Scottish Baccalaureate: Interdisciplinary Project

Additional guidance for candidates planning a project with a Geology or Earth Sciences theme

Contents

Introduction

The purpose of this pack is to provide additional information for candidates wishing to choose a Geology or Earth Sciences Interdisciplinary Project theme. It should be read in conjunction with further information on the [Scottish Baccalaureates](#) pages of the SQA website and in particular the [Candidate Guide](#) to the Interdisciplinary Project component of the Scottish Baccalaureate.

There is a suite of four Scottish Baccalaureate awards (the Scottish Baccalaureate in Science, the Scottish Baccalaureate in Languages, the Scottish Baccalaureate in Social Sciences, the Scottish Baccalaureate in Expressive Arts) and each award has the same structure:

♦ two Courses at Advanced Higher level (SCQF level 7)
♦ one Course at Higher level (SCQF level 6)
♦ the Interdisciplinary Project at Advanced Higher level (SCQF level 7)

Candidates with an interest in studying Geology/Earth Sciences could further develop this interest through the Interdisciplinary Project component of one of the Scottish Baccalaureates. The Scottish Baccalaureate chosen would depend on the candidate's other subject choices. The most likely would be the Scottish Baccalaureate in Science or the Scottish Baccalaureate in Social Sciences. However, links with Geology/Earth Sciences could also be made through the Interdisciplinary Project component of the other two Scottish Baccalaureates. As an example, a candidate studying for the Scottish Baccalaureate in Languages, who also had an interest in Earth Sciences, chose the topic of 'fracking' for her project and compared the development of fracking and the public response in France and in the UK.

The Interdisciplinary Project can also be chosen as a stand-alone Unit. It is at Advanced Higher level (SCQF level 7), is graded A to C and has been awarded UCAS tariff points equal to half of an Advanced Higher. It is a process-based project assessed holistically over five stages (Proposal, Plan, Presentation, Evaluation of Project, Self-evaluation). It is assessed internally in centres and externally verified by SQA. The project aims to develop the following key cognitive and generic skills:

♦ independent learning
♦ research
♦ planning
♦ communication
♦ problem solving
♦ presentation
♦ interpersonal
♦ evaluation

The topic chosen for the Interdisciplinary Project, as the name implies, must be interdisciplinary in nature and must be relevant to at least one of five broad

contexts: employability, citizenship, enterprise, economic development, and sustainable development.

The Scottish Baccalaureate, through its Interdisciplinary Project, provides candidates in their final year(s) at secondary school with an excellent preparation for the next stage of their lives by greatly enhancing the transition from school to university or the workplace. Candidate autonomy is a key feature of the awards and, from the start, candidates are encouraged to take ownership of the project by:

♦ choosing a project topic/theme
♦ deciding how to undertake the project
♦ selecting research methods
♦ making contacts outside of their own centre
♦ collating and analysing findings
♦ choosing a presentation method and audience(s)

The Interdisciplinary Project allows candidates to continue their study of a subject of interest, such as Geology/Earth Sciences, even if this subject is not available to them as a National Course.

Further information on the Scottish Baccalaureates and the Interdisciplinary Project can be found on the Scottish Baccalaureates pages of the SQA website.

Content of this pack

Contacts, links, publications, websites, resources

Candidates are required to carry out research as part of the Interdisciplinary Project and are encouraged to make links outside their own centre. This section of the pack provides an extensive list of professional bodies, organisations and resources (including publications, journals and websites) relevant to the subject area.

Examples of Interdisciplinary Project themes

Eight examples of interdisciplinary themes have been provided. However, these are for guidance only, as it is important that candidates choose their own themes based on topics of interest, which can be personal or related to future study or career aspirations.

Exemplar proposal and plan

Based on one of the Interdisciplinary Project theme examples provided, a Project Proposal and Plan have been written to offer guidance on the planning stages of the project. We have provided templates with candidate prompts for the five stages of the project and these examples provide information on the content and level of detail expected.

Assessment exemplar 1

This is a complete Interdisciplinary Project with a Geology theme undertaken by a candidate studying the Scottish Baccalaureate in Science. All five stages of the project are included and the candidate has developed an innovative end product. Problem solving skills and contingency planning are a key part of this project.

Assessment exemplar 2

This is a complete Interdisciplinary Project undertaken by a candidate studying for the Scottish Baccalaureate in Languages. It is of particular interest as the candidate has combined study of Languages with a study of Earth Sciences. All stages are well structured and detailed. The evaluation stages are balanced and insightful.

On SQA's website there are pages dedicated to the Scottish Baccalaureates. These pages contain details of the awards and a range of support materials aimed at both teachers and candidates. It is recommended that any centres considering either the Scottish Baccalaureate awards or the Interdisciplinary Project as a stand-alone Unit should first access these key documents and resources via the Scottish Baccalaureates pages of the SQA website.

Contacts, links, publications, websites, resources

Professional bodies/organisations

Name	Details	Website
The Geological Society of London	The UK's professional body for earth scientists	www.geolsoc.org.uk
Geodiversity Scotland	Website designed by Scottish Geodiversity Forum	www.scottishgeology.com
Edinburgh Geological Society	Aims to encourage public interest in geology and the advancement of geological knowledge	www.edinburghgeolsoc.org
Geological Society of Glasgow	Membership open to all who have an interest in geology	www.geologyglasgow.org.uk
Geologists' Association	Association for all geologists and earth scientists, both professional and amateur	www.geologistsassociation.org.uk
British Geological Survey (BGS)	A world-learning geoscience centre for survey and monitoring; modelling and research; data and knowledge	www.bgs.ac.uk
Institute of Quarrying	Organisation for those working in or interested in quarries	www.quarrying.org
British Institute for Geological Conservation	Independent group of earth scientists committed to the conservation of important geological and geomorphological sites	www.geoconservation.org
The Mineralogical Society of Great Britain and Ireland	International society for all those who work in the mineral sciences	www.minersoc.org

Name	Details	Website
Open University Geological Society	Website with links to related earth science sites	www.ougs.org
US Geological Survey	Latest information on earthquakes, volcanic eruptions and research	www.usgs.gov

Contacts/links

Contact/link	Details	Website
Geology Rocks	Earth science education website hosted by two Scottish geologists	www.geologyrocks.co.uk
Berkeley online exhibits (from University of California Museum of Palaeontology	Extensive website with content on history of life on Earth	www.ucmp.berkeley.edu
Our Dynamic Earth (Edinburgh)	Charitable trust raising awareness and understanding of our planet through the Dynamic Earth exhibition and promoting education and life-long learning in Earth and Environmental Science	www.dynamicearth.co.uk
Geodiversity: Argyll and the Islands	RIGS group — exists to promote public understanding of geological and geomorphological sites that have been identified as being important	www.argyllgeology.co.uk
Aberdeen University	Department of Geology & Petroleum Geology	www.abdn.ac.uk/geosciences/departments/geology
Edinburgh University	School of Geosciences	www.ed.ac.uk/schools-departments/geosciences
Glasgow University	School of Geographical and Earth Sciences	www.gla.ac.uk/schools/ges
St Andrews University	Department of Earth & Environmental Sciences	http://earthsci.st-andrews.ac.uk

Contact/link	Details	Website
Hunterian Museum	Scotland's oldest public museum. Houses large collections of rocks and minerals, dinosaurs and fossils	www.gla.ac.uk/hunterian
North-West Highlands Geopark	Website explaining the geological features of NW Highlands Geopark	www.northwest-highlands-geopark.org.uk
Earth-pages	Research news from earth sciences (blog hosted by Steve Drury)	www.earth-pages.co.uk
Geology.com	Geoscience news and information website (hosted in the USA)	http://geology.com
The Russell Society	Society for amateur and professional mineralogists which encourages the study, recording and conservation of mineralogical sites and material	www.russellsoc.org
Volcano World	Website hosted by Oregon State University on volcanoes including eruption data	http://volcano.oregonstate.edu
About.com	Popular geology website, part of the About network	www.geology.about.com
GeoBus	Mobile secondary school outreach programme supporting Earth science education, including field work	www.geobus.org.uk
Earth Science Education Unit	CPD support for teachers and teaching resources	www.earthscienceeducation.com

Professional journals/documents/websites/sources

The Lyell Collection (online publications from the Geological Society)
www.lyellcollection.org

Publications include:

♦ *Journal of the Geological Society*
♦ *Petroleum Geoscience*
♦ *Quarterly Journal of Engineering Geology and Hydrogeology*
♦ *Geochemistry: Exploration, Environment, Analysis*
♦ *Transactions of the Geological Society of London*
♦ *Scottish Journal of Geology*
♦ *Proceedings of the Yorkshire Geological Society*
♦ *Journal of Micropalaeontology*
♦ *Transactions of the Edinburgh Geological Society*
♦ *Engineering Geology Special Publications*
♦ *Memoirs*
♦ *Special Publications*
♦ *Petroleum Geology Conference Series*

Geologists' Association (publications available online)
www.geologistsassociation.org.uk

Publications include:

♦ *Geology Today*
♦ *GA Magazine*
♦ *Earth Heritage* (download at: www.earthheritage.org.uk)

Edinburgh Geological Society (publications available online)
www.edinburghgeolsoc.org

Publications include:

♦ *The Edinburgh Geologist*
♦ Lothian and Borders GeoConservation Publications

Examples of Interdisciplinary Project themes in Geology

Geology/history

1 How did James Hutton and Charles Lyell change our understanding of the Earth?

Geology/tourism

2 Examining the impact geoparks have on Scottish tourism. Could the designation be applied to other areas?

Geology/environment

3 Is geoconservation effective in Scotland?

Geology/medicine

4 Is there a connection between health and where communities' water is sourced?

Geoscience (hydrogeology, petroleum geology, structural geology, metamorphic and igneous geology, sedimentology)

5 What does the future hold for Scottish geoscience beyond hydrocarbon extraction in the North Sea?
6 Satellite imagery: what can be discovered about the Earth's structure from photographs?
7 Create a GIS database of groundwater flooding in Scotland and analyse the geology of the worst affected areas.
8 Cross-sections: how are onshore analogues used by extraction industries and where has this been most successful?

Exemplar Proposal and Plan

The following pages are based on the project theme 'Create a GIS database of groundwater flooding in Scotland and analyse the geology of the worst affected areas'.

