

## Formation of metamorphic rocks in Ireland | sample answer

**Q. 'Explain the formation of metamorphic rocks, with reference to examples from Ireland' (2013 Q1 B.)**

Metamorphic rocks are formed when igneous or sedimentary rocks change due to the fact they have been put under great heat or pressure or both.

The first type of metamorphism is Thermal metamorphism, this is when rocks are changed as a result of great heat, a common place to see this is around volcanic eruptions.

The Sugar Loaf mountain found in Wicklow, Ireland is comprised of the metamorphic rock called quartzite, quartzite was formed by Thermal Metamorphism.

Quartzite was originally sandstone. Hot molten magma from the magma heated the sandstone and this when cause its physical and chemical properties to change, causing it to become what we see today; quartzite.

Regional metamorphism occurs when heat and pressure occur over a large area. This occurs because of plate tectonics at convergent plate margins.

If two plates collide (converge) they hit into one another, as a result some of the plate is destroyed and lost. This is called a destructive plate boundary.

An oceanic plate will sink under a continental plate when at destructive plate boundary, this is because the oceanic plate is more dense. eg Pacific plate and the the South American plate. This sinking causes rocks to be under great heat and pressure.

Because the oceanic plate sinks when it collides it slides down into the hot molten rock and is destroyed and recycled. This is called subduction. The subducted rocks are now under the pressure of the other plate and this causes metamorphism.

This process can cause hot, melting rock to protrude through to the surface and cause a rocks to go through the metamorphic processes.

The majority of Ireland was formed about 450m years ago at the Caledonian fold mountain building period, as the American and European plates collided, it cause the plates to buckle and uplift.

When the plates buckle cracks and fault lines appear through the crust, when magma forces its way up through the cracks, the surrounding rocks are exposed to extreme heat and can form a metamorphic aureole around the magma that has extruded into the crust.

Mud stone in wicklow change to schist due to these processes, also in Ireland we can find a metamorphic rock called gneiss that was formed from granite after been under heat and pressure, these metamorphic rocks around the Leinster area, were formed but the metamorphic aureole around the Leinster Batholith.

Different metamorphism processes and different minerals involved can cause alterations in the process, for example limestone is grey but in connemara we can find green marble and in cork it is red (marble is limestone that has undergone metamorphism.)