A Field Study of the glaciated landscape of Glen Rosa on the Island of Arran

Garnock Academy

Wednesday 2nd April 2014

The generous support of the Frederick Soddy Trust is kindly acknowledged for the grant of £500 which fully financed this field visit to the island of Arran.

Approaching Brodick Pier on the island of Arran on 2nd April 2014

Arran is sometimes referred to as "Scotland in Miniature". It is the largest island in the Firth of Clyde, lying just 10 miles off the west coast of Scotland. With an area of 432 square km, it is the 7th largest Scottish island, and has a resident population of approximately 4500.

Arran is divided into highland and lowland areas by the Highland Boundary Fault, which runs north east to south west across Scotland. The island was glaciated during the Pleistocene period (11700 years ago), when glaciers covered all of Scotland. This period in geological history, along with volcanic activity around 60 million years ago in the Paleogene period, has resulted in the island being referred to as a "geologist's paradise". Arran's landscape is now rich with textbook glaciated features such as corries, pyramidal peaks and U shaped valleys, as well as a great variety of rock types including granites, sandstones and chalk.

The main industry on the island is tourism and the effects of this can be seen on the human landscape, particularly in the honeypot towns of Brodick, Lamlash and Whiting Bay, as well as in the scenic glaciated valleys and mountains.

As part of the Higher Geography Lithosphere unit, we study how glaciation has affected the landscape – both from a physical and human perspective.

The island of Arran, due to its rich geological past and current tourist activity, is therefore the perfect location for a Higher Geography field trip. The fact that it is only a 55 minute ferry journey away from Garnock Academy, makes it an ideal location to take young people on a 1 day field trip. Here they can see for themselves, how glaciation processes have shaped and formed our landscape.

Garnock Academy is a non- denominational co-educational state school serving Beith, Dalry Glengarnock, Kilbirnie and the surrounding area, and is located in the Authority of North Ayrshire. It has a school role of 1020 and employs 90 teachers.

31 Higher and Advanced Higher pupils (16-18 years old) went on the field trip to the Island of Arran, with 2 teachers – a Geography teacher and a Guidance Teacher – and a classroom assistant. To my colleagues Peter and Janet, I extend my thanks for their support on the day.

With the help of instructors from North Ayrshire's Arran Outdoor Education Centre in Lamlash, pupils were able to apply their classroom learning "out in the field" – by drawing field sketches of features, seeing for themselves the evidence resulting from the processes of deposition and erosion, and understanding the different land uses and conflicts in the island.

Much of our day was spent in Glen Rosa, a textbook U shaped valley, which has been formed by the movement of a large glacier down the river valley. The Glen Rosa valley runs from Goatfell, a dramatic mountain peak standing at 874m (called a "Corbett") and the highest of the island's mountains, right down to the sea.

Corbett is the name given to peaks in Scotland that are between 762 and 914.4m high, whilst Munro's are Scottish mountains over 914.4m high.

Goatfell from Brodick Bay, with Brodick Castle in the foreground

We set off from the Caledonian McBrayne Ferry Terminal at Ardrossan on the 9.40am ferry and arrived in Brodick at 10.40am, to be met by the tutors Eliot and Martin, who would facilitate our day.

The "MV Caledonian Isles"

Waiting at Brodick ferry terminal for the minibus to take us to Glen Rosa

A short trip round the bay and we arrived in Glen Rosa, where we would spend the day : walking into the valley, field sketching the glaciated features and learning about the impacts of tourism on the landscape.

Glen Rosa, with Goatfell shrouded in mist.

First things first and we needed to collect our field sketch equipment and waterproofs and listen whilst Eliot told us what he had planned for us on our Field Study day.

Once we were all kitted out with waterproofs and clipboards, he explained that we would walk a few miles into the U shaped valley and have our first stop to see some depositional moraines, which had been exposed by erosion. We would sketch them whilst he told us some interesting geological facts about the valley.

Field Study Leader Eliot, giving us his plans for the day.

Before we set off into the valley, Eliot reminded the pupils' of how this wonderful landscape had been created. He told us about the glaciated period in history around 11000 years ago, when mighty glaciers covered all of Arran, creating U shaped valleys, corries, pyramidal peaks, misfit streams and

hanging valleys as they moved across the island – all of which, he assured us we would see today.

Eliot telling us about the rocks that had been laid down in the Paleogene period – 60 m years ago

We then began our walk into the U shaped valley of Glen Rosa, taking along our equipment - a shovel (to take soil samples) and a quadrat (to record the frequency of vegetation)

Shovels and Quadrat at the ready

At our first stop, we really saw the grandeur of the U shaped valley of Glen Rosa. Eliot described to us how it had been formed by glaciers of slowly moving ice advancing down the river valley and gradually over hundreds of years, changing its shape from a "V" to a "U". Everyone then started their field sketches, with my slogan of "It's not what you look at…it's what you see" resounding in their ears.

