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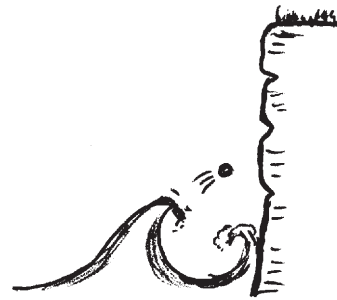
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Erosion means the wearing away of rocks. The sea is a very good agent of this, and is able to do so through a number of **processes**, outlined below:

Abrasion

Waves throw pebbles and rocks against the cliffs, causing them and the cliff to be worn away. In particular this takes place during stormy weather, when the waves are capable of hurling rocks weighing several tonnes.



Attrition

Rocks and pebbles collide into each other, becoming smaller and rounder. Eventually the particles form sand.



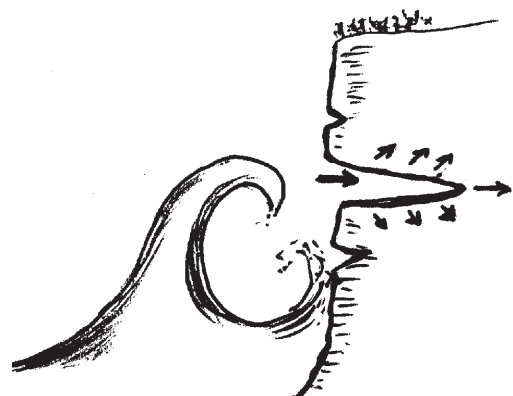
Corrosion

Salt and chemicals in the sea water dissolve some rocks such as limestone and chalk.



Hydraulic Action

As the waves crash against the cliffs, air is trapped in cracks and compressed. Air is forced further into crevasses. As it is released by the retreating wave it draws out loose stones.



