

MAKING SHINGLE

1. HOW DO WAVES EXTRACT FLINT FROM THE CHALK TO FORM SHINGLE BEACHES?

Did you know?

There are actually two sets of processes that break rocks down:

Weathering:

This is the breakdown of rocks due to the effect of the weather. Sun, rain and frost all break up the landscape surface and wear it away. On cliffs, physical weathering by frost, heat and other processes can widen cracks in the rock and encourage cliff falls. Chemical weathering caused by water altering the chemical composition of the rock can also cause breakdown. In addition, algae and lichens growing on the cliffs may weaken the rock by biological weathering.

Erosion:

This is mainly due to the effects of rivers, the sea, glaciers and wind. They each involve movement, and wear away the rocks of the Earth's surface.

EROSION BY THE SEA

The waves and tides that make the coast so dynamic, exciting (and sometimes extremely dangerous) are the main forces that erode the cliff face and extract flints from the Chalk.

WAVE POUNDING

Storm waves can reach heights of over 30 metres and hit sea cliffs with a force of over 30 tonnes per square metre, again and again, over many hours or even days. Such relentless pounding eventually undermines the cliffs, causing large masses of rock to fall into the sea. On the Chalk coasts of England and France many flints and chalk blocks are released onto the beaches when the cliffs fall.

HYDRAULIC ACTION

While pounding the cliffs, waves also trap air against the rock faces, compressing it, and forcing it in a series of shock waves deep into the joints and pore spaces. This helps to prise the rock apart, and the weakened rock falls into the sea.

ABRASION

On the Chalk coasts, fallen flints and chalk blocks are themselves picked up by the waves, and hurled back against the cliffs to detach more flints and chalk blocks. This process is rather like sand-blasting, but on a much larger scale.