Science IP Proposal: GIS database

Proposal

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	**Create a GIS database of groundwater flooding in Scotland and analyse the geology of the worst affected areas**

Project outline (what it is you want to do and how will you go about it)

Groundwater flooding is becoming a serious natural hazard as our climate and weather patterns become less predictable. Recent events (winter 2014/15) have resulted in increased rainfall through the British Isles. This project will create a Geographical Information System (GIS) database of groundwater flooding in Scotland and analyse the geology of the worst affected areas. To do this I will analyse maps showing susceptibility to groundwater flooding and the geological map of Scotland.

To undertake this project I will use mapping and well data from the British Geological Survey (BGS). The existing geological map of the British Isles which I will use is also published by the BGS. While the BGS produce groundwater susceptibility maps, it is important to compare these with rainfall data from the Metrological Office and information I can obtain on surface flooding from the Scottish Environmental Protection Agency (SEPA) and on river levels from gauge stations, also collected by SEPA.

While comparing data from maps and other sources is an important part of this project, it is vital to consider the geology the groundwater is flowing through, as this is an important aspect of the flooding risk. To properly analyse this, I will visit the Hunterian Museum to describe specimens of the rocks and their porosity. With groundwater flow, permeability is also important, so I will research geological literature to understand the permeability of the rock, as well as permeability caused by faulting.

I will present my findings as a GIS database, including a map showing where the groundwater flooding is worst and linking this to the underlying geology. The detail of relevant well data, recent rainfall data, river levels, rock descriptions and photographs of the worst affected areas will also be tied to the GIS map. This, along with my report, will form the submission of my project.

Reasons for choosing this project (eg personal interest, future plans, links to other subjects you are studying/ have studied)

I am interested in studying Earth Sciences at university. As the climate is changing I can see the need for qualified hydrogeologists who are trained in finding and managing our valuable water resources. I am currently studying Advanced Higher Geography and have really enjoyed the studies on rivers and flooding we have done.

At Higher level I studied Computing Science, I think creating my own database using GIS will be a challenge, but it is going to be a useful skill for the future.

I regularly walk in the Trossachs and like to photograph interesting rock formations, as well as researching how those formations were created. However, I also studied Mathematics at Higher level and am keen to handle data as well as analyse rock specimens, which is why I haven't chosen to complete a fieldwork only project.

The broad contexts this project will cover are:

☐ Citizenship ☐ Enterprise ✓ Employability

☐ Economic development ✓ Sustainable development

Employability

I think that learning about groundwater flooding; while it is so topical will make me more employable; though it is more for interest that I am undertaking this project. Learning to use GIS and designing a database will definitely be a useful skill for the future.

Sustainable development

This project will help to explain where the groundwater flooding is occurring and why. It is possible that the findings may show flood risks in other areas. I hope my database will be used by local councils for considering planning applications so they can decide how these areas can be developed sustainably.

Learning environments I will access are:

I intend to use free, downloadable GIS software to build my database, and will discuss how to start using this interface with ICT technicians in my school.

If I have difficulties accessing material from SEPA, the Metrological Office or BGS, I will contact the relevant professionals from these departments for support.

I will discuss how to further research the permeability of the rock specimens in the Hunterian Museum with the Rock and Mineral collection curator there.

There are a number of journals that are freely available on geology special interest websites, I will use these to develop my database and add details about the relevant rocks.

How I will use my knowledge of science/technology

Skills learned in Advanced Higher Geography like map drawing, data collection and interpreting graphical information will be useful in the creation of my database and interpreting the rock specimens.

The technical knowledge I have from Higher Computing Science will help me to design and build the database, especially when uploading different types of files.

My Mathematical abilities in data handling (developed from Higher) will be useful in managing large amounts of data, and both extracting the relevant information and performing any relevant statistical analysis.

The skills I will develop and/or improve in the course of this project are:

(carry out a short analysis of your current strengths and weaknesses in the skills areas below and how you think your project will allow you to develop and/or improve these skills)

♦ application of subject knowledge and understanding

I will apply my knowledge of rivers and flooding from Advanced Higher Geography and consider this in relation to the underlying Geology. I will use geographical skills I have learned at school in conjunction with my Computer Science skills to create a database.

♦ research skills — analysis and evaluation

I have had some experience of research through my studies at Higher and this project will give me an opportunity to broaden these skills. I am certain there is sufficient accessible data for this project. I will be using a number of sources to gather my data and will use my skills in analysis to select relevant information to work with. While the project sets out to look at groundwater flooding in Scotland, should there be difficulties with accessible data or if there is too much data for the scope of this project, I may have to make this project more regional, thereby limiting the coverage to an area, Southwest Scotland, for example.

♦ interpersonal skills —negotiation and collaboration

I have discussed this project with the Head of Chemistry (who is also a keen amateur Geologist) and technicians in the ICT department.

I am keen to discuss the project with professionals and am looking forward to the phase of research after the database mapping, when I will be analysing rock specimens in the Hunterian Museum.

The Geology community in Scotland is very friendly and a number of professionals have offered me their assistance when I attended a local Geological Society talk.

♦ planning: time, resource and information management

I will plan my time carefully to make sure that I complete each stage of this project, making sure I don't become too involved with the database mapping. I will access the data first, in case the well data takes time to be retrieved and posted to me, or I have to access it in the BGS offices, for example.

- ♦ independent learning — autonomy and challenge in own learning

I am looking forward to the independent learning that this project will demand of me. I like to challenge myself and I know I can complete a substantial project to a deadline. This will be good training for university where I will have to work on my own without the kind of support school has provided.

- ♦ problem solving — critical thinking: logical and creative approaches

Research always creates problems, unforeseen difficulties is part of the fun of project work. I am looking forward to solving technical glitches with the database software, as well as having blanks in my work where I have to work out a way of finding the information I need. Geology always has problems to be solved because of the nature of studying something that lies below the surface of the Earth!

- ♦ presentation skills

Working out an effective way of presenting my project will be a challenge for me. I know that a CD containing the database would be useful, but this will need to be supported by a report, and I also think that printing all, or part of the maps I create, or perhaps generating screenshots will be necessary. I will take advice on this from my teachers, when I am further into my project.

- ♦ self-evaluation — recognition of own skills development and future areas for development

I think it is a good idea to keep a 'research log', where I will record the tasks I complete, make brief notes on future tasks which arise, along with the date I will need to complete these by, and detail any skills I had to develop in the process.

Assessor feedback to candidate

This is an interesting project and you have clearly given it a great deal of thought. It will bring together your interest in Geology and your skills in other areas such as ICT and Mathematics.

It looks as if there will be no shortage of information but your selection and organisation of this data will be a challenge. You are right to anticipate scaling the project down as you want it to be manageable within the timescale.

You may also like to consider some key journals such as the Quarterly Journal of Engineering Geology and Hydrogeology and Geology Today.

I look forward to reading your detailed plan. Well done at this stage!

Proposal approved		**Further work required**		
Candidate signature			**Date**	
Assessor signature			**Date**	

Science IP Plan: GIS database

Plan

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	**Create a GIS database of groundwater flooding in Scotland and analyse the geology of the worst affected areas.**

Is this a group project?   **yes**   ☐   **no**   ✓

If a group project my individual role or responsibilities will be:

Timescales (this should be a detailed timeline and any separate spreadsheets or charts should be included as evidence)

September/October:

♦ Access data from various sources.
♦ Download GIS software and start building GIS database.

November/December:

♦ Assess size of project from the data and decide if it needs to be focused on one or two regions in Scotland.
♦ Enter relevant data onto database and tie to maps.
♦ Begin descriptions of rock specimens.
♦ Review literature for porosity and permeability data.
♦ Continue to update reference list, which was started at the beginning of the project.
♦ Ensure report is up-to-date.

January/February:

♦ Include details from literature and rock descriptions (including photographs) on database.

March:

♦ Complete research and write conclusion.
♦ Present research to students at school.
♦ Finalise project report including evaluation.

Planning (how you are going to meet the agreed objectives of your project)

I intend to:

♦ Gather maps and other data from various sources.
♦ Download GIS software and create a database.
♦ Including relevant data from sources on database.
♦ Describe, sketch and photograph relevant rock specimens/formations.
♦ Research the porosity and permeability of the relevant rocks using journals and the internet.
♦ Write a report to explain the database and my findings.
♦ Revisit any data or geological location if my conclusions require it.

Resources (eg people, materials, places)

♦ GIS software downloaded from a website.
♦ ICT technician at my school.
♦ Scottish Environmental Protection Agency (SEPA) – data on surface flooding and river levels.
♦ British Geological Survey (BGS) – Geological map of Scotland, groundwater flooding susceptibility maps, well log data.
♦ Metrological Office – recent rainfall data for each area.
♦ Rock and Mineral collection at the Hunterian Museum, University of Glasgow.
♦ Journal of Petroleum Geoscience (and similar) for porosity and permeability data of the rocks/formations.
♦ Various websites (eg university Earth Science department websites in Scotland, Scottish Geology website, Geopark websites, British Geological Society website).

Research methods (eg contacting companies, surveys, focus groups, experimentation)

♦ Contacting relevant organisations for data (digitally or on the phone/ in person)
♦ Constructing database
♦ Analysing maps
♦ Museum-based research of hand specimens
♦ Literature research to get more information on the porosity and permeability of relevant rocks and the formations
♦ Fieldwork at the most important sites

Presentation

Who do I think will benefit from listening/reading/looking at my presentation of my project findings/product?

I think this database will be most useful to local council employees as these are the people who make difficult decisions regarding planning applications. The information I will collate may have a bearing on areas that are susceptible to groundwater flooding and areas which are potentially at risk of groundwater flooding because of the types of rock found in these locations.

What methods are appropriate to my audience(s) (eg demonstration, presentation software, websites, oral, report, piece of theatre, dvd, wiki/blog or any combination)

I will give a presentation to explain my database and how it can be used to access detailed information on areas at risk of groundwater flooding in Scotland.

I will follow this up with a report, which will include screenshots from the database, where the data was sourced and my conclusions. This will contain a full reference list so people can review my work and perhaps continue from my findings.

Dependencies (what is required for your project to go ahead ie reliance on other people or resources, steps in plan that must be completed before starting the next step)

The completion of this project is not reliant on the quantity of data available, there is enough data that is open source, i.e. it is freely obtainable on the internet.

I will have to complete a certain area of the map on GIS database before continuing to the rock specimens. This is why, if there is too much data, it may be better to limit the project to one or two regions of Scotland.

