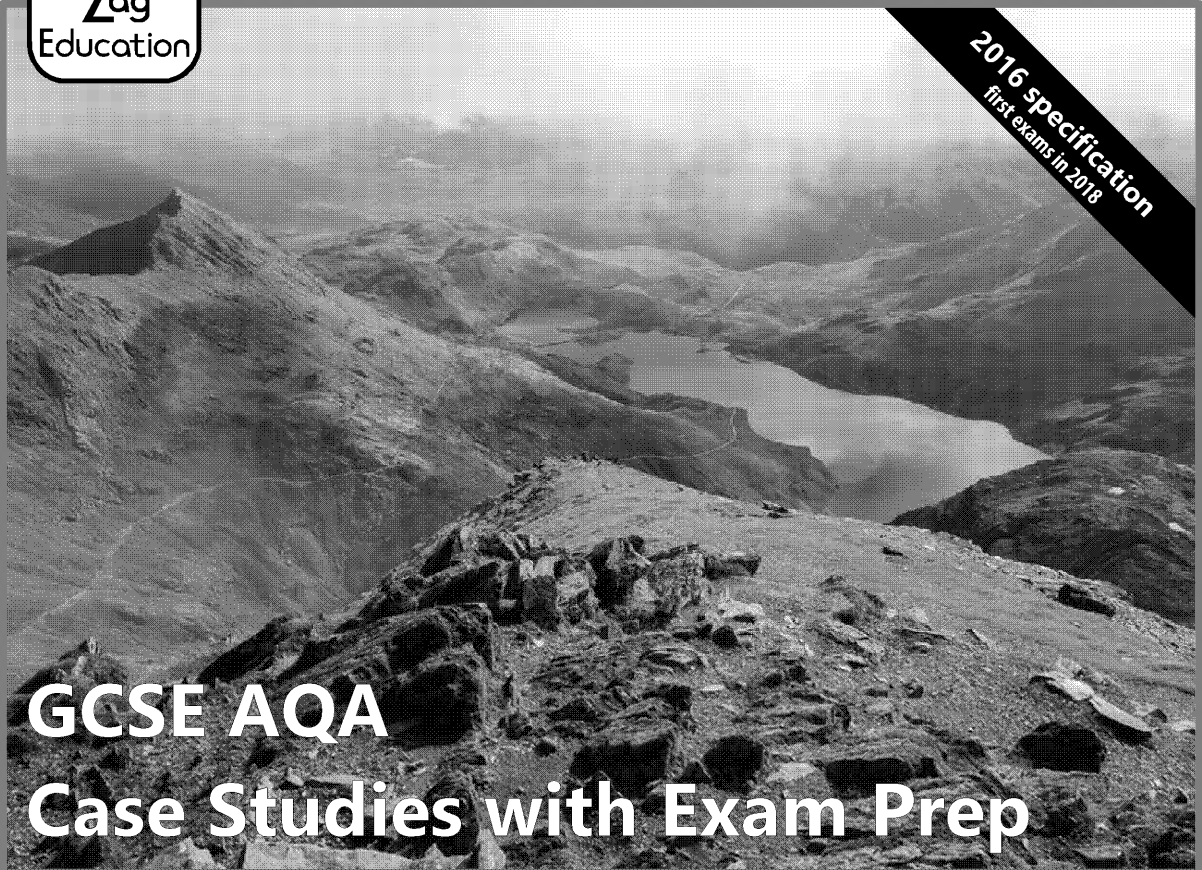


2016 specification
first exams in 2018



GCSE AQA Case Studies with Exam Prep

Physical Landscapes in the UK: Glacial Snowdonia

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Teacher's Introduction

This resource has been developed to provide case studies and exam preparation material to support the GCSE AQA specification (8035) **Section C: Physical Landscapes in the UK**.

This detailed case study is on **Snowdonia National Park** representing a **glacial landscape** within in the UK.

The case study includes a main content section which can be used as part of a lesson plan or distributed to students for self-guided research; a selection of ICT interactive links to further students' research around each topic and a set of Springboard Images and discussion questions (also available as a PPT file accessible by digital download) which makes a fantastic starter activity.