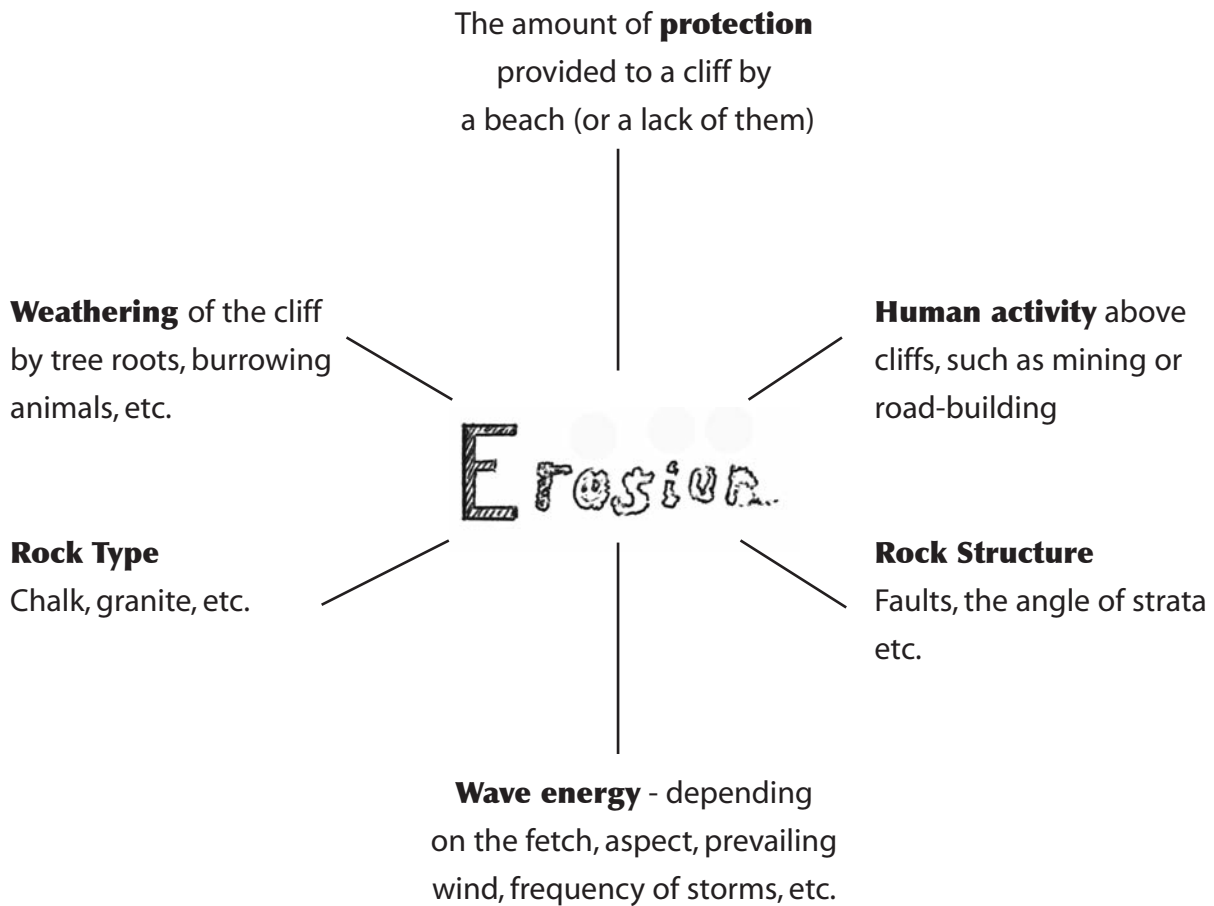
Transportation

The eroded material may be moved along the coast as the result of the action of waves, such as **longshore drift** (See Chapter 3).

Rates of Coastal Erosion

The speed at which the coast may be eroded depends on a number of factors, as shown in the diagram below:

