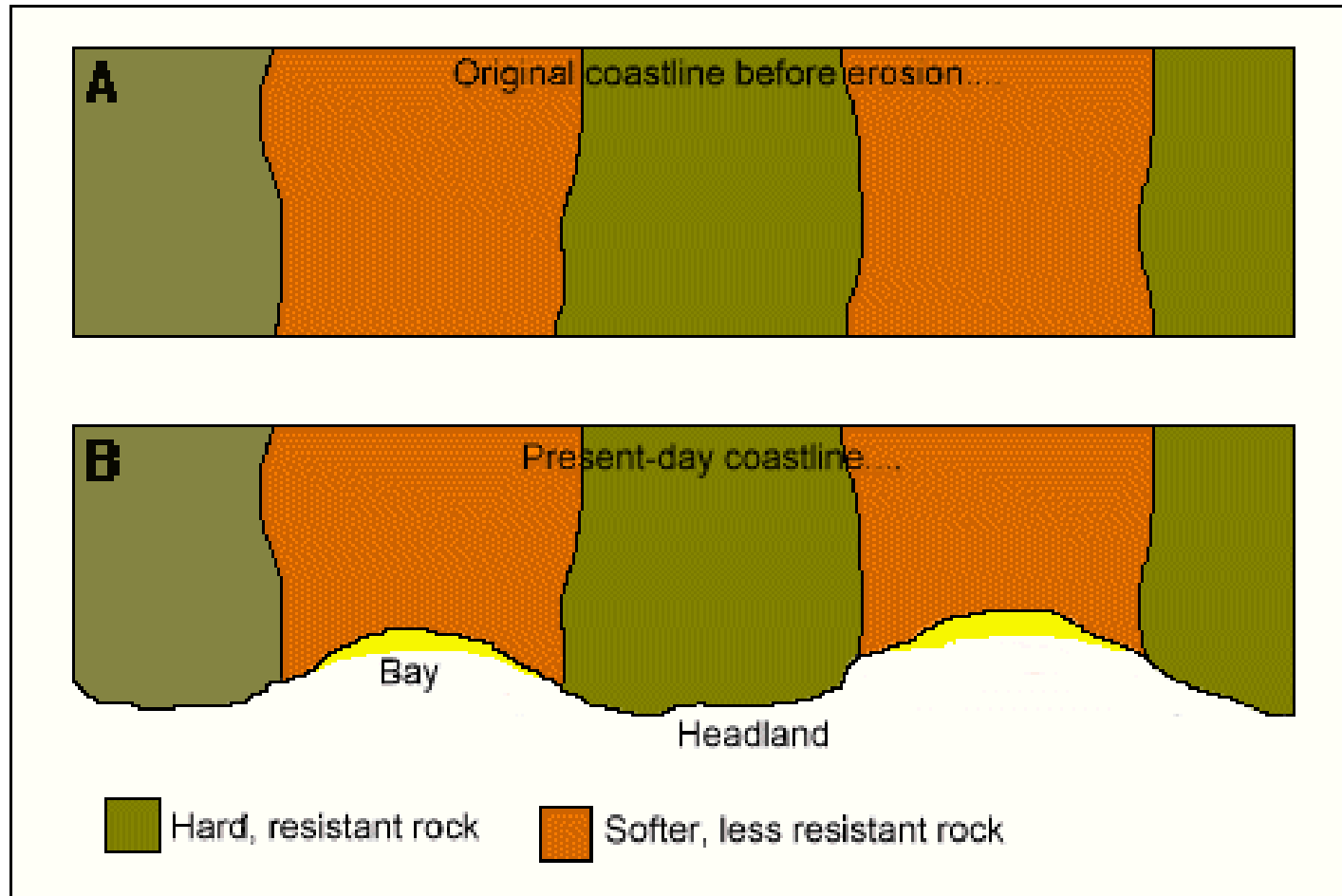
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1. Erosional features
2. The Twelve Apostles
3. Task 1