Field sketching the U shaped valley

This was a great opportunity to take a class photograph with the grand U shaped valley in the background!

Mrs Davidson and the Higher Geography Class of 2014

Our next stop was to see a great example of a glacial moraine, the composition of which had been eroded and exposed by the flow of the misfit stream - the Glenrosa Water - through the valley. This allowed the pupils to look closely at the stones, rocks and pebbles embedded in the clay soil and for Eliot to explain to them that, as the glacier neared the end of its journey through the valley, it began to flow more slowly and as a result, dropped more and more of its load. This moraine was the resulting landform.

Glen Rosa Water eroding the glacial moraine

Glen Rosa Water - the misfit stream in the wide valley floor of Glen Rosa

Glacial deposit up close

Eliot explained how to field sketch the moraine, to make sure that all the features were clear. This obviously necessitated getting as close to the moraine as possible and getting wet feet into the bargain!

He also explained that Glen Rosa Water was classed as a misfit stream because it was a river that was clearly too small for the massive flat bottomed and wide Glen Rosa valley…so was a bit out of place!

Field sketching the moraine from a great vantage point

Some serious field sketching of the moraine

By this time, everyone was getting hungry, so a lunch stop was combined with some work. The 3 groups were each given the task of preparing, then presenting on a variety of glaciation topics such as how corries, hanging valleys, pyramidal peaks and arêtes had been formed. This was testing the pupils' classroom knowledge with the help of the "real thing" in the field!

A "working lunch"

Looking at a hanging valley was next on Eliot's plan. This was formed when a smaller tributary glacier met the main glacier as it moved down the valley. As the smaller glacier contained much less ice, it was not as powerful and could not erode the valley as deeply. Where and when they met, the tributary glacier was left "hanging" above the main valley.

Looking at the hanging valley and listening to Eliot explain its formation

The "hanging valley"

Our walk into Glen Rosa was over when we arrived at our last stop and saw the majestic view of Cir Mhor, a Corbett of 799m, with a perfect pyramidal peak formation, and looking like a giant rocky cone rising up from the landscape. We could clearly see 2 of the 3 corries which formed the peak and Eliot explained how the corries had been created over 11000 years ago.

He told pupils how, at the start of the Ice Age, snow would have collected in the hollows high up in the mountain and would have gradually been squeezed into ice. As more snow built up, it would have filled the hollow and eventually some of it would have been squeezed out and forced down the mountainside, helped along by the force of gravity. This would have been the starting point of the glacier.

The hollow in which the snow and ice collected would have been eroded by the ice to form a much deeper and steeper "armchair" shaped hollow, which we call a corrie. 3 such corries at the top of a mountain would create a pyramidal peak like Cir Mhor.

Everyone then had the opportunity to field sketch the peak and its corries. Fortunately, we had arrived just at the right time to see the mist lifting off the summit, giving us a wonderful view of the pyramidal peak.

Field Sketching Cir Mhor as it appears out of the mist!

Eliot giving us some tips on how to field sketch Cir Mhor

Heading back to the minibus before the rain

Our final stop was to hear about how Glen Rosa Valley was used for employment – mainly farming and tourism. Eliot explained that deer farming was common all over the island and at certain times of the year, tourist and farmers would stalk the deer as a leisure activity. Forestry is also an important part of sustainable land use activity on Arran, and an important industry. Eliot explained how the Forestry Commission grow trees for 3 main purposes –" sawlogs" for construction, small "roundwood" for paper and "woodfuel" for sole use on the island.

Eliot also told the pupils about how land use conflicts between tourists and locals are managed on the island. He explained how all planning application for tourist related activities are considered very carefully but also how tourists are very much encouraged to visit Arran, because their spending creates an income for the majority of the residents, who work in shops, golf courses and hotels.