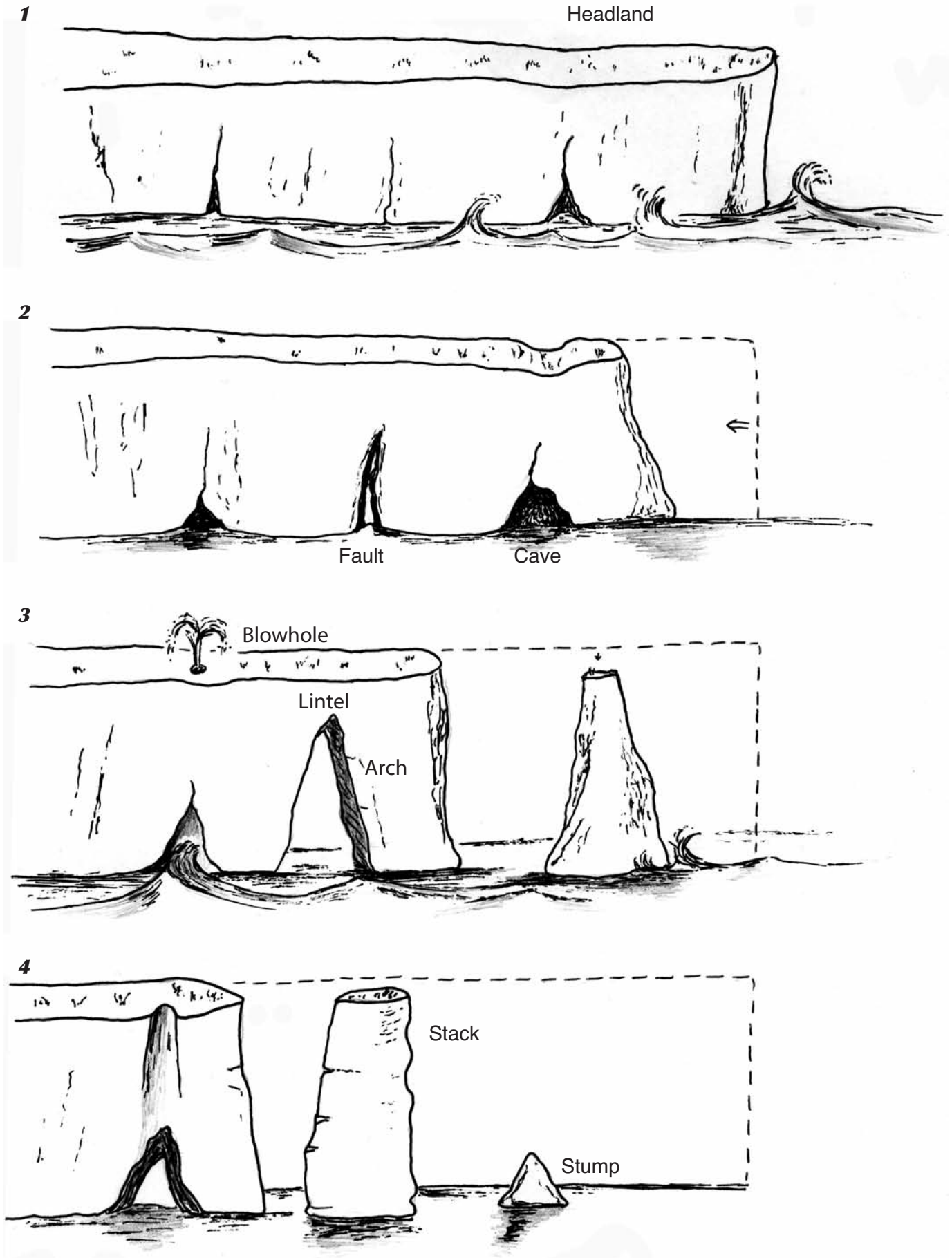
Figure 1



Features Created By Coastal Erosion

Headlands, Caves, Arches and Stacks

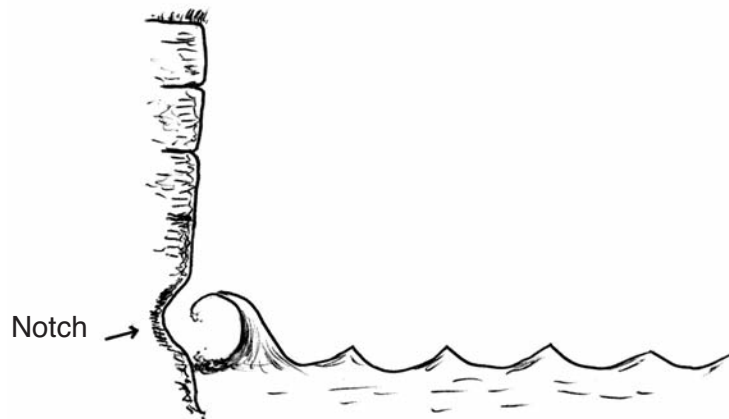
Figure 2



Notches

These are often formed at the foot of cliffs, for the greatest amount of erosion occurs a little further up the cliff from the high water mark. This is revealed by a curved indentation in the cliff known as a **notch**.

Figure 3



Wave-cut Platforms

Over time the cliff may recede (be cut back): rock collapses above the notch and faults are widened and weakened, particularly during storms. This may leave a feature called a **wave-cut platform**. Here we may find rock pools left exposed at low tide in what is referred to as the **inter-tidal zone**. The wave-cut platform may grow so large that the waves rarely reach the cliff any more, so it becomes a **dead cliff**.

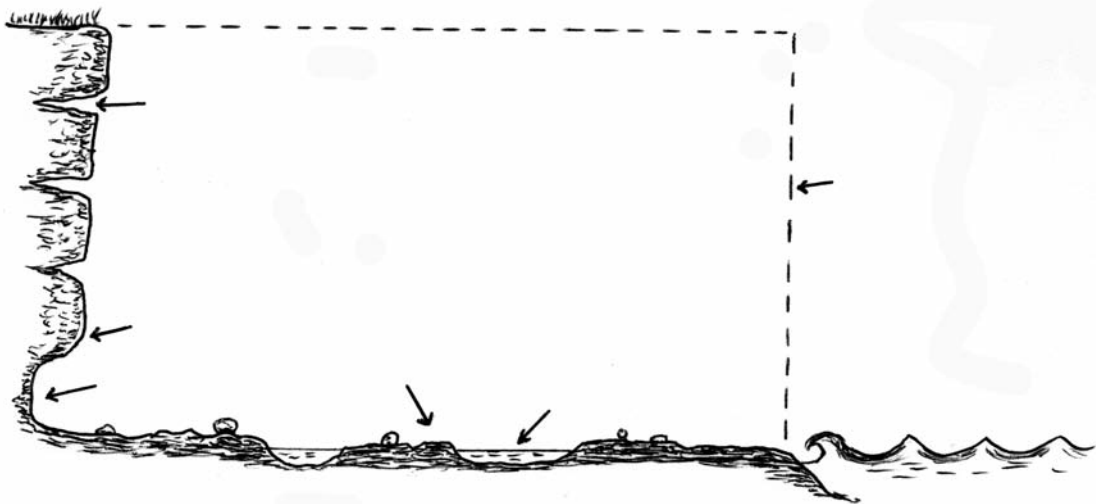
Rock pools provide a safe haven for a wide variety of marine organisms. There is often abundant food and the numerous cracks and crevices are good hiding places from predators. However, during storms, powerful waves may dislodge plants and animals. Some have adjusted to the conditions, such as barnacles cemented to the rocks yet able to spend several days out of water, while snails and mussels have hard shells for protection. The creatures that inhabit the rock pools also have had to adapt in other ways: on hot summer days the water temperature rises dramatically, and as water evaporates, the salt concentration increases; during heavy rains the salt water may be diluted so that it is almost fresh.