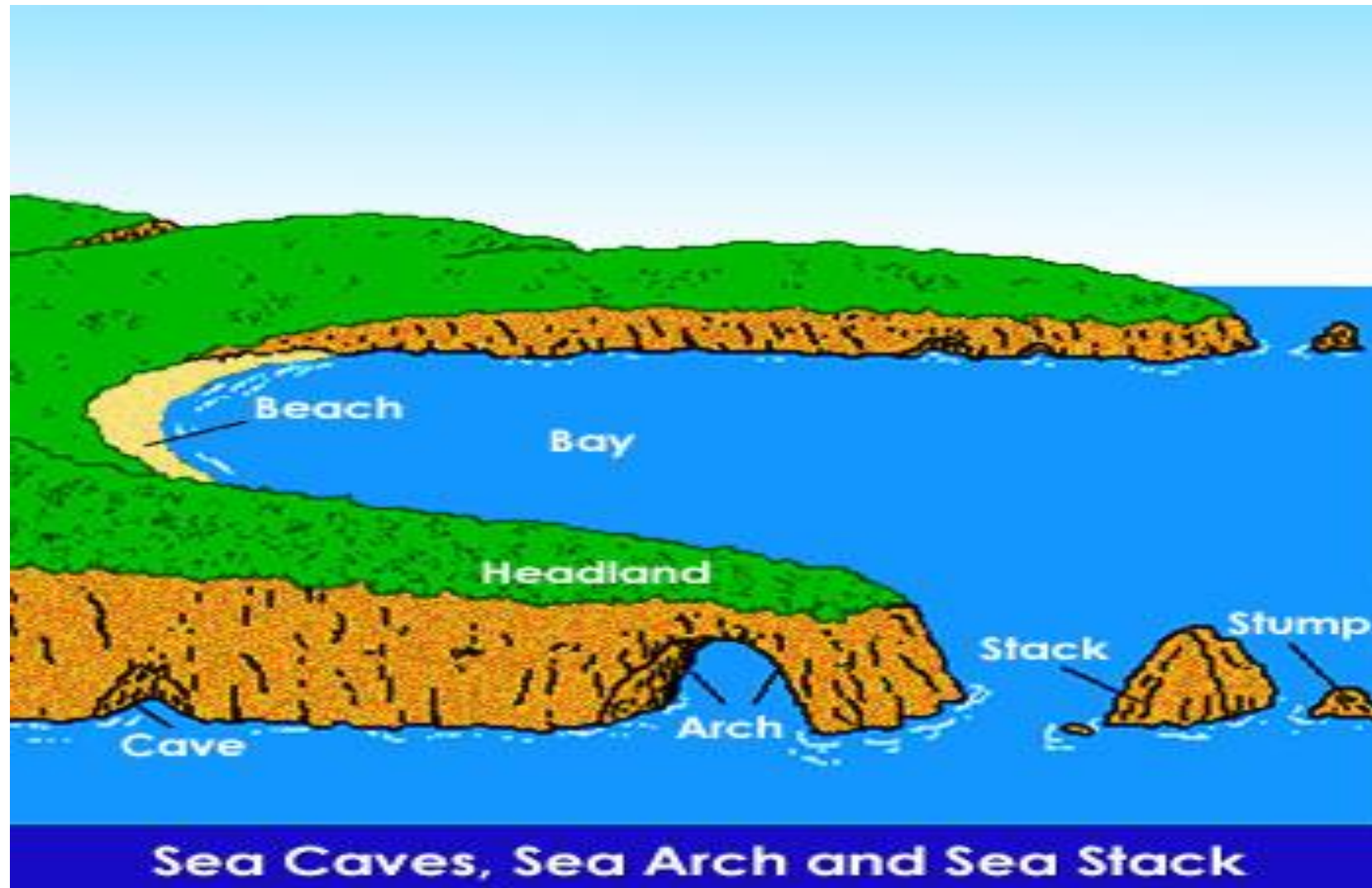
## Erosional features

Look again at **Source A** on Page 92. The area where soft rock reached the coast has been eroded to form a **bay**. More resistant rocks on either side form **headlands**. On the headlands waves erode the rock face, forming cliffs. Along lines of weakness between the high and low water marks, a notch may be created along with an overhang above the notch. Eventually the overhang collapses as the notch is cut deeper into the rock. As the cliff is eroded backwards, it leaves behind a wave-cut platform at the low water mark. A line of weakness, such as a fault or joint, is increased in size until it becomes a cave and the waves continue to erode the back of the cave until a natural arch is formed. When the arch roof falls into the sea, it leaves behind a stack and after more erosion this is reduced in size to form a stump.