We had a final farewell to Arran and a well- earned "chippie" before heading back to Ardrossan on the 4.40pm ferry – after a great day "in the field"

A "chippie" whilst waiting for the ferry

A final headcount and farewell to Arran

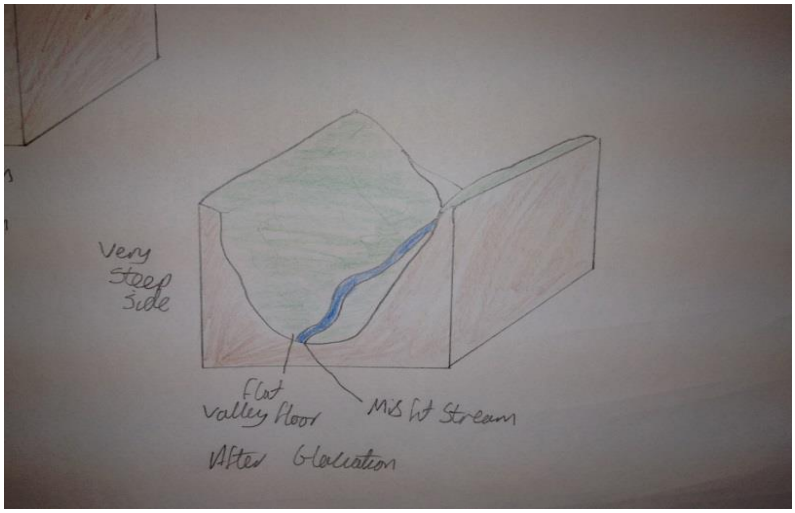
….and a well - deserved snooze on the ferry after a tiring day!

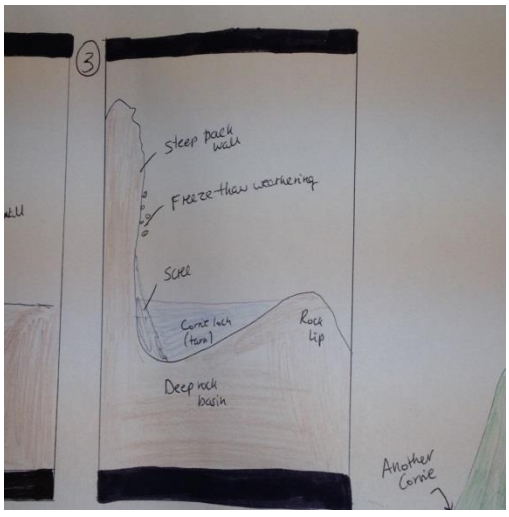
BACK AT SCHOOL ….

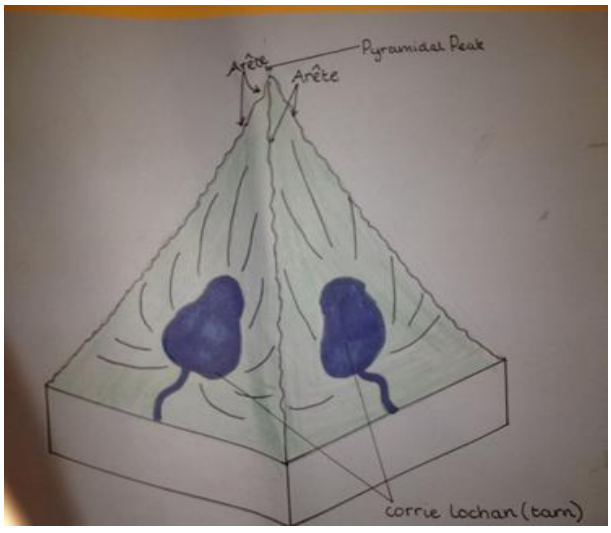
Field sketching

Next day on our return to the classroom, we put the finishing touches to our field sketches and displayed them around the classroom. This gave us a real visual and lasting impression of what we had all experienced the day before in Glen Rosa.

As sketches such as these will require to be reproduced for glaciation exam questions, these techniques gave my pupils great practice ahead of the exam in May.