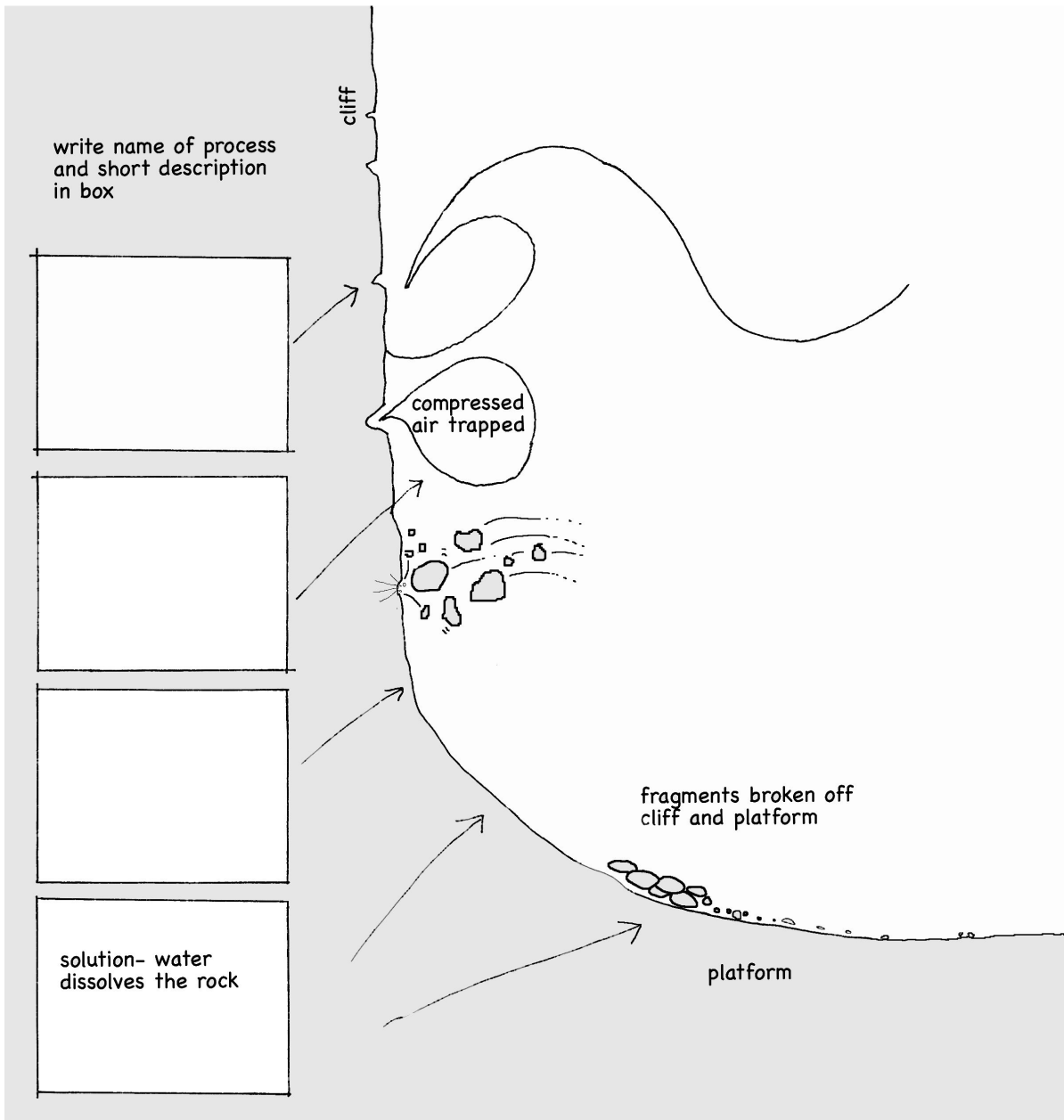


SOLUTION

The water dissolving the Chalk away loosens the flints, so that they are more easily eroded from the cliff.

a) Using all this information, fill in the boxes on the diagram below to show how the flints are removed from Chalk sea cliffs.

DIAGRAM TO SHOW PROCESSES THAT EXTRACT FLINTS FROM THE CLIFFS TO FORM BEACHES



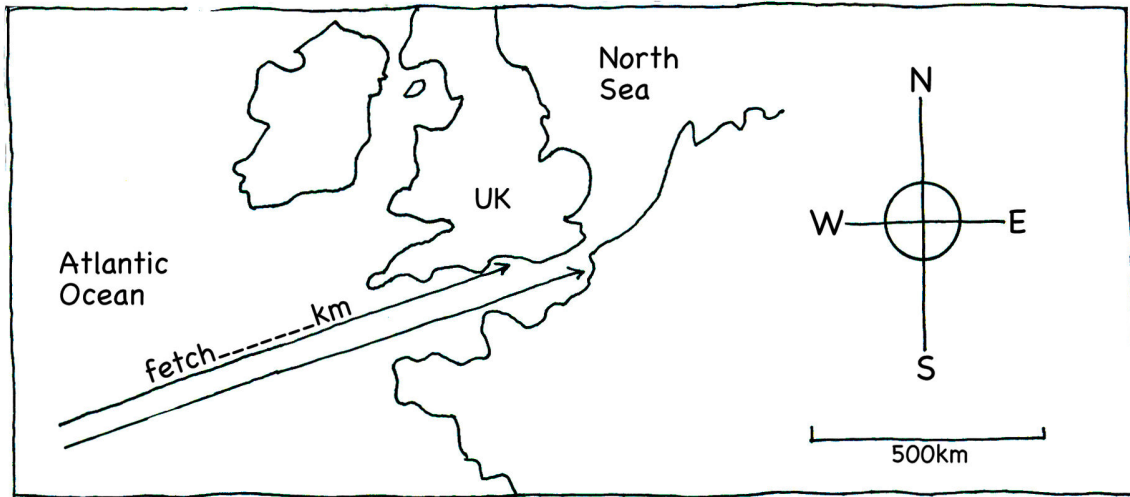
2. WHERE DO WAVES GET THEIR ENERGY?

Waves are caused by the frictional effect of the wind blowing over the surface of the water. The length of water that the wind blows over to form the waves is known as the FETCH. The longer the fetch, the greater the potential energy of the waves.

In the English Channel the winds are predominantly from the south-west and the fetch could in theory extend all the way from the Gulf of Mexico. Cliffs facing south-west are subject to greatest attack.

a) Use your atlas to work out the distance from the Gulf of Mexico and insert it on the diagram.

DIAGRAM TO SHOW THE LENGTH OF FETCH AFFECTING WAVES THAT HIT THE CHANNEL COAST



What other factors affect the height of waves?

b) _____

c) _____

d) At what season of the year are major storms most likely?



e) Fill in the following table to show the differences between calm and stormy seas:

| | Calm sea | Stormy sea |
|--------------------------|-----------------|-------------------|
| Length of fetch | | |
| Strength of wind | | |
| Duration of wind | | |
| Height of waves | | |
| Force of waves | | |
| Amount of erosion | | |