A webpage containing all the links listed in this resource is conveniently provided on ZigZag Education's website at zzed.uk/8801

You may find this helpful for accessing the websites rather than typing in each URL.

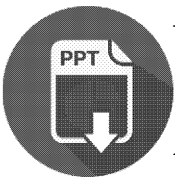


The exam preparation section which follows the case study contains a summary table, bringing together all of the key facts and figures relating to the case study; rapid-fire revision questions (with answers) to help recall and retention of the main points; and an exam-style question and mark scheme, written in the style of the AQA sample material, so that students can practice answering questions relating to case studies and applying relevant knowledge in their answers.

The resource may be used as a source of reference for the required case studies for individual study, or for group work leading to discussion or debate. Subheadings in the information sections are designed to enable tabulated comparisons of social, economic and environmental impacts.

Other detailed case studies are available for this topic area (two coastal landscapes, two river landscapes, and an additional glacial landscape):

- The Jurassic Coast (Coastal)
- The Seven Sisters (Coastal)
- The River Thames (River)
- The River Spey (River)
- The Lake District (Glacial)



A PowerPoint presentation containing the Springboard Images starter activity to accompany this resource is available as a free digital download. Just register for free updates using the link below to download all available content for your school or purchasing site.

November 2018

Free Updates!

Register your email address to receive any future free updates* made to this resource or other Geography resources your school has purchased, and details of any promotions for your subject.

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Content

Introduction:

Snowdonia is an upland region in North Wales characterised by high mountain ranges, lakes and waterfalls. It covers an area of 2,132 km² across the Welsh counties of Gwynedd and Conwy.

It became a National Park in 1951 to honour and protect the unique landscape that it holds. Within the National Park lies Snowdon, the tallest mountain in England and Wales that reaches a height of 1,085 metres. Although this is the tallest mountain in the area there are plenty of mountains surrounding it that reach over 900 metres. Between these mountains lie hundreds of lakes, rivers and waterfalls.

Around 26,000 people live in Snowdonia. The region has plenty to offer with its rich Welsh culture, picturesque scenery and extreme sports, so no wonder it attracts around 10 million visitors every year!