Contingencies

Any anticipated problems	My plans for overcoming the anticipated problems
Too much data has a 'snow' effect.	Reduce the coverage of the project from Scotland to one or two regions.
Downloading the GIS software and sorting out the licence at school.	There is a free download available; I may have to reduce the amount of linking I do on the database, if the freeware has file size limits. If this is the case, I will include more detail in the report and less on the database.
Difficulties with downloading the data files from SEPA and BGS.	Contact an ICT technician at school for help.
The Rock and Mineral collection at the Hunterian Museum is closed.	I will go to Edinburgh to use the collections there.

Method for recording my skills development and future areas for improvement

I will maintain a detailed research and reflective log throughout my project. This will help me to record the days I work, as well as vital information like references and follow-up notes that arise in the course of the research. This log will also be a record of the skills I learn and develop throughout the project, in this way, challenges (and the solutions) will be noted and I will be able to see which skills I need to improve further as I progress through the project. This will also help me when I reach the evaluation and self-evaluation stages of my project.

Assessor feedback to candidate

This is a detailed and comprehensive plan. I would suggest that you put more work into your timeline which could be more specific in terms of milestones, completion dates and contingencies. You should also consider other commitments on your time, such as holidays, other subject work, general school activities, prelims etc. There are effective project management tools like Gantt charts available on line. Your planned presentation methods seem very appropriate to the project theme and I think you are right to extend your audience to beyond school. You may also like to send a copy to some of the contacts who provide you with information. Good work!

Assessment Exemplar 1

This exemplar on fracking is for the Scottish Baccalaureate in Languages.

Languages IP Proposal: To frack or not to frack?

Proposal

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	To Frack or not to Frack?

Project outline (what it is I want to do and how will I go about it)

My aim is to examine attitudes towards a method of obtaining natural gas known as "Hydraulic Fracturing", or "Fracking." While it is currently a popular method in America, it has been banned in France and is claimed to have many negative effects environmentally which has led to health hazards to members of the public. The method has existed in the UK for a few decades but has caused little controversy. However, as companies are requesting more areas of land to perform Hydraulic Fracturing, it has recently become more recognised and is appearing more and more in the news, sparking great debate.

My project has the following objectives:

♦ I will first research how Fracking works, what is involved, the process itself and, in doing so, I will discover why it has caused such controversy. I will research reports, contact experts in France and the UK and, if possible, I will contact energy companies working in this field.
♦ Having learned more about the process, I will contact anti-Fracking groups, politicians and town mayors in France to find out why it was banned. I will also contact a number of anti-Fracking groups and environmental groups in the UK.
♦ I will research and contact groups that are in favour of Fracking especially politicians and energy companies in the UK and France.
♦ While I will be researching a number of arguments for and against Fracking, I will not come to any overall conclusion about the worthiness of Fracking but rather I will examine attitudes and discover why different countries have such differing attitudes towards it.

Reasons for choosing this project (eg personal interest, future plans, links to other subjects I am studying/ have studied)

Personal interest and future plans.

I came across arguments against this form of energy for the first time while on holiday in France this summer (2012). Therefore, it is something I am interested to learn more about during the making of the project. I am strongly interested in Geography and how human beings interact with their natural environment and I

plan to study Geography at university before going to study education for my desired career of Geography teaching.

I have an interest in France and the French language as I have chosen to continue the language to Advanced Higher level and I want to link my study of French to the field of Geography and, in doing so, develop some of the skills which will be important to me and useful for when I continue on to university including research, analysis, evaluation and interpersonal skills. I will explore these in more detail in a subsequent section.

The broad contexts this project will cover are:

✓ Citizenship ☐ Enterprise ☐ Employability
☐ Economic development ✓ Sustainable development

How I will use my knowledge of languages

I will use my knowledge of French to read and understand research documents. I will also have to contact individuals and groups when I examine arguments for and against fracking. I will be writing e-mails and letters and may have to use persuasive language in order to receive a reply from these contacts.

I will also be using English to contact groups and companies around the UK again using persuasive and formal language.

I may ask pupils in my school and in France their opinions of fracking.

Learning environments I will access are:

I will be using the learning environments within my school such as the Modern Languages department, the Geography department to speak to the teachers. Also the Library where I will hopefully find a number of resources. I hope to access materials in the University Library.

I will collect information from the contacts that reply to me such as anti-Fracking organisations in UK and France and companies that carry out Fracking.

The skills I will develop and/or improve in the course of this project are:

Application of subject knowledge and understanding

I will need to use my knowledge of French to contact groups, politicians and mayors in France and the Food & Water Watch European office in Brussels and to understand French publications. Through my study of Geography, I already have some knowledge of the environmental issues concerned but this project will enable me to go deeper into the issues and will hopefully benefit my studies once at university.

Research skills — analysis and evaluation

Although I have undertaken research before in my Higher subjects, for example Geography, I have never undertaken research on such a large scale. The research I will be undertaking for the Interdisciplinary Project will certainly help to

prepare me for future studies and research in university as the development of analysis and evaluation skills will be vital. Development of such skills will help me to analyse and assess information and data and select relevant and key information from sources.

Interpersonal skills — negotiation and collaboration

A large amount of this project will include contacting professionals and groups in writing and in person. I have never done anything similar to this so this will be, hopefully, a positive experience and will allow me to interact and develop my communication skills with adults and professionals which will benefit me in later life.

Planning: time, resource and information management

While I feel that my organisational skills are quite good, time management can always be improved. Much of this project will rely on receiving replies from a number of people who approve of appearing in the project, therefore I cannot leave this until the last minute and careful planning will be essential.

The information taken from reports and replies will have to be carefully managed and organised for use in my project. Improving time management and organisational skills will help me during my studies in university.

Independent learning – autonomy and challenge in own learning

As I have to contact and gather information from many people, a lot of this project will be researched independently. I am doing Advanced Higher French this year; I will find that a lot of this course will involve independent learning in order to achieve the best possible grade. Therefore this skill will hopefully be strongly developed as the year goes on through my Interdisciplinary Project and my Advanced Higher French. This will be crucial for moving onto university where I am expected to undertake a number of tasks completely independently.

Problem solving – critical thinking: logical and creative approaches

The planning of this project will involve logical thinking as I have to carefully plan my work and decide who I will contact. I must be sure to have contingency plans in case people do not reply to me. Logical thinking must also be used when establishing my timeline and when organising my research findings.

Creative approaches will be used when I am using the French language – either spoken or written – to persuade companies and groups in France to reply to me.

Presentation skills

While I am still unsure how I will present my project at the end of the year, my experience of teaching Geography as my PSD option has certainly improved my presentation skills: I have prepared a number of my own lessons to teach to classes in lower years. This means that I have had experience in creating PowerPoints and speaking to groups of people which I found at first a very nerve-wracking experience but am now gaining confidence.

There are also a number of other ways I could present my findings, such as a written reports or presenting my findings to anti-Fracking groups and websites as well as the school's website.

Self-evaluation – recognition of own skills development and future areas for development

As I have taught some Geography classes, I have undergone a number of self-evaluations and am increasingly acknowledging the importance of reflecting on my own work, describing what I felt was successful and areas to develop. Using a reflective diary, I will take note of my progress throughout this project, mentioning what information I may have gathered, who I wrote to, my opinions of my efforts so far and what could be improved. This will help me when I write my self-evaluation as I will have a record of my thoughts at certain points throughout the process of the project. Mentioning areas I need to develop will be of some significance as it will help me to develop and improve my skills in future research and projects.

Assessor comments

You have chosen a very interesting project in which you give yourself many opportunities not only to use your French but to apply what you have learned in language classes to new contexts. You also clearly explain how you will develop your skills. Your proposal fully meets the requirements of the project. I look forward to discussing your project with your through our mentoring meetings and reading about your progress.

Proposal approved	Yes	Further work required	No

Languages IP Plan: To frack or not to frack?

Plan

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	To frack or not to frack?

Is this a group project? yes ☐ no ✓
If a group project my individual role or responsibilities will be:

Timescales (this should be a detailed timeline and any separate spreadsheets or charts should be included as evidence)

September – October 2012:

♦ Planning should be complete – I will have chosen my contacts for the project.
♦ I will be on holiday for part of October. This will be a limiting factor although desk research can take place when I am not on holiday abroad.
♦ Desk research will take place.
♦ I hope to visit the University of Edinburgh library in order to undertake further research.

October/November 2012:

♦ Primary research
♦ I will contact experts and professionals working in the field of Hydraulic Fracturing
♦ By the end of November, I should have enough information on the process of fracking so that I can begin to contact chosen groups, companies and experts.

November/December 2012:

♦ Making contact with chosen groups, companies and individuals in the UK who support fracking.
♦ Making contact with chosen groups, companies and individuals in France who support fracking.
♦ Making contact with chosen groups and individuals in UK who oppose fracking.
♦ Making contact with chosen groups and individuals in France who oppose fracking.
♦ The Christmas holidays may be a limiting factor as contacts may not be available over this period.
♦ Asking the opinions of pupils in my school and a school in France. I will produce a questionnaire.

This area may continue to the beginning of January.

January/February 2013:

- ♦ I must bear in mind that prelims will be taking place in February.
- ♦ All information/responses will have been collected.
- ♦ Condense, analyse and review all relevant and necessary information preparatory to presentation.

March 2013:

- ♦ Presentation of project to audience
- ♦ Analysis of project and self-evaluation

Planning (how you are going to meet the agreed objectives of your project)

Objective 1: Research the method of Fracking

Using a variety of sources, I will research the elements involved in fracking as well as the process itself. This research will be done independently.

I hope to use sources in my school's Geography department as well as the "New Civil Engineer magazine" (NCE) and its website, which has already featured certain relevant articles. Furthermore, I hope to gain access to the University of Edinburgh library to find books and reports on the method in English and French.

Using the internet, I hope to find online reports and various other sources of information about the method.

I will also try to contact parties working in the area of fracking; these may include engineers and energy companies.

In doing this, I should begin to understand why this method has caused so much controversy.

Objective 2: Investigate opinions for and against the method of fracking

For this objective, there are a large number of potential contacts. I will therefore have to decide whose feedback would be most appropriate, constructive and valuable.

I will, firstly, seek to contact individuals and companies engaged in fracking in UK and France. After this, I will seek to contact groups and individuals who oppose fracking in UK and France. I will do this by e-mail and phone calls. I will also seek the opinions of young people here and in France through a survey.

