

## Plate tectonics & the distribution of fold mountains| sample answer

**Q: 'Explain how the study of plate tectonics has helped us to understand the global distribution of Fold Mountains.' (2010 Q2 C.)**

The earth is covered in a thin, solid crust. The lithosphere is broken into 16 major slabs called plates. Plates are being constantly moved around by convection currents in the mantle.

As the plates move around the earth, landforms such as volcanos, rift valleys and fold mountains form at the plate margins and fault lines.

Convergent, transverse and divergent plate boundaries exist where plates move towards each other, slide past or move away from each other. This movement of plates is called plate tectonics.

Oceanic plates are thinner, only 6-12 km thick, made with dense, heavy rock like basalt. Made of silicon and magnesium rich rock as a result they are more dense than continental plates.

Continental plates are 40-60km thick, made with lighter rocks such as granite. Silicon and aluminium rich rocks make up these plates.

Because continental plates are lighter, when a continental plate and an oceanic plate collide. The oceanic subducts., Creating a trench. Trenches mark subduction zones and volcanic fold mountains such as Mount St. Helens was created like this as the continental plate crumples.

When 2 continental plates collide neither subducts because they are the same consistencies. As they release compressional pressure the rock buckles and is uplifted and is folded.

Synclines and anticlines of a fold mountain mark the faults and the crushing of rock as they collide. This mountain building is called orogeny.

Mountain ranges such as the Himalayas mark convergent continental plate boundaries. The Himalayas mark the compression of the Indian and Eurasian plate 50 million years ago,

There are three major mountain building periods that affected Ireland and Europe. The Armorican, the Caledonian and the Alpine.

The Wicklow mountains were formed 450 million years ago during the Caledonian period. As plates collide magma is forced into upfolds in the crust and cools to form granite (Batholith).

The heat of the magma causes surface rocks to be metamorphosed called a metamorphic aureole. This is seen in the Wicklow mountains as there is still quartz and schist preserved in the synclines.

The next period in Ireland was the Armorican period. 250 million years ago there was plate pressure coming from the south of the country. As a result the Munster mountains have an East-West trend.

Mountains such as the Macgillycuddy Reeks and the Blackwater Valley are examples. Sandstone was uplifted and was covered in limestone which was later eroded.

The youngest fold mountains we see today are the Alpine period, the Alps and the Pyrenees in France and Spain were formed only 60 million years ago.

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The Alps have not yet been eroded down and so their intrusive granite is not yet exposed. The Wicklow mountains were once this tall but denudation wore them down.

The folding process can also be seen in the Pacific Ring (Andes and Rockies) and the Himalayas (India pushing into Asia). The Himalayan mountains are still growing as the plates are still colliding.

Fold mountains can also trigger earthquakes eg Pakistan 2005 and 89,000 died, Megathrust earthquake occurred at oceanic to continental zones.