

A short geological field trip to Kilfarrasy Beach



The production of this guide was supported by the **local Agenda 21 fund** and Waterford City and County Council

Introduction

The rocks which form Kilfarrasy cove are the result of a time when this part of Ireland was the site of ancient undersea volcanic eruptions, massive tectonic events and abrupt changes in climate.

The cliffs around the beach display a complex mixture of Ordovician volcanic and sedimentary rocks. Within these, the sedimentary rocks can be seen to be deformed and heavily distorted in some places.

These sedimentary rocks are strongly cleaved, or slaty, because of the intense pressure they experienced during the Caledonian mountain building event which happened around 400 million years ago . The volcanic rocks are less deformed due to their stronger nature.

Towards the western end of the beach there is a headland with a distinct arch eroded through it. Also, on the foreshore eastward of the headland is a freestanding rock arch, with two arches present. Sea stacks and other coastal erosion features abound here.

The best way to explore the geology of this beach is walk around it and look at the rocks. The following pages contain a short field trip to Kilfarrasy which you can follow as you walk around. They also contain some missing words that will help you understand a little bit more about geology and the story that is told in the rocks here.

There are three localities outlined here that show you the different rock types found in Kilfarrasy.

By going to each locality and filling in the missing pieces in this field trip workbook you can learn about the geology of the Copper Coast and Ireland in general.



Field trip map orientated north, the car park can be seen in the mid left of the image

Locality 1.1

Here we see two different coloured rocks and a great example of a fundamental geological law. The black rocks are sedimentary rocks which formed as seafloor mud settled. They are dark in colour which tell us that they were formed in an _____ environment which was low in oxygen, these rocks are called mudstone. The lighter coloured rock here is a volcanic rock called rhyolite which was injected into the

mudstone by a volcanic eruption. This is a great example of the geological law of cross-cutting relationships which means that younger rocks cut through older rocks. This means that the _____ must be older than the _____.

Locality 1.2

Looking at the cliffs here we can see patterns in the rocks as if someone has bent them out of shape. Some of these rocks are more distorted than others. The distortion is the result of intense pressure and heat which acted on the rocks after they were formed. We can see at the base of the cliff there is sandstone which is less deformed than the mudstone above, this is because the sandstone is _____ than the mudstone.

This deformation was caused when an ancient ocean, known as the Iapetus Ocean, closed and three ancient continents; Laurentia, Baltica and Avalonia collided. This collision occurred extremely slowly but with massive force and as a result rocks across a large part of what is now Europe were distorted.

The process that caused this collision and continues to move the earth's plates to this day and cause earthquakes is called Plate _____.

Locality 1.3

The rocks here show a different pattern than the previous ones and give us a clue as to the nature of the volcanism which was seen here.

You can even crumble some parts of the grey rock with your fingers. On closer inspection, the rock is made up of lots of different rocks including volcanic ash and fragments of the surrounding rocks, it is called a breccia and tells us that the eruptions here were _____.

Above here on the cliff we can see examples of the most recent geological activity here which occurred only 13,000 years ago at the end of the last _____ age. The melting of massive ice sheets deposited lots of clay and sand and formed much of the soil we see here. This kind of soil, which is very common around Ireland, is known as glacial till.

Overall Interpretation

You can either write your own interpretation or fill in the blanks based on what you saw above.

The oldest rocks here are the _____ which tell us that Kilfarrasy cove was once on the _____ while the igneous rocks tell us that the area was then subject to _____ activity. The rocks in Kilfarrasy are from the _____ era and are ~ _____ million years old.

Missing Words

Locality 1.1.

Anoxic mudstone must be older than the **rhyolite**

Locality 1.2

Sandstone is **stronger** than mudstone,

Plate **Tectonics**

Locality 1.3

Eruptions here were **explosive, Ice Age**.

Overall Interpretation

The oldest rocks here are **Mudstones**,

Kilfarrasy cove was once on the **Seafloor**

Subject to **volcanic** activity

The rocks in Kilfarrasy are from the **ordovician** era and are around **450 million years old**