Objective 3: Presentation of information/findings

I may produce a written report of my findings as well as give an oral presentation. The audience may consist of Geography pupils/ teachers and senior staff, including the head teacher of my school. I will also invite those whom I contacted throughout the making of the project.

I may publish my project on my school website and send a copy to any relevant interested parties.

Resources (eg people, materials, places)

I hope to find much of my information for Objective 1 by using the internet and books. I may be given access to the University of Edinburgh library to find books. I will ask the school librarian for help. The internet will also help me to choose the best contacts for completion of Objective Two.

An important resource for this project is people. To complete Objective Two, I will be required to rely on a number of people in Scotland and France providing me with information and their own opinions.

I will use my school's Geography department as there are books with information on fracking. However, it is only recently that the process has been spoken about so I may not find a large amount on the topic here.

I will use my school's Modern Languages department as I will be writing e-mails in French to contacts abroad and will want my teachers' feedback before I send the e-mails.

Research methods (eg contacting companies, surveys, focus groups, experimentation)

♦ **Desk research:**
I will use websites to research the elements involved in fracking as well as the process itself. I will use books to find out information on fracking. I will read magazine articles as well as any newspaper articles so that I have relevant and up-to-date information on the topic.

♦ **Primary research:**
I will be making contact with groups, individuals and professionals. This will be done through e-mail, most probably. I may have the opportunity to meet contacts based in Edinburgh.

♦ Survey of pupils and data analysis.

Presentation

Who do I think will benefit from listening/reading/looking at my presentation of my project findings/product?

I think groups and individuals both for and against fracking would benefit from my presentation. It would definitely appeal to those interested in learning more about this new process.

I plan to present it to Geography students in my school.

What methods are appropriate to my audience(s) (eg demonstration, presentation software, websites, oral, report, piece of theatre, dvd, wiki/blog or any combination)

An oral presentation with the use of a PowerPoint presentation will be appropriate to my audience as I am presenting a lot of information and I have had some experience in this area through teaching lessons in the Geography classroom. A written report may also be appropriate for the likes of local MSPs, anti-fracking groups as well as any member of the general public seeking to find more information on the topic.

Dependencies (what is required for your project to go ahead, ie reliance on other people or resources, steps in plan that must be completed before starting the next step?)

I will need to have planned who to contact (and back-up contacts).

A great amount of this project will rely on the responses and co-operation of contacts. This may be more difficult for larger energy companies or high ranking professionals.

Contingencies

Any anticipated problems	My plans for overcoming the anticipated problems
Some contacts may: Not reply due to an overwhelming amount of e-mails/letters already received or they are very busy	I will make sure to have a number of back-up contacts.
Choose not to supply information due to the controversial nature of the subject matter.	I will have to find information and opinions from interviews that have been published in books or online. I will have to research reports and books written by those who oppose or support fracking.
School in France does not return survey	Have a back-up school

Method for recording my skills development and future areas for improvement

I will simply be using a notebook as a progress log. In this I will regularly record my activities throughout the project, this will include any e-mails I write or receive, any interviews that I organise and a summary of information I find.

I will also write self-evaluations at any time I feel is appropriate and necessary. This way, I will discover my own personal strengths and weaknesses and be able to improve.

Doing all of the above will help me when I come to write my evaluations.

Assessor feedback to candidate

Your plan expands on the ideas you described in your proposal. You have put a lot of thought into your plan and have identified specific resources, groups and individuals you hope to include in your project – this is commendable. You understand the need for contingencies and have built them in accordingly. I look forward to learning about the progress you are making as your project progresses.

Languages IP Presentation: To frack or not to frack?

Presentation of Project Findings/Product

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	To frack or not to frack?

How I presented my project findings *(Describe in detail how you presented your project findings and explain the choices you have made with regard to your presentation method(s) and audience(s))*

I presented my findings in an oral presentation, with the use of PowerPoint. This was presented to an audience that I had invited which included staff in the Modern Languages department, the Social Subjects department, the Science department and senior management as well as some pupils at my school. I chose these departments because I felt that they could perhaps benefit from my findings as I discussed issues that related to their subjects. I also invited contacts that I had spoken with during the research and interview process of my project as well as some students from my year group.

I have had much experience in creating PowerPoint – both for younger pupils and for people my age and above as I have created and presented a number of lessons in the Geography department and I have taken part in a Young Philanthropy Initiative at school where I had to present my group's chosen charity with the use of a PowerPoint. As a result of this, I felt confident in making the PowerPoint and using its features.

I began by explaining why I did the project – explaining the Bac and giving a detailed introduction to fracking and what my aims were: to research the method of fracking and to investigate the opinions for and against fracking in the UK and in France, mentioning how I discovered the process – which was during a trip to France in summer 2012 - as well as the documentary film 'Gasland' by Josh Fox which raised awareness of the problems surrounding fracking

I explained the physical processes involved in fracking and what is needed to allow it to take place. To research this I used a number of sources, including:

♦ New Civil Engineer Magazine

♦ BBC News (http://www.bbc.co.uk/news/uk-14432401)

♦ YouTube (http://www.youtube.com/watch?v=MqUw6HoaZBU)

♦ http://www.energyfromshale.org/hydraulic-fracturing/what-is-fracking

♦ http://www.gaslandthemovie.com/

♦ http://shaleshock.org/drilling-101/

♦ http://www.bctwa.org/Frk-HowManyTankerTrucks.pdf

- http://www.stopaugazdeschiste07.org/spip.php?article3
- http://www.safewater.org/PDFS/resourcesknowthefacts/Fracturation.pdf
- http://www.legazdeschiste.fr/focus-technique/17092012,qu-est-ce-que-la-fracturation-hydraulique-,81.html
- Wikipedia

I gave examples of locations where fracking already exists, for example the USA where it is very prevalent, and mentioned that it is becoming increasingly common in Europe. This led to my next aims in the project: establishing the arguments for and against fracking, specifically in the UK and in France.

I moved on to present the surveys that I carried out - both for high school students here at Broughton and to those in a school in France. In Scotland, 29 pupils were surveyed, with this figure at 28 for France. Most were around 14, with a couple a year younger and older.

I explained the questions I asked in the survey and how I had analysed the data I received. I then displayed the results in the form of pie charts and bar graphs. As well as asking the age and school year of the pupil, the questions I also asked were:

- How much do you know about fracking?
- Do you agree with Fracking/do you think it is good?
- Do you think the Government should approve fracking?
- Are you aware of the alleged environmental concerns over fracking? (and give an example of any you may know)
- Are you aware of the alleged benefits of Fracking? (and give an example of any you may know)
- Do you think that allowing Fracking to take place and provide energy should be allowed despite the alleged environmental concerns (do you think that the benefits outweigh the disadvantages)? (and give a reason why you chose this answer)

I chose these questions as I felt that they were simple and easy to understand and they were very to the point. I also had to consider the fact that my French might have to cope with fairly technical and scientific vocabulary.

I reviewed all the answers and displayed a comparison of opinions and comments made by the students. In summary, far more pupils in Scotland said they knew "a fair amount" on the topic while the majority of French pupils felt they only knew "a little". In both countries, the vast majority said they were against fracking, 72% in Scotland and 79% in France. More people knew of the environmental concerns in Scotland than in France, with the statistic for Scotland actually at 100%. However, fewer pupils actually knew of the alleged benefits of fracking. In France, the majority did not know of any. In my final question, 79% of Scottish pupils disagreed with the statement that fracking should go ahead despite the alleged environmental concerns; while 64% of pupils in France felt that it should not go ahead.

I went on to list and discuss the contacts that I made during the process of achieving the second objective of the project (finding out reasons for and against fracking in the UK and France), mentioning the fact that many did not respond to me! In an attempt to overcome this problem I drew on my contingencies,

contacted people several times and sought new groups and individuals to contact. I talked in detail about the responses I received from companies and organisations from both sides of the debate.

After summing up all arguments, I summarised my findings. The main arguments for and against, I followed:

YES

♦ Efficient
♦ Can be produced safely
♦ Provides a low-cost energy
♦ Cleaner alternative to coal
♦ Enhance energy security
♦ Improve local and national economy
♦ Royal Society and the Royal Academy of Engineering in June 2011: Fracking can be undertaken safely if best practice and effective regulation are enforced

NO

♦ Use of chemicals = contamination to water sources
♦ Resulting in illness
♦ Minor earthquakes
♦ Air pollution: Trucks, escaped methane
♦ Is it really cheap? Jobs for local community?

To conclude, I discussed a number of answers that were given by the pupils in Scotland and France that did the survey for the question "Do you think that allowing Fracking to take place and provide energy should be allowed despite the alleged environmental concerns (do you think that the benefits outweigh the disadvantages)?"

Responses included:

NO

♦ Welfare of people should always come first.
♦ There are other, safer ways of getting energy, eg wind power.

NON

♦ Environment must be looked after and respected
♦ There other sources of energy available that are safer, eg the renewables

YES

♦ It is possible to focus on the development of a safe way of fracking and using careful procedure to limit damage
♦ Good for the future as it provides much energy

OUI

♦ Oil is running out – need for new sources
♦ Provides jobs, improves economy

Assessor feedback to candidate

Your presentation was outstanding. You worked hard to pull together all your primary and secondary research and you presented it in a colourful and engaging manner.

Your presentation was very well structured and showed clear thought processes. It was visually appealing and included a range of formats – text, photographs, diagrams, charts and video clips. The videos you chose were apposite and through them you were able to inject humour into the proceedings.

You are a skilled presenter. You have had opportunities to present through your PSD programme and you brought this experience to bear. You have such an engaging manner and you held your audience's attention throughout. You invited your audience to ask you questions at the end and you were able to answer all the questions skilfully.

You discussed the successes of your project but also admitted that not everything went according to plan. However, because of your meticulous planning and contingencies, you were able to draw on alternatives.

You have very successfully used a range of skills and drawn from several subject areas over the course of your project. You have worked well with others and set yourself challenging targets. You have used French in new and demanding contexts and have learned some very specialised language.

Overall this is an excellent project and I have no doubt that the skills you have developed will serve you well in future.

Bravo!

Candidate signature		Date	
Assessor signature		Date	

Languages IP Evaluation: To frack or not to frack?

Evaluation of project

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	To frack or not to frack?