Figure 4 - Wave-cut Platform

1. Label the diagram with:

Notch: Wave-cut platform: Faults widened by erosion: Overhanging rock: Rock pool:
Original coastline

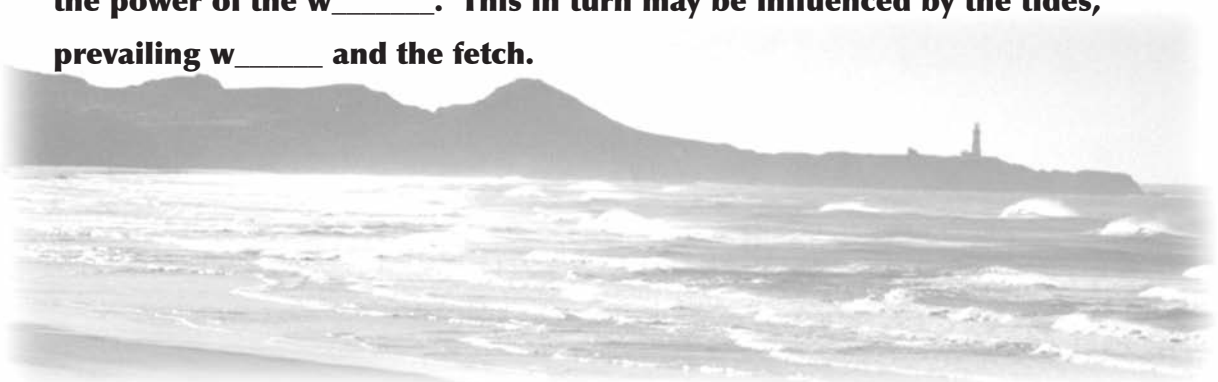


2. Using Figure 2 to help you, copy the following, filling in the blanks:

An area of hard rock may be eroded less quickly than the softer rock around it, leaving a **h**_____. However, this may still have fissures, faults or weaknesses that will be eroded to form **c**_____. On rare occasions a natural tunnel may be created, forming a **b**_____ that allows an incoming wave to shoot up in a fountain of water.

Over time the sea may break through the back of the cave, forming an **a**_____. When this natural bridge or lintel collapses a column of rock called a **s**_____ will be left. A small stack is known as a **s**_____.

The rate of erosion will depend on the **t**_____ of rock that forms the cliff, and the power of the **w**_____. This in turn may be influenced by the tides, prevailing **w**_____ and the fetch.



Case Study - Beachy Head

Cape Wrath on the north coast of Scotland has the highest sea cliffs in mainland Britain. Beachy Head on the south coast near Eastbourne, Sussex, boasts the highest **chalk** cliffs in the United Kingdom. However, because chalk is soft and easily eroded, the famous cliffs are losing up to a metre to the sea each year.

