

ERUPTION IN A FISH TANK

Rising Eruptive Plumes

When there is an explosive volcanic eruption a large amount of material is thrown up into the air in an eruptive plume or column, made up of tiny rock fragments and very hot gases. The material is initially thrown upwards by the force of the explosion, but it keeps rising and stays airbourne for a long time... so what stops it falling down?

In this experiment you can create your own eruptive column in a fishtank and find out what it is that makes it rise...

What you'll need:

- A large clear container that can hold minimum 20cm deep water (a fish tank works best)
- A small empty glass bottle (food coloring bottles are perfect)
- A drop of red food colouring
- A kettle

Instructions

Fill your large container to the top with cold water. Ask an adult to put a drop of red food coloring into the small glass bottle (not too much or it won't work), and top it up with water from a just boiled kettle (right to the top). Then instruct your adult to place the small bottle at the bottom of the tank of cold water in the middle. Stand back and watch what happens...



What's happening?

The red water in the bottle should rise upwards forming an eruptive plume column. This happens because the red water is much hotter and therefore less dense than the water in the tank. Because it is less dense it rises up towards the top of the tank, a process known as convective upwelling. This is exactly what happens in a volcanic eruptive column. Initially, all the material is thrown upwards by the force of the explosive eruption, but after this it continues to rise, instead of falling straight back down. This is because the hot gases are less dense than the surrounding air and so rise up, taking tiny fragments of rock with them.



If you leave the experiment for long enough, you may see the red eruptive column start to sink back towards the bottom of the tank as it cools down and becomes more dense. When this happens in the eruptive column, the hot gases drop all the tiny rock fragments they are carrying, forming volcanic ash fall.

KEY POINTS

- Eruptive columns are made from material thrown in the air by an explosive eruption.
- The reason they continue to rise is because the hot gases are less dense than the surrounding air.

INFO FOR INTERESTED ADULTS

How is ash formed?



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