How successful has my project been overall? (consider the strengths, weaknesses and learning points of your planning, implementation and findings/outcomes giving examples to support your comments)

Overall, I feel that the project was successful. While I found it an interesting and great opportunity to take up, I also managed to achieve my initial objectives:

♦ To research the method of fracking
♦ To investigate opinions for and against fracking in the UK and in France
♦ To present my findings

Before beginning the project, I had to think about how I would go about achieving these aims, focusing on who I would contact throughout the project as this was a very important aspect.

To achieve objective one, I used a number of online resources and the New Civil Engineer magazine to get some background on fracking. I aimed to use the University of Edinburgh library but unfortunately, there were very few pieces of literature that would have been of use to me as this is a very new process in the UK. I also began to e-mail some contacts early as I knew I would need to give time for responses. I started to send e-mails in November to, the director of a consultancy company specialising in fracking and finding ways to obtain as much energy with as little environmental risk as possible. He sent me a factsheet which, frankly, was very scientific and full of jargon which I had trouble understanding! On the same day, I e-mailed two university lecturers – one at Queens University Bristol and one at Keele University – who I received a reply from. Again, I was given some online resources. This was not too much of a problem for me when achieving my first objective as there were many other resources online and in the magazines I used to provide me with sufficient information and understanding of the process.

In late November and through December, I looked to find the arguments both for and against fracking. I sent e-mails to a number of groups and companies both in the UK and in France. Admittedly, this was a harder objective than I expected it to be for the simple fact that many of the contacts did not actually respond to me. However, I was very lucky to receive a response from a company to pursuing fracking in the UK. They have featured in the news a lot and I was surprised to

have received a response. However, after replying to them, I did not hear from them again. I sent them a couple of reminders as I was very keen to hear from them and I eventually, thanks to my persistence, received answers to all of my questions in early February. As well as this, I came across an anti-fracker, who spoke to me in great detail via Facebook and helped me very much, providing numerous sources and putting forward opinions which I was able to use in my presentation. I e-mailed a few other companies as well as one in France and I also contacted an environmental group in France but I was unlucky and received no responses, even after sending reminders. This was indeed an eye-opener to me which caused me to feel slightly anxious about how much content I would actually be able to include in my final presentation. However overall I felt that I had enough material from the sources who HAD contacted me.

In December, after discussion with my teacher, I considered another idea that we had considered in planning process. This was to obtain the opinions of young people on fracking – both in the UK and in France. I created a survey and arranged with a Geography teacher in my school to hand this out to a couple of her 3rd year classes. One of the members of staff in the Modern Languages department had a cousin who worked in a school in France so I was able to send the survey over there to be given to a class of students of similar age. When doing this, I had to think carefully about which questions I wanted to use and ensure that they were simple and to the point. I had to translate the survey before sending it to France. This was an extremely successful idea and I was very pleased to have done it. I felt confident in knowing that this would have a positive effect on my final presentation.

By this time, I had collected information from many online sources, a well-known fracking company, a very helpful anti-fracker and a number of young people in Scotland and in France, I felt somewhat more confident to begin putting all my information together and creating my final presentation.

I feel that my presentation was extremely successful. This was an oral presentation with the aid of PowerPoint which I felt confident creating. I presented it to staff from the Modern Languages department, Social Subjects department and Science department as well as a few students from my year group. Although the presentation was longer than I expected it to be, I did not feel that this caused my audience to lose interest at all. I had also created a feedback sheet that had a couple questions based around the presentation: what the viewer learned and what they felt the strengths and weaknesses were. I received excellent feedback and could not have asked for better!

While there were a few hiccups in regard to contacts and responses, I feel that the project went generally very well and had a successful ending. I feel that the independent work has benefited me greatly as I plan to go university this year where I will be expected to work independently. Furthermore, this topic was very relevant to me as I wish to study Geography and pursue a career in Geography teaching.

How effective were my communication methods throughout the project?

This is an area which could have been more successful. While I sent a number of e-mails to different companies and groups both in the UK and in France, I did not receive a high number of responses. In attempt to overcome this, I sent a couple reminders to the contacts and set about looking for other contacts through my contingency plans. This caused me to feel somewhat anxious as this was a crucial part of my project. I have learned from this that I must have a very detailed and lengthy contingency plan when pursuing a project of this nature in order to be well prepared with back-up contacts.

The idea to survey the classes in my school and in France to obtain an alternative perspective on fracking did put my mind more at ease as this was very successful.

I felt that communication between myself and my assessor, was very strong. Through e-mail and meetings at school we were able to regularly review my work so far and future plans for the project and I was given sufficient help so that I felt confident to continue my work on the project knowing that I was moving in the right direction.

Is there any aspect of my project that could be taken further? What might my next steps be?

I enjoyed creating the survey for the school students in Scotland and France and I found it interesting to analyse the responses. Therefore, if I undergo a project in future that involves evaluating opinions, I would consider doing it in this style.

In terms of the content of the project, this will be relevant to my course at university. Therefore, I could even consider the same topic in more detail or in a different light for any independent project tasks in future.

Assessor's comments

You have provided a thoughtful and honest evaluation of your project. You have considered your original objectives and the extent to which they were met through your project. You evaluate your successes, which were many, and recognise areas which might have been done better. You recognise that your communication methods were successful and appropriate to your project but that it is vital to have a detailed contingency plan. You did have one but with hindsight you recognise that perhaps a longer list of back-up contacts would have been desirable. Your chosen method of presenting your findings, via an oral presentation was a good decision. You have excellent presentation skills and some experience in this area and, as you describe above, kept your audience enthralled throughout. You have worked hard and learned so much through this demanding project, not only about fracking and the different attitudes and opinions surrounding it, but also about yourself in terms of independent study.

Languages IP Self-evaluation: To frack or not to frack?

Self-evaluation of generic and cognitive skills development

Candidate name									
SCN									
Centre name									
Assessor name									
Project title	To frack or not to frack?								

In evaluating your skills consider the skills analysis which you carried out at the Proposal stage and how you said you would develop and improve these skills.

Now refer to your reflective diary/log/blog and feedback you have received and evaluate how you have developed and/or improved these skills through the work on your Interdisciplinary Project.

Application of subject knowledge and understanding
(Think about practical uses for the languages you have learned. How did you use your knowledge of languages effectively to help you carry out various aspects of your project and how it related to your chosen broad context(s)?)   I used my knowledge of the French language when researching a number of online materials and reading articles. I was also watching a number of videos on YouTube of news coverage in France as well as general videos made by people interested in the topic. This gave me a chance to use my language skills for understanding in every day real-life situations. This is beneficial as it provided me with challenging uses of French out-with the classroom.   My knowledge was certainly challenged during the survey for young people. I had to translate my English version of the questionnaire as well as analyse the responses from the students. It was interesting to be able to read genuine opinions of young people but I was faced with a lot of new vocabulary on energy and environmental issues   I also had to use my language skills when writing e-mails to the energy company in France and the anti-fracking group. Therefore, I challenged my skills in reading, writing and listening throughout the project and the opportunity to do this in real-life situations and independently was both demanding and rewarding. I feel my French was well developed through the broad contexts of Citizenship and Sustainable Development.

Research skills — analysis and evaluation

(Think about the research process. How did you plan, carry out, analyse and evaluate your research? You should evaluate your research methodologies, tools, resources and contacts, data recording and referencing, reliability and usefulness of data.)

As I had done a small amount of research on the topic before undertaking the Baccalaureate project, I knew roughly where I would be looking to find information. I spent most of my time at the beginning of the project deciding who I would contact and by what means; mainly e-mail. I was given the opportunity to visit the University of Edinburgh library which I did early on in my project. However, I did not feel that there was sufficient literature on the topic as it is still fairly new in the UK.

I planned for my primary research to take place in October/November and I was able to stick to this.

However, I planned for November and December to prioritise e-mailing my chosen contacts and I did not receive many replies at all. I was continuing to e-mail new contacts through January and even early February so this area did not go to plan, unfortunately. As I was waiting for a long time to receive any last minute replies, I did not start condensing my information and creating the presentation until very early February.

The use of the surveys helped to expand my analysis and evaluation skills. I was reading a range of opinions and had to create tables and charts to reflect these views. This was not something that I had done before so this new experience was exciting and interesting.

Interpersonal skills — negotiate and collaborate

(Think about how you considered other peoples' views/feedback, discussed issues of concern, reached a solution where needed, adjusted your approach in response to a situation/environment, showed positive self belief and had the confidence to offer and ask for support.)

As I spent a lot of my time during this process making contact with a number of individuals, groups and companies, this certainly helped develop my communication skills, especially when I was e-mailing contacts in France. When receiving replies, I accepted their content in an unbiased manner and successfully used them in presentation of my findings. I would try and get as much information as I could from the contacts without seeming overbearing.

I was working with a couple of younger classes in the Geography department during the survey part of the project. I went over the survey with classes, making sure that all the students understood what I was asking of them because this would improve the reliability of the results.

When I felt that I was not receiving enough responses from contacts, I raised this issue of concern with my assessor. She reassured me and provided some help in how to overcome this problem. I felt confident in asking her for support as I knew she would work hard to provide support as best as she could.

At the end of my presentation to an audience, I gave them to opportunity to ask me any questions. I was asked a few and tried to the best of my ability to answer these in an honest, detailed and comprehendible manner. I also asked them to fill in a feedback sheet, describing what they had learned from the presentation, what the strengths of the presentation were as well as the areas to improve on. Overall, the feedback was extremely positive and encouraging and I made sure to take on board any opinions on how I could have improved the presentation.

I have had to work with and relate to many groups of people on many different levels, from children to university Professors and this has challenged me.

Planning — time, resource and information management

(Think about your time management. How did you set targets, monitor/record progress, consider any probable barriers to achievement and take steps to minimise them?)

Overall, I feel that I managed my time effectively but perhaps did not give enough consideration to the possible lack of e-mail responses.

I was able to stick to my timeline and ensure that my project was running in good time. I recorded my progress with the use of a diary and also used a word document to keep a list of e-mails that I had sent out and on what date they had been sent as well as the date of any reminders I had to send and also responses received.

The main problem was when I was not receiving as many responses as I hoped. While did have a contingency plan, I felt I had to rush to find new contacts as I did not have a substantial list of back-up contacts. I was not expecting this to be a big problem at the time, probably because I had not undertaken a project like this before and had never had to contact groups and individuals for opinions and interviews.

I would say that this was probably the most problematic area of the project.