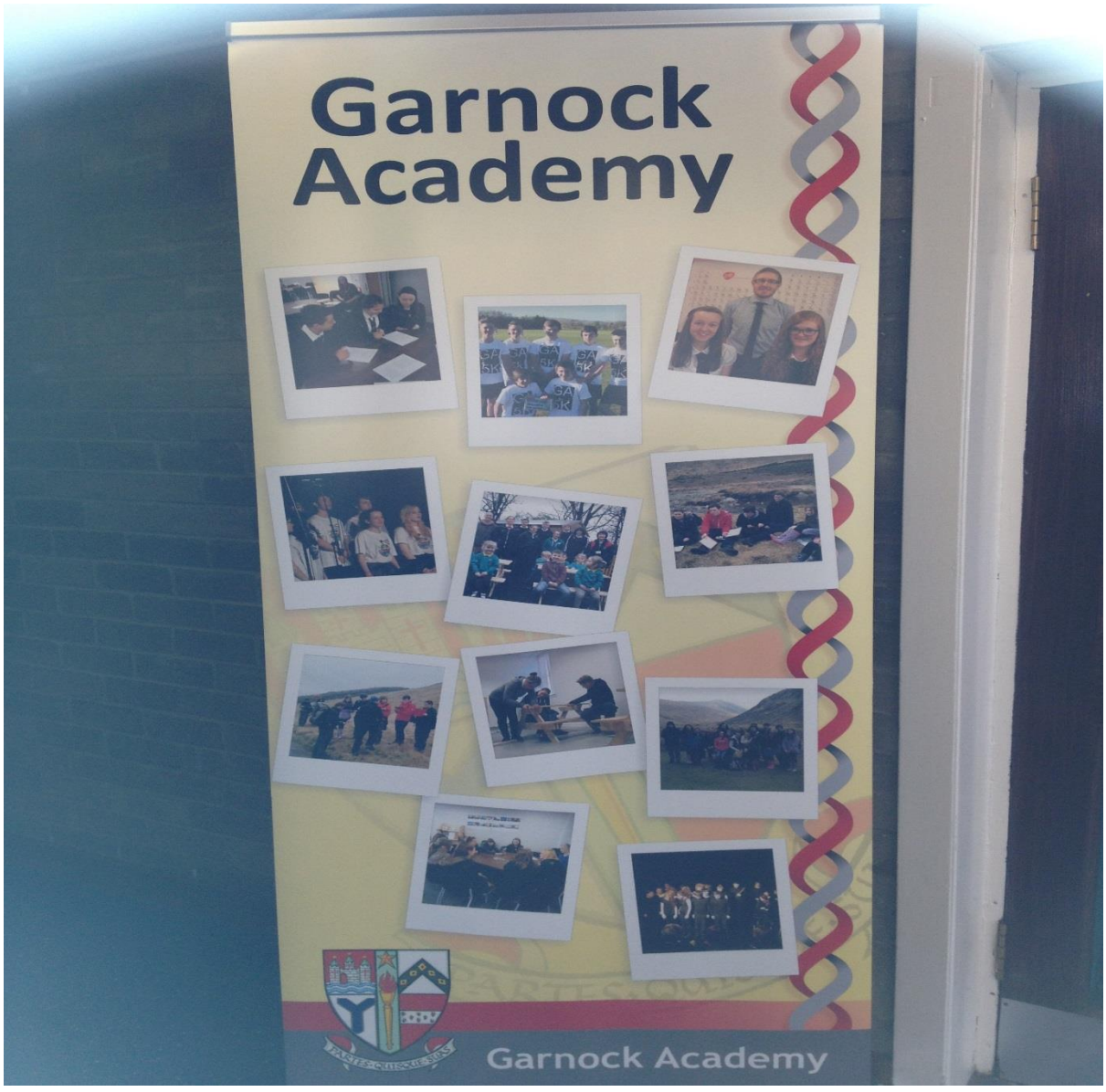




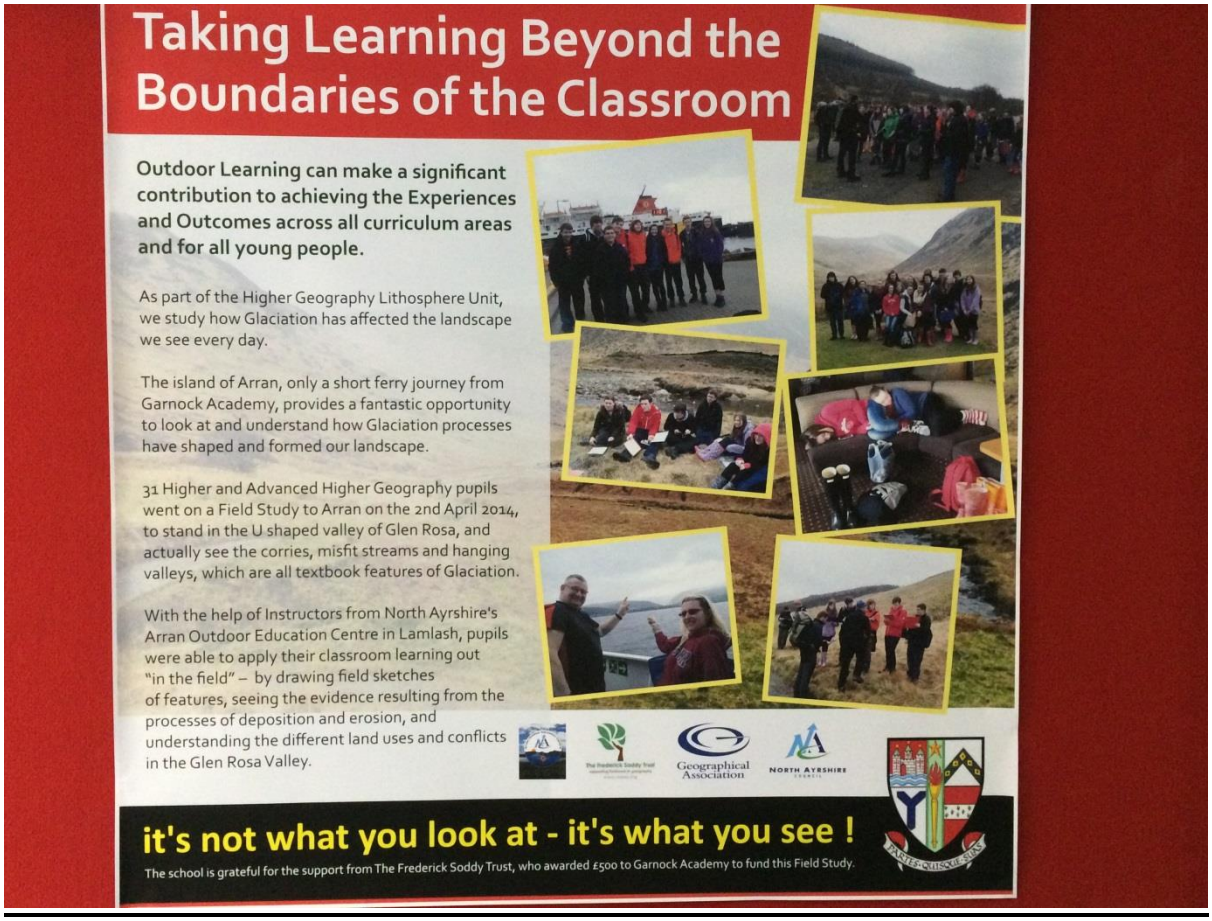
Displaying our Field Trip around the school

Our Head Teacher Mr Dick, is very keen to display the extra curricula work of Garnock Academy pupils around the school.

Using photographs and information about the trip, Mr Dick has had a 7ft banner and a 1x1m poster professionally designed, both of which are now on show to all. As you will see from the poster below, I was keen to ensure that the Frederick Soddy Trust was given a mention as well as a thank you!



The Banner with some of our field trip photos on show



The Poster displayed in the corridor of the Geography Department

OUTWITH SCHOOL .....

I was also keen to get the pupils and our field trip a mention in the local press, so I sent a photo and article to the local paper on our return, hoping for some coverage.

On the 29th of May 2014 (co-incidentally the day of the Geography Higher exam), the following article and photograph appeared in the Ardrossan & Saltcoats Herald. Again, as you will see from the article, I made sure that I acknowledged the support that the Frederick Soddy Trust had given to our Field Trip.

Arran's origins are a lesson for pupils

Garnock teens take studies out into the field

by DOUGLAS COULTER

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A GROUP of senior pupils from Garnock Academy have taken a step back in time to study how the island of Arran was formed millions of years ago.

The 31 pupils aged 16 and 17, are studying Higher Geography with their teacher Lynn Davidson.

Their external SQA examinations were just around the corner and the class and their teacher were determined to take their studies out of the classroom and into the field.