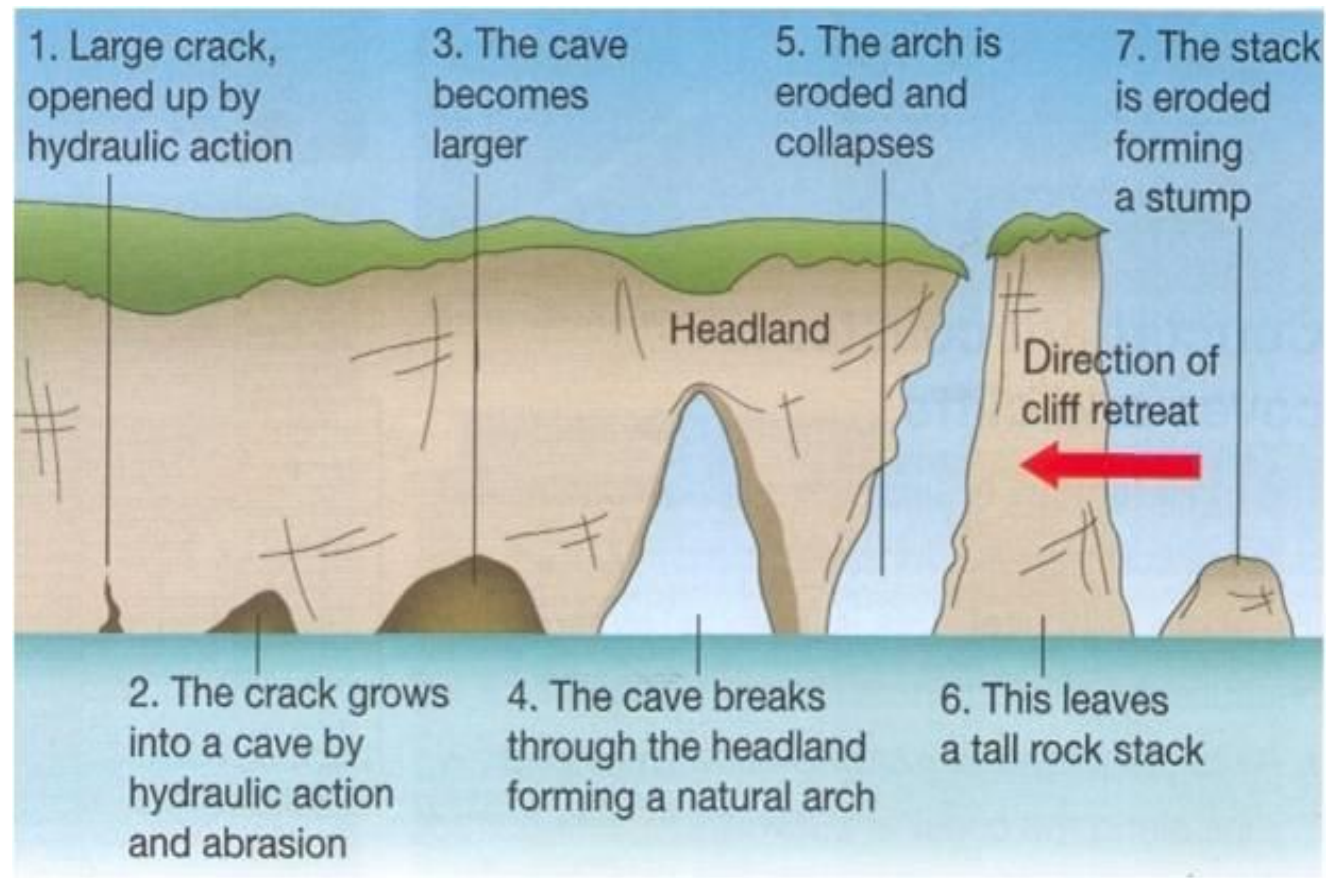
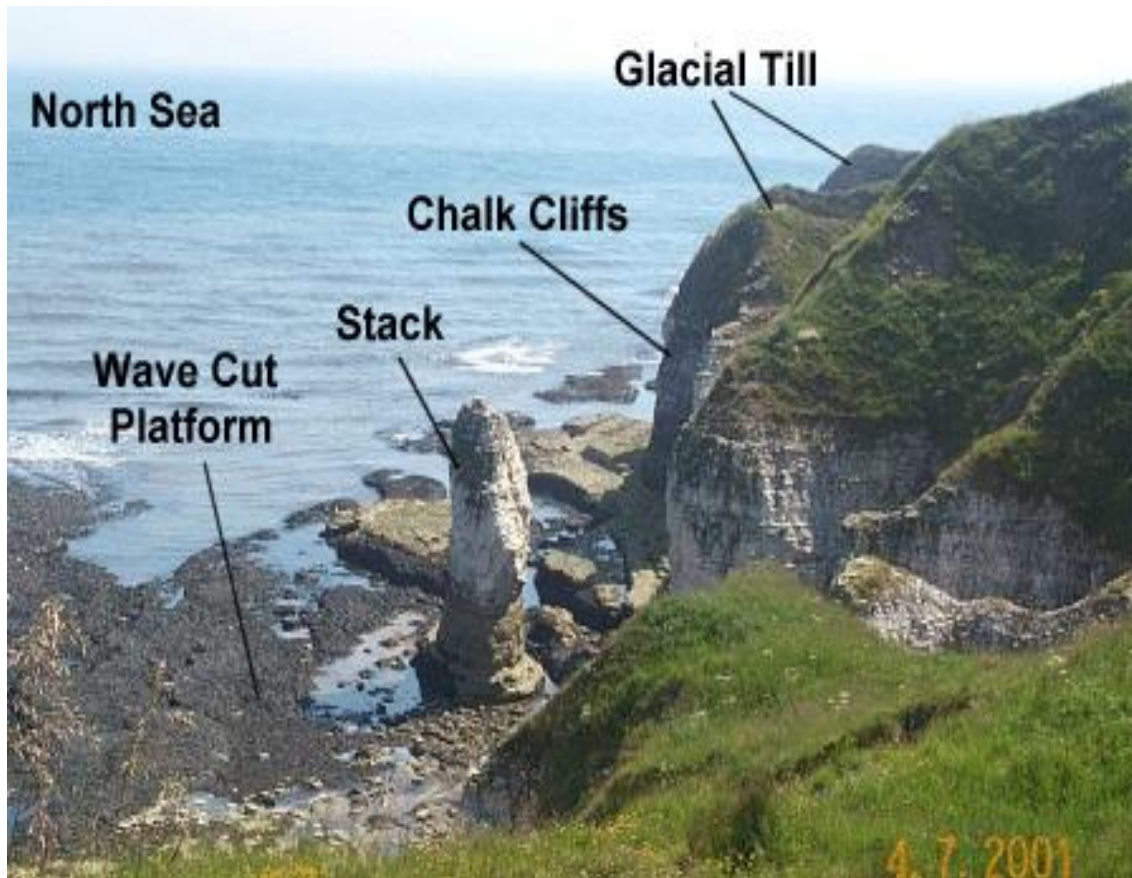
# 1. Erosional features