In an attempt to overcome this problem, I pursued the idea of obtaining the views of young people and this was a good addition to the project as it meant I had more opinions to discuss in the presentation.

Independent learning — autonomy and challenge in own learning

(Think about how you used your skills to make things happen, took the initiative to establish links with other learning environments/opportunities and looked for challenges rather than taking the easy option.)

I feel that the main benefit that has come from undertaking the Interdisciplinary Project is that I have learned in an independent way and this is quite different from doing a subject at school where a lot of teacher support is given. This is a skill that will be very useful during university and I hope to continue to develop my skills in independent learning.

While my assessor made sure that I was on the right path, all the research on the topic of fracking was done on my own.

With the skills I already had in independent research I had done in the past, I did not find it too difficult to undergo desk research at the start of the year. The experience of finding contacts and sending e-mails to them was new so I took the initiative to undertake a task which was new and unusual to me. I did not expect to receive as few responses as I did. Therefore, this is an area which I have learned from greatly.

A great challenge was e-mailing contacts in France. I was given some help so that I knew exactly how to write a formal yet detailed letter in French.

I worked by myself to create the survey for young people, ensuring that I chose questions which were easy to understand and to the point. I organised visiting the class to give them the surveys and explained to them how they should go about answering the questions.

Problem solving — creative approaches; critical thinking; logical approaches

(Think about your problem solving skills. How did you generate and explore ideas, use logical and creative approaches, analyse source materials in order to support findings, reflect on problems and possible contributory factors and think critically about possible actions/changes?)

Overall, there were few problems but the ones that arose were fairly significant.

I went to my assessor with my concern that I had not received enough responses from contacts and that I felt this may weaken my presentation of findings. She supported me and provided me with advice on how to overcome the problem. In the end, I just aimed to get as much out of the contacts who HAD replied. For example anti-fracker, was able to add me on Facebook, meaning that lines of communication were easier and information was broken up into chunks. This made it easier for me to understand all the arguments he put forward at a reasonable pace and he was also able to provide me with sources to back-up his arguments and add me to anti-fracking Facebook groups so that I could read the views and opinions of other environmentalists.

In terms of using my French, I was hesitant at first as I knew I would be challenging my skills in reading, listening and writing as well as having to understand new, technical vocabulary. Again, I took this slowly and ensured that I fully understood any articles and videos before moving on. My assessor helped me as I was unsure how to write a formal letter in French on this topic and this was beneficial to me.

One specific contact provided me with a factsheet which I found very difficult to understand for the simple fact that it was extremely detailed with scientific language and jargon. I attempted to pick out all necessary information but I felt that this would not be a good source to use in my presentation as it would confuse both myself as well as my audience!

Presentation skills

(Think about how you presented your findings. Evaluate your presentation method(s), choice of audience(s), layout, structure, degree of formality and choice of content. Did your presentation include information/ideas/reflections with supporting detail in a logical order and reach a reasoned conclusion?)

I presented my findings in an oral presentation, with the use of PowerPoint. This was presented to an audience that I had invited which included staff in the Modern Languages department, the Social Subjects department, the Science department and senior management as well as some pupils at my school. I chose these departments because I felt that they could perhaps benefit from my findings as I discussed issues that related to their subjects. I also invited contacts that I had spoken with during the research and interview process of my project as well as some students from my year group.

I feel that my project was clear and easy to understand. In some areas I went into some detail explaining technical and scientific ideas. In terms of the degree of formality, I don't think it was too formal but this was probably an advantage as it did last longer than I had anticipated and the audience seemed to remain interested for the duration of the presentation.

I clearly introduced each section of the presentation: explaining the process of fracking and what is involved, the opinions of young people in Scotland and in France on fracking, and opinions of fracking companies as well as environmentalists. I ended with my conclusions. Therefore, I feel that my information was presented in a logical order.

I feel that I provided sufficient arguments from both the pro-fracking side and the anti-fracking side. I concluded both sides of the debate and feel that I did this in an unbiased manner. A number of feedback sheets from the audience also mentioned that the presentation had been unbiased so they were able to make a decision for themselves on the topic.

Although it was a serious and complicated subject I tried to add some humour into my presentation, for example by showing video clips.

Overall, I feel this may have been my strongest skill throughout as I had previous experience of presenting in different environments so I was able to create this presentation with confidence.

Self-evaluation — recognition of own skills development and future areas for development

(Think about how you have developed throughout your project. How did you deal with feedback, praise, setbacks and criticism and their impact on your own development of knowledge, skills and understanding? To what extent did you ask for feedback, learn from experiences and how will you use these to inform future progress?)

My assessor was very helpful in describing what the Interdisciplinary Project involves at the beginning of the school year and I definitely felt comfortable in pursuing it on the topic of my choice. She explained thoroughly what would be expected of me and how I would need to go about planning and undertaking the

project as well as writing about my project in the SQA templates. However, when actually researching the topic of fracking and going about achieving the aims, I was certainly working more and more independently, but I always had time planning and deadlines at the back of my mind. I had a genuine interest for the topic and was happy to use my own free time to work on the project.

While I faced some struggles in terms of not receiving the amount of responses I expected, I made sure to deal with this in a productive way: continuing to use online sources and arguments as well as making the most of the responses I HAD received. I have learned from this that I must have a thorough contingency plan at the beginning when undergoing a large piece of independent work.

I now have a deeper understanding of the importance of time management and will continue to learn this throughout my years at university.

This section is not mandatory. It has been included to allow you the opportunity to undertake an overall reflection of your project.

Reflection on my experiences throughout this project (eg things you feel you have achieved, things you have done that you feel particularly proud of, anything you would do differently were you to do something similar in future)

I felt that this was a very interesting and demanding project which I was pleased to have done in my final school year. It was interesting setting myself deadlines for each aspect of the project and working to overcome any problems that arose. This can be difficult sometimes as you can easily miss deadlines that you have set yourself.

I particularly enjoyed creating the survey for students in Scotland and in France. I enjoyed reading the opinions and arguments of young people on the topic of fracking and I especially enjoyed comparing the results of the two countries. In addition to this, I enjoyed speaking with anti-fracker as he had some very interesting points to make and he was passionate about the subject.

I felt that the final presentation of my findings was a big success. The feedback given by my audience was absolutely fantastic and felt very rewarding and encouraging. I feel confident that the presentation was of a high standard and this is very satisfying as I spent much time creating it independently.

Skills that I have used in this project that I would like to develop further (eg using skills in even more challenging situations, more working on your own, more team working)

Time management will always be an area for development and improvement and I will certainly have opportunities to do this during my time at university. In addition to this, the independent learning aspect was very beneficial as, again, this will be a skill I need in future years and I had not had a huge amount of experience in this area prior to undertaking the Interdisciplinary Project.

A significant lesson I learned is that I will make sure in future that when I go about undertaking a demanding task, I will plan thoroughly and have a detailed and lengthy contingency plan so that I feel less stressed if things do not go to plan.

Assessment Exemplar 2

The next exemplar is based on a geological guide and is for the Scottish Baccalaureate in Science.

Science IP Proposal: Geological guide

Proposal

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	Geological Guide — Dollar

Project outline (what it is you want to do and how will you go about it)

Dollar is a popular town for tourists and locals who wish to explore the history and the beautiful scenery on offer. There are walking trails through the glen leading up to the 15th century, Castle Campbell which offers views of interesting rock exposures and waterfalls. There is currently no geological guide available to anyone walking the trails and it is my intention to make it more interactive and educational for users especially as it is a Site of Special Scientific Interest.

I wish to create and publish a trail map with locations of noteworthy rocks and features through Dollar Glen. This would be used as an educational tool for the community and anyone wishing to visit the glen and find out more about its geological history including; Economic geology - mining history of copper/gold, fossils (if possible) to 'paint a picture' to engage the younger audience and to raise awareness of what lies beneath us and its importance.

I also wish to approach a local community fund to gain possible funding for the printing of the leaflets.

As more and more people rely on information from their smartphones, I think it is appropriate to develop a smartphone app providing an offline map of the glen with the ability to determine the individual's position using GPS technology on their phone. This would alert them to 'points of interest' nearby, what to look out for with labelled images.

Reasons for choosing this project (eg personal interest, future plans, links to other subjects you are studying/ have studied)

There is currently no information readily accessible about the local geology of the local area and in particular Dollar Glen. It is a popular walking trail and information about the surroundings would, I believe, be very beneficial.

I am planning on studying Earth Sciences at university and this project will give me an opportunity to research and produce something I am keenly interested in and otherwise would not have been able to do within the classroom hours. It links nicely with my AH Chemistry investigation which looks at extracting copper from the local malachite ore in the disused copper mine on the Burn of Sorrow.

The broad contexts this project will cover are:

♦ Citizenship — provide a valuable resource for local people and tourists
♦ Enterprise — may possibly actively attract people to Dollar as a result of app
♦ Employability - aid my interest in Geology and further my chances of entering university
♦ Economic development — generate tourism in Dollar
♦ Sustainable development — By educating people they may appreciate the environment more and take greater care when accessing it

Learning environments I will access are:

I will work with various teachers within the school who have specific subject knowledge, eg geologists. I have the intention of accessing local community groups, specifically the Ochil's landscape partnership scheme which already has a large involvement in the area but no such guide has yet been published.

Historic Scotland Educational Support Officer.

Knowledge of app developers.

How I will use my knowledge of science/technology

Skills learned in AH Geography such as map drawing and data collection will be useful when taking rock samples from the various locations and interpreting that onto a map.

Developing knowledge in AH Chemistry to understand any text that contains chemical formulae and structures. Also developing knowledge in Physics and Biology as Geology is a very interdisciplinary science.

The skills I will develop and/or improve in the course of this project are:

(carry out a short analysis of your current strengths and weaknesses in the skills areas below and how you think your project will allow you to develop and/or improve these skills)

♦ application of subject knowledge and understanding

I wish to develop the use of subject knowledge, eg using Geography and Chemistry knowledge to apply it to this project - map drawing

♦ research skills – analysis and evaluation

I have established a good set of research skills which has been tested lately in my independent subject research for AH Chemistry and Geography projects. I believe this project will develop these skills as there are not many widely accessible journals/books on the local geology.

♦ interpersonal skills – negotiation and collaboration

Further improve on my links with teachers and how to get the most from their knowledge and apply it to my project. To use my contacts successfully to gain as much as possible from it.

♦ planning: time, resource and information management

I am a very organised person and always work to deadlines efficiently but this will push these and develop them as I will have to manage two other projects along with class learning.