With the enthusiastic support of head teacher Alan Dick – and financial help from the geography charity, The Frederick Soddy Trust – the group were off to Arran.

Mrs Davidson said: "These pupils had never been out of the classroom to see geography in the field which made me as their teacher very frustrated.

"My catchphrase as the pupils will tell you is 'it's not what you look at it's what you see'.

"It is true to say that the island of Arran is 'Scotland in miniature' and we were able to get up close to examples of corries, U-shaped valleys, hanging valleys and misfits streams – all in the magnificent setting of Glen Rosa. These were all formed millions of years ago during periods of glaciation when Scotland was covered in ice, and seeing them brought to life what the pupils had learned in the classroom."

Over the course of a packed day, two tutors from North Ayrshire's Outdoor Education Centre in Lamlash told the group all about Glen Rosa's glaciated landforms, helped them do some field sketching, and discussed the economic and social impacts of the tours industry on Arran.

Mrs Davidson added: "It was a great day ou and one which I believe increased their knowl edge and will help them in their studies an SQA exams next month.

"Field trips are an excellent addition to th geography curriculum and I will be doing eve rything I can to make them happen again."

Our mention in the local press!

All that now remains to be said is ….a huge **THANK YOU** to the Frederick Soddy Trust, from me and all 31 pupils from Garnock Academy for making this Field Trip possible!