

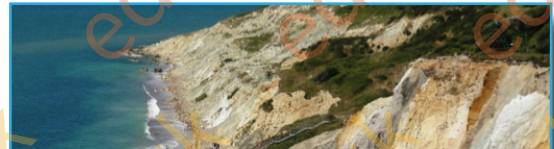


## All about Alum!

Alum Bay and The Needles are, arguably, the most visited part of the Isle of Wight. The multi-coloured sand cliffs of the bay and the three chalk pillars of the needles are amongst the most photographed landmarks in the UK. But, how were these magnificent features created?

You are going to learn about the physical processes that created the landforms that you can see.

For starters... Using as much geographical terminology as you can, label all that you can see (or can't see but know is happening/has happened!) in the images below...



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### A bit of history...

A long, long time ago, (about 70 million years!) the sea level was much higher than it is today, and warm shallow seas covered the Isle of Wight. These seas were home to sharks and rays, and over 500 different types of shellfish lived in them. The Isle of Wight is made of **sedimentary** rocks, which were formed at this time under the sea. The remains of animals (e.g. bones and shells), and eroded sediments carried to the sea by rivers, accumulated on the sea bed. This debris built up in layers, and over millions of years these were compacted so tightly under pressure from above, that rocks were formed. At Alum Bay you can see several different types of sedimentary rock: the multi-coloured **sandstones** of the Bay (the colours are due to varying mineral composition), a narrow band of brown **London Clay**, and the steep white **chalk** cliffs extending out to The Needles.

Label these rock types on the image below:





So the layers of these rocks were laid down over a very long time, one on top of the other...

*But... hang on a minute...*

Look closely at the cliff and images – what do you notice about the layers? And why are the rocks side by side, rather than on top of one another?

The layers are vertical (up, down) rather than horizontal (left-right)... Why is this?

The Earth's crust (the top 'layer' of the earth's structure) is divided into tectonic plates. These plates move on powerful

**convection currents** in the **mantle** (the layer under the crust!). Between 65 and

2.5 million years ago, the African and Indian plates from the south, collided with the European plate from the north.

This collision was responsible for the formation of the Alps, Pyrenees and Carpathian Mountains in Europe.

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Although the UK is over 1000km from the collision zone, the immense forces caused the rocks to be pushed and folded upwards and this is most visible on the south coast of Dorset, e.g. at Lulworth (pictured), and at Alum Bay of the Isle of Wight.

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### Summary

Match the sentence starters on the left with their correct ending on the right to summarise what you have learned:

- |  |  |
|--|--|
| 1. The multi-coloured rocks at Alum Bay are... | A. Vertical rather than horizontal                       |
| 2. They were formed...                         | B. Varying mineral composition in the rock               |
| 3. The colours are caused by...                | C. Under warm shallow seas, millions of years ago        |
| 4. You can also see...                         | D. Sedimentary rocks                                     |
| 5. The layers of rock here are...              | E. Folding caused by the Alpine Orogeny in Europe        |
| 6. This is due to...                           | F. Other sedimentary rocks such as London Clay and Chalk |

1	2	3	4	5	6

### Do you know your Needles?

Any good geographer will know the classic sequence in the development of stacks... Do you?

If not, well, you'd better listen while your teacher reveals all!

Then, in the space beside the image of The Needles below, write your 'step-by-step' guide to stacks...



Step-by-step guide to stacks...

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### Lot's Wife Lost!

The Needles are believed to be named after a Needle that is, in fact, no longer there.

Like the gap in a row of teeth, you can clearly see where it would once have stood in the image below. This slim, sharp rock, known as 'Lot's Wife', was the tallest of the four (120ft).

A great storm here in 1764 is said to have caused the collapse of this stack and it is said to have been felt in Portsmouth. Even though the three remaining pillars are nowhere near as needle-like as Lot's Wife was, the name has remained.

Marine processes of erosion (*can you name any?*) continually wear away the base of the cliff and stacks, and other weathering processes (*can you name any?*) attack their exposed chalk faces.

### Time travel...

If you were able to return in another, say, 500 years, what might this headland look like? Draw a sketch in the box below the picture and explain (using geographical language) why you think it might look like this in the future:

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