# Features of headlands



# Landforms formed by erosion.





## 2. The Twelve Apostles.

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## The Twelve Apostles

The Twelve Apostles are famous coastal landforms in the Port Campbell National Park, Victoria, Australia, which have been carved by the sea from the limestone cliffs. Originally the rock layers formed as horizontal beds of sediment on the sea floor over 10 million years ago to become **sedimentary rock**. Along this stretch of coast, the cliff base is constantly being eroded by the waves. Steep cliffs which reach 70 metres high, wave-cut platforms, notches, natural arches and stacks are formed.

The Twelve Apostles is a collection of stacks, the tallest reaching 45 metres high, although now there are only seven left. The rate of erosion at the base of the limestone pillars is

approximately 2 cm per year and a number have fallen over as waves continue to erode their bases. The Twelve Apostles were formed as a result of different rates of erosion along the coast due to the alternate bands of hard and soft rocks. Headlands formed where the rocks were most resistant. At the bases of the cliffs on these headlands, waves eroded along lines of weakness (e.g. joints, faults and bedding planes). Back-to-back caves first formed on each side of the headlands. Continuous erosion caused these caves to extend backward until the caves met and natural arches were formed, linking the tip of the headland with the mainland. When the arches collapsed, the pillars were left standing and became stacks.

D The location of the Twelve Apostles



E The Twelve Apostles



# Task 1

There are many other famous arches and stacks. Here are some examples.

Stacks:	Natural arches:
Goat Rock, USA Old Harry Rocks, England The Needles, England Old Man of Hoy, Scotland Hopewell Rocks, Canada Po Pin Chau, Hong Kong Needle of Arsène Lupin, France Lange Anna, Germany	Percé Rock, Canada Holei Arch, Hawaii Durdle Door, England Porte d'Amante, France Great Pollet Arch, Ireland

Carry out research in groups and prepare a presentation, perhaps using PowerPoint. In your presentation you need to choose **one** stack and **one** natural arch from the list, or an example from your own country.

- Describe the precise location of your chosen stack and natural arch and show them on a map.
- Find photographs to show your chosen stack and arch and describe their main features (e.g. shape, size, rock type).
- Explain clearly how each of the features was formed.