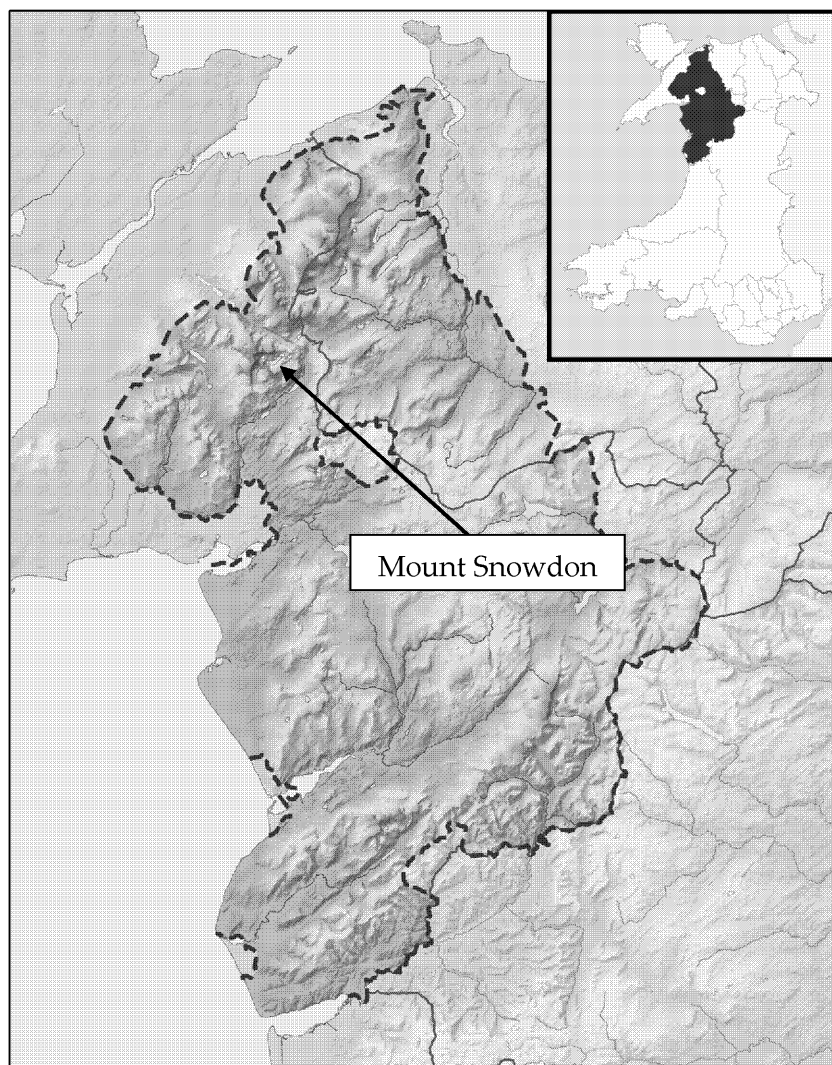


Figure 1: Map of Snowdonia

The Formation of Snowdonia:

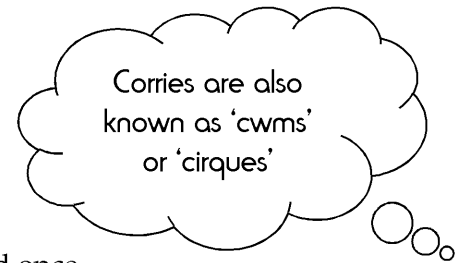
The upland landscape of Snowdonia was formed over 400 million years ago during the geological time period called the Cambrian. During this time the landscape was sculpted by volcanic activity, tectonic plate movement and the deposition of sediment. The land was then subject to a significant uplift which formed a mountainous landscape.

Since then, the landscape has been further shaped by the climate, rivers and ice ages. The glaciers formed in the upland areas and made their way down the mountains through the river valleys to lowland areas, all the while eroding the landscape and depositing debris. The last glaciers retreated around 10,000 years ago revealing new glacial landforms across Snowdonia. It is these geological and glacier shifts that have formed Snowdonia into the landscape we know today.

'Snowdonia is still being shaped today by the processes of weathering, erosion and deposition. What do you think it will look like in another 10,000 years?'

Glacial Landforms in Snowdonia:

The paths of the glaciers have left significant trails across Snowdonia. It therefore holds many great examples of erosional and depositional glacial landforms.



Erosional Landforms Found at the Source:

The sources of glaciers are usually found high on the mountainside and once retreated leave behind some interesting landforms.

Corries are vast armchair-like hollows found in the mountainside. In the UK they are often found on the north-east side of the mountain where it is cooler and more sheltered. During an ice age, ice and snow would have accumulated and compacted in a small hollow creating the source of the glacier. Over time, the weight of the ice along with plucking and abrasion would have deepened the hollow. Freeze-thaw weathering would also have helped to erode the headwall, deepening the hollow further. After glaciation, lakes often form in the corrie and are known as *tarns*.

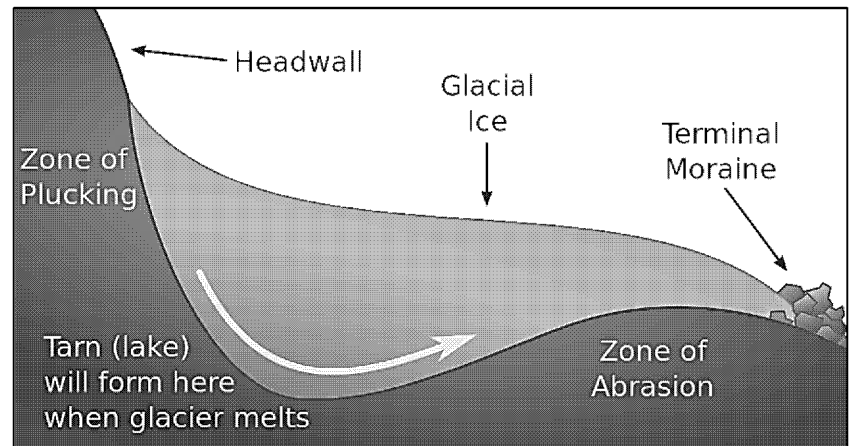


Figure 2: Diagram to show the formation of a corrie

Snowdonia has many examples of corries, one of the most iconic examples being Cwm Idwal. It is very popular with tourists and geologists as it shows a great example of a corrie as well as other glacial features.