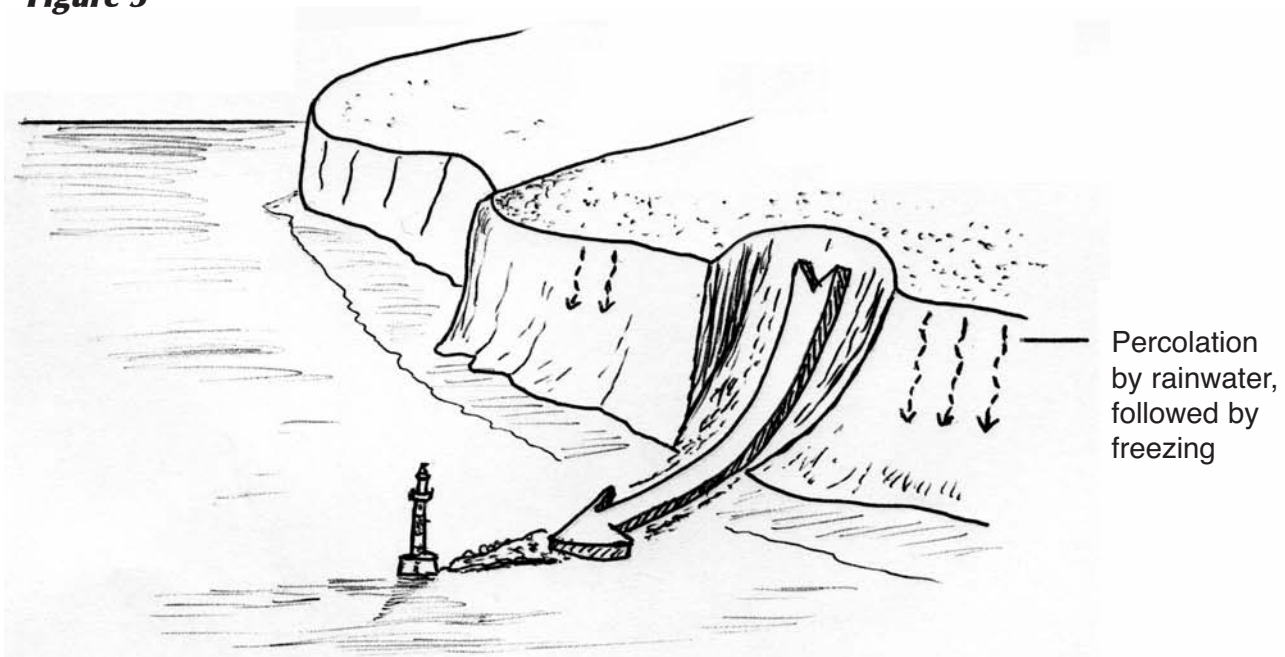
In January 1999 a large section of the cliff face fell 150 metres into the sea. It was described as being Britain's biggest single loss of coastline in living memory.

Previously the unmanned Beachy Head lighthouse had stood on an island beneath the cliffs, but when thousands of tonnes of rock slipped it created a causeway of rubble stretching out to the base of the tower. Few people could remember a single fall anywhere approaching this; a fifteen metre deep slab of rock had slipped across a 180 metre stretch of coast.

The reason for the fall was believed to have been above average rainfall causing water to penetrate the rock. Then in the cold weather the water froze and expanded, forcing the cliff to break up.

There are indications that such falls could become more frequent as a result of climate change. In times of drought the chalk dries out, then during periods of heavy rain the cliffs become water-logged. This puts buildings, such as houses or the nearby old Belle Tout lighthouse, at risk. Rising sea levels will also increase the rate of erosion at the base of the cliffs.

Figure 5





3. **Where are the highest sea cliffs in mainland Britain?**
4. **Which is the nearest town to Beachy Head?**
5. **The cliffs meet the _____ Channel and face _____.**
(North, south east or west?)
6. **What important man-made feature stands at the base of the cliffs?**
7. **Which of the following words best describe the cliffs at Beachy Head?**
Hard: granite: limestone: porous: chalk: soft: low: impervious: tall.
(You may find the glossary at the back of the book helpful).
8. **What indications are there that large landslides such as the one described in the Case Study may become more frequent?**
9. **In what ways are landslides on cliffs a danger?**
10. **Do such landslides matter, or should we just accept them as examples of geographical change? Write down your ideas, then discuss them as a class or in small groups.**