♦ independent learning – autonomy and challenge in own learning

There will be a lot of independent learning throughout this as I will have to learn techniques of sampling and learn more about the complex rock formations and their history.

♦ problem solving – critical thinking: logical and creative approaches

I am a very logical thinker in approach to all matters. I may have to find a more creative approach to some aspects of the projects in relation to design and look of guide.

♦ presentation skills

One of my weaker skills that I wish to improve upon during the process of this project

♦ self-evaluation – recognition of own skills development and future areas for development

I wish to take on board feedback from professionals and teachers to further my project and produce the best final product that I can.

Assessor feedback to candidate

This is a well-conceived project which has the potential to develop into a sustainable resource that will be valuable in the community. The background research that you have already conducted has highlighted how this project could really add value. You are clearly aware of how this project will utilise the knowledge that you are gaining, particularly with your AH Chemistry and Geography courses. I am impressed with the enthusiasm that you have shown for learning new skills – for example, exploring the option of developing an app alongside a leaflet. Your goals are definitely challenging and you will need to ensure that you are very well organised to meet your goals alongside your other commitments. I was also pleased to see that you have considered the economic and historical aspects to the project as well – making this truly interdisciplinary.

Proposal approved	Yes	**Further work required**		No
Candidate signature			**Date**	20-09-13
Assessor signature			**Date**	20-09-13

Science IP Plan: Geological Guide

Plan

Candidate name	

SCN									

Centre name	
Assessor name	
Project title	**To frack or not to frack?**

Is this a group project? yes ☐ no ✓

If a group project my individual role or responsibilities will be:

Timescales (this should be a detailed timeline and any separate spreadsheets or charts should be included as evidence)

Gantt Chart will be used to keep on top of deadlines

Planning (how you are going to meet the agreed objectives of your project)

I will stick to deadlines set on my Gantt chart to ensure the smooth running of the project and complete tasks on time.

I will research and gather information from various resources including maps, soil and rock data. I will also research the geological history including economic geology. The feasibility of creating an app from scratch will be researched and any other methods e.g. hiring developer to make one.

Keep track of progress made from week to week in a diary.

Resource development - app and leaflet. Getting special support from designers and IT Support.

Organise meetings with local community groups and experts and find contacts in the area.

I will need to plan time to work in the glen doing practical work like taking photos, rock samples and map recordings.

I will also need a way of collecting and logging info effectively.

Resources (eg people, materials, places)
- British Geological Survey
- Clackmannanshire Field Studies, "Mines and minerals of the Ochils"
- Mining history
- Local libraries
- Online resources

Research methods

(eg contacting companies, surveys, focus groups, experimentation)

I will contact the British Geological Survey regarding information on the area with the possibility of them sending someone out to analyse and identify rocks. Developers and makers of relevant apps will be contacted to gain an understanding into the production of it.

Read local books/studies on the area and contact the makers of them to see if they still have involvement within the community.

Plan how to collect and log materials from the glen.

Presentation

Who do I think will benefit from listening/reading/looking at my presentation of my project findings/product?

The local community and tourists visiting the area will learn about the local geology in a fun and interactive way through the app and/ or leaflet.

What methods are appropriate to my audience(s) (eg demonstration, presentation software, websites, oral, report, piece of theatre, dvd, wiki/blog or any combination)

Presentations to the Ochil's Landscape Partnership Scheme, School and National Trust.

Dependencies (what is required for your project to go ahead ie reliance on other people or resources, steps in plan that must be completed before starting the next step)

Be able to access the local geological map from the British Geological Survey OR Ordnance Survey.

Acquire accurate information about local geology from sources

Being able to sit in on a meeting with the local community groups and air my proposal to them. Subsequently have their support and backing to continue with my project.

Having the ability to identify the rocks and or have a professional to do so. Before doing practical work, I will need to have an idea of what I am looking at or searching for e.g rock types. I will also need to have an appropriate way of logging and gathering data from the glen.

Permission will be required from National Trust to access and carry out practical work in the glen. This practical work to be completed before the weather starts to deteriorate or days become too short.

Contingencies	
Any anticipated problems	**My plans for overcoming the anticipated problems**
Copyright issues of using British Geological Survey Maps of the local area	Create own map
Finding the right support from local groups. Possible conflict of my own leaflet with any other that may be in production already	Produce a school specific leaflet for education purposes and a younger audience
Learning new skills and information on top of school coursework	Plan and manage my time effectively with the ability of being flexible with it
Inability to develop/produce an app	Create a leaflet only
Insufficient geology easily seen from footpaths	Broaden scope to include whole of Dollar and possibly other mines in the county

Method for recording my skills development and future areas for improvement

A log book will be kept throughout the process which will contain descriptions of what I have managed to achieve from week to week and the skills I have gained in doing so.

Assessor feedback to candidate

I think that you have developed a good, clear plan that will enable you to achieve your objectives. You have a lot of different strands of research and I have been pleased to see that you have already started to make contact with local geology groups to help you formulate your ideas. I believe that you have considered the main dependencies – you realise that you will need support from external agencies but have considered how you will manage this if it does not happened. With all of your other commitments you must ensure that you use your Gantt chart to help you to manage your time. I am impressed with your enthusiasm and your positive response to feedback and desire to work collaboratively with others.

Plan approved	Yes	**Further work required**		No
Candidate signature			**Date**	11-10-13
Assessor signature			**Date**	11-10-13

Science IP Presentation: Geological guide

Presentation of Project Findings/Product

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	Geological Guide — Dollar

How I presented my project findings (describe in detail how you presented your project findings and explain the choices you have made with regard to your presentation method(s) and audience(s))

My project was presented as a smartphone application available on Apple and Android OS. This was an interactive way to view the map with information points on it and one which was easily downloadable for a user. Unfortunately, the developers closed the application down and it is no longer available. Therefore, it was also presented as an A3 poster because this was the simplest and most effective way of showing an audience the whole map and information. Showing the app version (discontinued) would have proven too difficult as no one would have been able to download it.

I presented my final poster/leaflet to the local council on 17th March 2014. They welcomed it with great enthusiasm and offered support to take it further and make it available to the local community. They gave good feedback, providing me with contacts to talk more with and future development and will consider the possibility of producing the app/smartphone format.

Assessor feedback to candidate

Whilst it was disappointing that the Makkamap app was withdrawn from the marketplace within days of the completion of this project, you demonstrated a calm, pragmatic, solution-focused approach that has been present throughout this project. You have had very positive feedback from the Dollar Community Council – who have offered to support you to finish the app development over the summer. Your final product is clear, informative and will provide a valuable resource for the local community and visitors to Dollar. Your subject knowledge has increased significantly, alongside your understanding of copyright issues and the precarious nature of the app world. You have had a lot of other commitments and have managed these well. You refocused the project where necessary and used the resources at your disposal intelligently. Your approach was professional and this has been reflected in your final product.

Candidate signature		Date	24-3-14
Assessor signature		Date	24-3-14

Science IP Evaluation: Geological guide

Evaluation of project

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	Geological guide - Dollar

How successful has my project been overall?

(consider the strengths, weaknesses and learning points of your planning, implementation and findings/outcomes giving examples to support your comments)

Plan

I made good use of my progress log to take notes on any milestones reached or after any e-mail or face-to-face contacts. I successfully managed to organise a meeting with the local community council to propose my end product along with speaking to the museum and a member of the Regeneration Project. I logged and collated information and data efficiently making use of Google Drive to have access to it on all devices anywhere.

It was difficult to stick to deadlines set on my Gantt chart as unexpected events and work arose which could not be put off so this had a knock on effect on my timings. The survey proved useful but it would have been better to get it to more people so I could have even more feedback. I was not able to go into the glen with a geologist and take samples and look in more detail. However, I did make various trips myself and walked the trails to see what geology could be seen from them.

My planned area of study was widened from just the Dollar Glen to encompass more of the local landscape to include more information about mining, fault lines and environmental conditions millions of years ago. It paints a picture of the wider landscape, not just of a specific feature of it, which will hopefully have an impact on more people and their thoughts about the rocks beneath them.

Implementation

It was difficult deciding on the best method of presentation to show as much information as possible without it being an overload. My survey showed that children would rather have a story told about the past environments and like to view it in an interactive way - this is why the smartphone application was ideal.

The one weakness of the survey was that I only received approximately 30 replies. Although these were from a range of ages across the community, I felt that more were needed to gain a better understanding of what the majority of people wanted.

Contacting local geologists and professionals proved successful and the information they provided was adapted and included in my guide. I have learned that persistence is key to getting an answer (within reason) and for one of my contacts I resorted to phoning them to organise a meeting.

Outcomes

The final map on MakkaMappa application can no longer be accessed on the app store as the company have removed it and shut it down in the late stages of my project. Therefore, only a few people now have access to this, including me. As a result of this I changed direction and have produced an A3 poster with the information shown on it. The downside of this has meant that it is not interactive

and as engaging and majorly, people cannot see their own location on the map using GPS which was a major advantage of the app.

Time constraints did not allow me to develop my own application however after some research a suitable application that provided software to upload my own map was found.

I gave a presentation to the local community council which they welcomed with great enthusiasm. Presenting to a local group of people was useful and important as this means word can be spread around and more can be aware of what I'm trying to achieve within the community.

After a conversation with a teacher within the school, it is planned to incorporate my final map with information into a Primary 7 science course that looks at local rocks.

How effective were my communication methods throughout the project?

Throughout my project I was contacting organisations and individuals including;

App developers, British Geological Survey, Local council.

I did this by means of e-mail communication as this proved most time effective and sensible, meaning speedy replies were possible as it would be logistically too difficult to take a trip to the BGS headquarters to ask them questions.

I produced a survey to send out within the school and local area to pupils, teachers and people living in the village. This provided me with great feedback and helped steer me in the right direction with the leaflet and application by aiming key questions to them about how age specific some of the content should be.

By giving a presentation to the council; informing them of my project and showing them my finalised A3 poster/leaflet they warmly welcomed the idea amongst their members and plan to add to it and give me more support with it.

I got in touch with my local museum and organised a Saturday afternoon to go along and use their facilities and knowledge to gain some important research.

I met in person with, a fundraiser a community project in Dollar and although she gave me support and backing, the community project are focusing on their own developments but she gave me contact information for the Dollar museum and its curator.

Is there any aspect of my project that could be taken further? What might my next steps be?

