

## Formation of limestone pavement in Karst region| sample answer

**Q: 'With the aid of diagram(s), explain how chemical weathering has shaped the limestone pavement in a karst region' (2012 Q3 B.)**

There are 3 types of rock groups these are categorized as to how they were formed. Metamorphic, igneous and sedimentary.

Sedimentary rocks are composed of compressed sediment. Sedimentary can be sub categorized into inorganic and organic. Organic is if the sediments that make up the rock were living matter like plants or animals.

Inorganic is if the sediments were broken down rock cemented together (lithification) eg. Conglomerate. Because of the layers on top of the rock, lithification happens when sediments are put under a lot of weight. As more weight is added the air and water pockets between each sediment are squeezed out and is stuck together with a calcium or silica sticking agent.

Limestone is formed when lithification occurs with dead marine organisms on the sea bed.

In Ireland, limestone was formed in the carboniferous period. Because of the way limestone is formed (in layers) there are strata and bedding and because of plate tectonics there are joints..

Limestone is made of calcium and as result erodes easily to weak acids found in rain. Because of Carbonation process. This is a type of chemical weathering by rainwater. As rain passes through clouds it gathers CO<sub>2</sub> and becomes slightly acidic, and this erodes the calcium rich limestone and can cause the formation of a Karst Landscape.

Karst landscape usually develops on carboniferous limestone that has either been uplifted by tectonics activity or exposed by denudation.

Karst landscapes are most prevalent in regions with tropical or moist temperate climates, eg China. Another example is the Burren in north Clare.

The Burren was formed when shale and sandstone was essentially scraped off beds of limestone in glacial times. We guess this because the highest point (Slieve Elva) is capped by shale and sandstone.

Early settlers were also a factor in creating the Burren landscape. They removed forests; therefore the roots to keep the soil down. This exposed the limestone to weathering and carbonation.

The Limestone pavement is the most impressive external landform seen here.

It was formed when the slightly acidic rain passed through the soil (rotting vegetation and organisms) making it even more acidic, this rain would then pass onto the underlying limestone and begin to erode it. The acidic rainwater reacts with calcium carbonate in the limestone and forms calcium bicarbonate. The process of carbonation.

Limestone is pervious. Rain passes down joints and along bedding planes. Weathering is concentrated at the joints of the rocks layered structure

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The carbonation and chemical weathering causes widening of these joints and they then become deep grooves in the rock's surface which are called **grikes**.

The rocks between the grikes are large slabs called **clints**. This is almost like a stepping stone formation at first glance. Also the capping resemblance is the reason it is called a limestone pavement.

Soil has been washed into grikes and as a result, in the Burren, hazel trees grow in these areas.

Along the pavement there are swallow holes and other collapsed caverns. eg Pollnagollum is 40m in diameter

The Burren is starting to become in its mature stage in the karst cycle of erosion. Meaning the underground eroding puts too much strain on the surface and therefore it collapse. These create big indents in the karst landscape.

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