Without time constraints I would have liked to develop my own application but that would have required learning how to code and the steps involved in publishing it. With possible funding this could be outsourced to a professional app-developer.

The local community have warmly welcomed my project and wish to take it on with me. This is something I wish to take further and work alongside them to produce the information in leaflet form to be distributed within the community in mass. Given time and money it would be ideal to produce an application similar to MakkaMappa and make it available digitally within the community.

As proposed by the Lead Developer at the BGS the next step would be to work with them on their application.

E-mail extract:

"Another option would be to collaborate with BGS and suggest changes to iGeology to enable users to upload their own content - similar to MakkaMappa but more geologically focused and for the whole of the UK. We could make changes to the app for you and you could advise on how best to do this and provide content for your specific area."

After a conversation with a teacher within the school, they wish to incorporate my information poster into a Primary 7 science course that includes rocks of the local area.

Candidate signature		**Date**	
Assessor signature		**Date**	

Science IP Self-evaluation: Geological guide

Self-evaluation of generic and cognitive skills development

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	Geological Guide - Dollar

In evaluating your skills consider the skills analysis which you carried out at the Proposal stage and how you said you would develop and improve these skills.

Now refer to your reflective diary/log/blog and feedback you have received and evaluate how you have developed and/or improved these skills through the work on your Interdisciplinary Project.

Application of subject knowledge and understanding

(Think about practical uses for the science you have learned. How did you use your knowledge of science/technology effectively to help you carry out various aspects of your project and how it related to your chosen broad context(s)?)

Understanding mineralogy literature meant reading background texts to gain an understanding of what was happening and this brought in my AH Chemistry which allowed me to understand chemical formulae and structures used in describing the rock types.

Cartography skills from AH Geography to draw, interpret and produce labels.

I had to use my knowledge of Geography and Geology to interpret the complex geological maps for the area and then extract this information into a more readable format for my audience and present it onto the poster.

Maths was also used throughout when considering scales for all my maps.

To produce the application, IT skills were used in the processing of image editing and map calibration online using the MakkaMappa software.

Research skills — analysis and evaluation

(Think about the research process. How did you plan, carry out, analyse and evaluate your research? You should evaluate your research methodologies, tools, resources and contacts, data recording and referencing, reliability and usefulness of data.)

I made use of online resources and journals to research the mining history of the area. I examined the copper mine in the Ochils by hiking up to it and photographing it to get a general feel for the area and brought rock samples back home.

After getting a list of journals and books from BGS contact and local museum I sourced and printed them. These large documents contained a lot of irrelevant information about other areas and I had to scan these to find relevant information about Dollar, highlighting it as went along.

I used external contacts such as the BGS who suggested a book on the local geology to look up which I sourced and read. Some of these texts contained detail that was too complex to include within my guide. I had to 'translate' this information into something more understandable for the use of the general public and children.

My research findings and information was managed using Google Drive, an online cloud application which meant I could have access to all of my information on my phone, laptop and school computers.

Interpersonal skills — negotiate and collaborate

(Think about how you considered other peoples' views/feedback, discussed issues of concern, reached a solution where needed, adjusted your approach in response to a situation/environment, showed positive self belief and had the confidence to offer and ask for support.)

The software and app that I was using shut down near the end of my process after I had produced and uploaded the map. That meant that no one was able to download the MakkaMappa application as it was taken off the App store. Therefore, I adjusted my approach and produced an A3 map with the information boxes on it to represent the digital format. I had to contact MakkaMapp directly by e-mail to enquire about the app not being available. They gave me an option that they could make the app available for one day so that specific people could download it from the App store, however I did not feel this was enough time and would prove no use for future potential users.

I carried out a survey around the school from a variety of ages - teachers and children aged 16-18. I took these into account when developing my app and information boxes, making them 'light-hearted' but still containing enough information about the geology.

After contacting the British Geological Survey (BGS), copyright issues arose when trying to use the BGS maps as a base map and this involved a lengthy

process to gain permission which time could not allow for. Instead I sketched an OS map and adapted it to my own needs.

Throughout the process I contacted many people via e-mail and it was difficult waiting for replies that I needed for my project to progress. Some individuals did not reply after a few e-mails so I had to get around this by finding others that might know the answer to my questions.

I got in touch with my local museum in Dollar and arranged a face-to-face meeting with them. They were very helpful and provided me with access to old geological maps made specifically for the area and gave me a few books to read over. Their support was useful and they are planning on producing a presentation about the coal mining of the area - this inspired me to produce my app/leaflet

I asked for support from one of my teachers, who has a background in Geology and she provided me with helpful guidance and useful advice for areas I wished to explore and supported my ideas.

After realising time would not permit me to develop my own application I went online and researched how much it would cost to outsource the development to a professional. I had online conversations with developers from China and proposed my ideas. They then gave me a price of £2000 and this was unviable considering I had no funding.

Planning — time, resource and information management

(Think about your time management. How did you set targets, monitor/record progress, consider any probable barriers to achievement and take steps to minimise them?)

Managing time was difficult as I am Deputy head boy of the school and a member of the school pipe band. These two things take up the majority of my day, with band practices every Wednesday night and every other lunchtime, it was hard to find time to fit this in. Especially due to other coursework and exams for my 3 Advanced Highers.

Throughout the process, I referred to my Gantt chart, however unexpected work, deadlines and pipe band competitions got in the way, so work on completing the app and poster was completed during any other spare time, for example in free periods or lunchtime during school.

I kept a progress log throughout the process which I entered information into after any milestone, key piece of research or advancement was made.

Independent learning — autonomy and challenge in own learning

(Think about how you used your skills to make things happen, took the initiative to establish links with other learning environments/opportunities and looked for challenges rather than taking the easy option.)

I contacted a geologist from the BGS, Mike Browne via e-mail, who provided me with great specific information about Dollar and the surroundings and gave me guidance on a book to research. Although he said there was 'no stunning geology' in Dollar Glen itself, I then thought to broaden my area to incorporate more of the surroundings.

I established a link with the Dollar museum and they became interested in my project as they are in the process of producing an information board about the local coal history which plays a part in my project. They gave me access to old geological maps produced specifically for Dollar and supported my project.

When researching if anything similar had been done, I came across a geology map of the Loch Lomond area complete with a trail map. I e-mailed the individual who produced the map using the MakkaMappa software. She provided me with useful information about her experience with the software and gave tips on how to get the most out of it.

Another individual at the BGS, Christopher Rochelle put me in touch with their iGeology application lead developer, Wayne Shelley, who is in charge of the application which has 160,000 active users across the UK. He was more than happy to provide specific data for Dollar and suggested collaborating with BGS on their iGeology application for the Dollar area.

Problem solving — creative approaches; critical thinking; logical approaches

(Think about your problem solving skills. How did you generate and explore ideas, use logical and creative approaches, analyse source materials in order to support findings, reflect on problems and possible contributory factors and think critically about possible actions/changes?)

My initial research included similar apps or even publicly available information within the local community. I found that there was no such thing available.

It was difficult to decide on a best method to present all the data on one map. I therefore decided to colour code areas and put information boxes within each area. There was also a lot of information that I couldn't include as this would make the information boxes too large and would become less engaging for the reader.

My end product was first in the form of a smartphone application until the company running the app closed it down and now it is no longer available to download. I therefore extracted the map from this and made it into an A3 poster with the information attached so I could present this.

I did not wish just to produce a standard leaflet at the end. I want to expand on this and produce a digital app

I contacted the British Geological Survey (BGS) as copyright issues arose when trying to use the BGS map this then involved a lengthy process to gain permission which time could not allow for. Instead I sketched an OS map and adapted it to my own needs.

My survey that was handed out throughout the community had to be specific and I had to aim the questions so that I could then go in one direction from the responses given.

Presentation skills

(Think about how you presented your findings. Evaluate your presentation method(s), choice of audience(s), layout, structure, degree of formality and choice of content. Did your presentation include information/ideas/reflections with supporting detail in a logical order and reach a reasoned conclusion?)

I presented this final poster/leaflet to the local community council on 17th March 2014. They welcomed it with great enthusiasm and offered support to take it further and make it available to the local community. They gave good feedback, providing me with contacts to talk more with and future development and will consider the possibility of producing the app/smartphone format. I feel it was important to give this presentation to a local council as they are very influential and can spread the word about my guide and its aims

Although the application was shut down, I still produced it and it is accessible to anyone who already has the MakkaMappa application.

Therefore, the final product was in the form of an A3 poster with information boxes on it that would have been included within the application. This was a copy of the application but it was difficult to represent the data as easily and it became more cluttered using paper format.

Self-evaluation — recognition of own skills development and future areas for development

(Think about how you have developed throughout your project. How did you deal with feedback, praise, setbacks and criticism and their impact on your own development of knowledge, skills and understanding? To what extent did you ask for feedback, learn from experiences and how will you use these to inform future progress?)

The project has allowed me to further take into account the views of people around me who have given suggestions and improvements to the whole process.

Feedback from my survey and general comments that were provided were considered and my approach was changed slightly because of this.

I gained great feedback from the local council who suggested ways to develop this further and improve upon the design.

I have been given feedback for the A3 poster by teachers within the school to change the information boxes so that they can be more easily linked to the map so it is more understandable for the reader.

In the future I will try to take into account the time allocated to fit everything in. At times I was rushed and other activities took priority.

My presentation skills and ability to stand in front of an audience have improved dramatically. I feel that really knowing the subject matter is key to giving a good presentation. In the future I will use this and get to understand the topic to the best of my ability so that it is easier to stand up and talk freely about it, knowing all the details.

My IT skills were tested throughout when developing the map using Photoshop and the online calibration software. This is something I wish to build upon in the future and become more at ease with Photoshop. An area of future development which has great potential is app development and one which I wish to access to produce my own app.

Communication skills have also been improved as it was important throughout my project to get across to an individual exactly what my guide will include and the aims of it. It was important to do this as concisely and engaging as possible so that they would have interest in it.

This section is not mandatory. It has been included to allow you the opportunity to undertake an overall reflection of your project.

Reflection on my experiences throughout this project (eg things you feel you have achieved, things you have done that you feel particularly proud of, anything you would do differently were you to do something similar in future)

I feel proud that my guide may be used in a classroom environment - it is nice to give something back and others can read and learn from what I have produced.

Skills that I have used in this project that I would like to develop further (eg using skills in even more challenging situations, more working on your own, more team working)