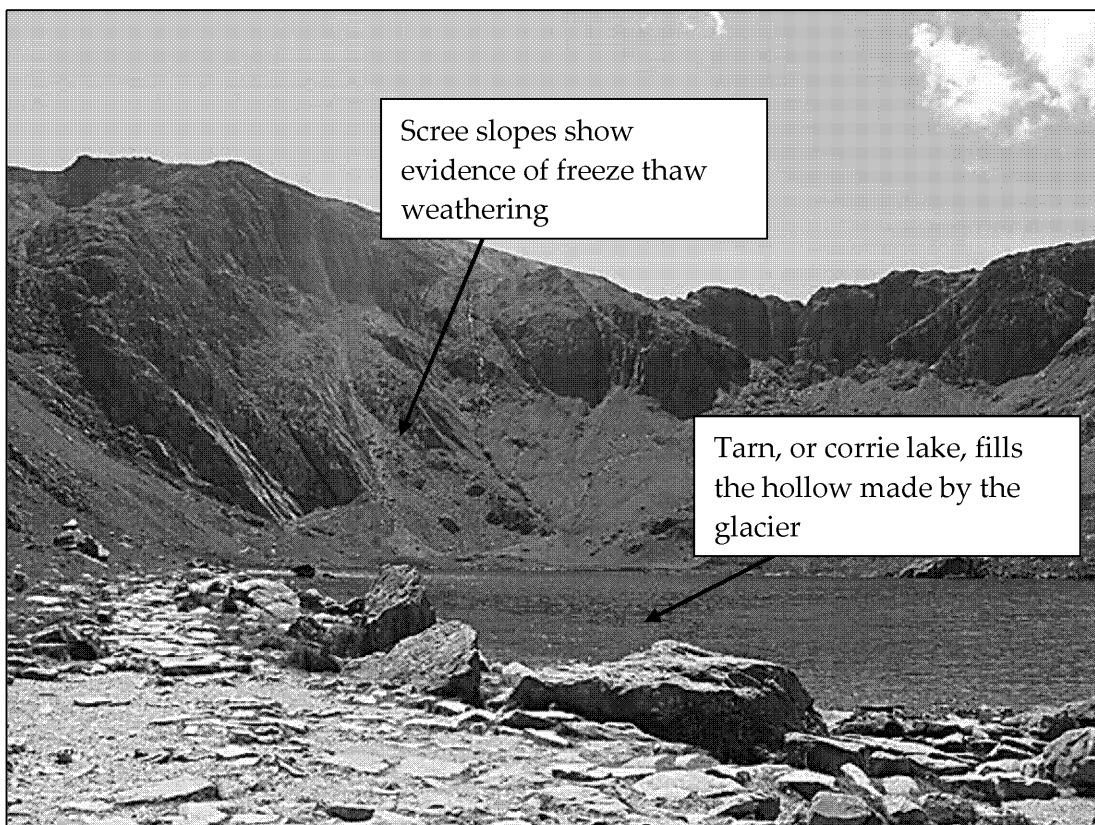


Figure 3: Cwm Idwal

From the formation of a corrie other key glacial features form:

- *Arêtes* are ridges that form when two corries form next to each other or back to back.
- *Pyramidal peaks* are sharply pointed mountain peaks that form when three or more corries form around a mountain.

Due to the number of corries found in Snowdonia there are plenty of arêtes. A prime example is the famous steep ridge known as Crib Goch that leads to Snowdon. Snowdon itself is actually a pyramidal peak as it is surrounded by three corries: Cwm Glaslyn, Cwm Tregalan and Cwm Clogwyn, and has a sharp pointed peak.

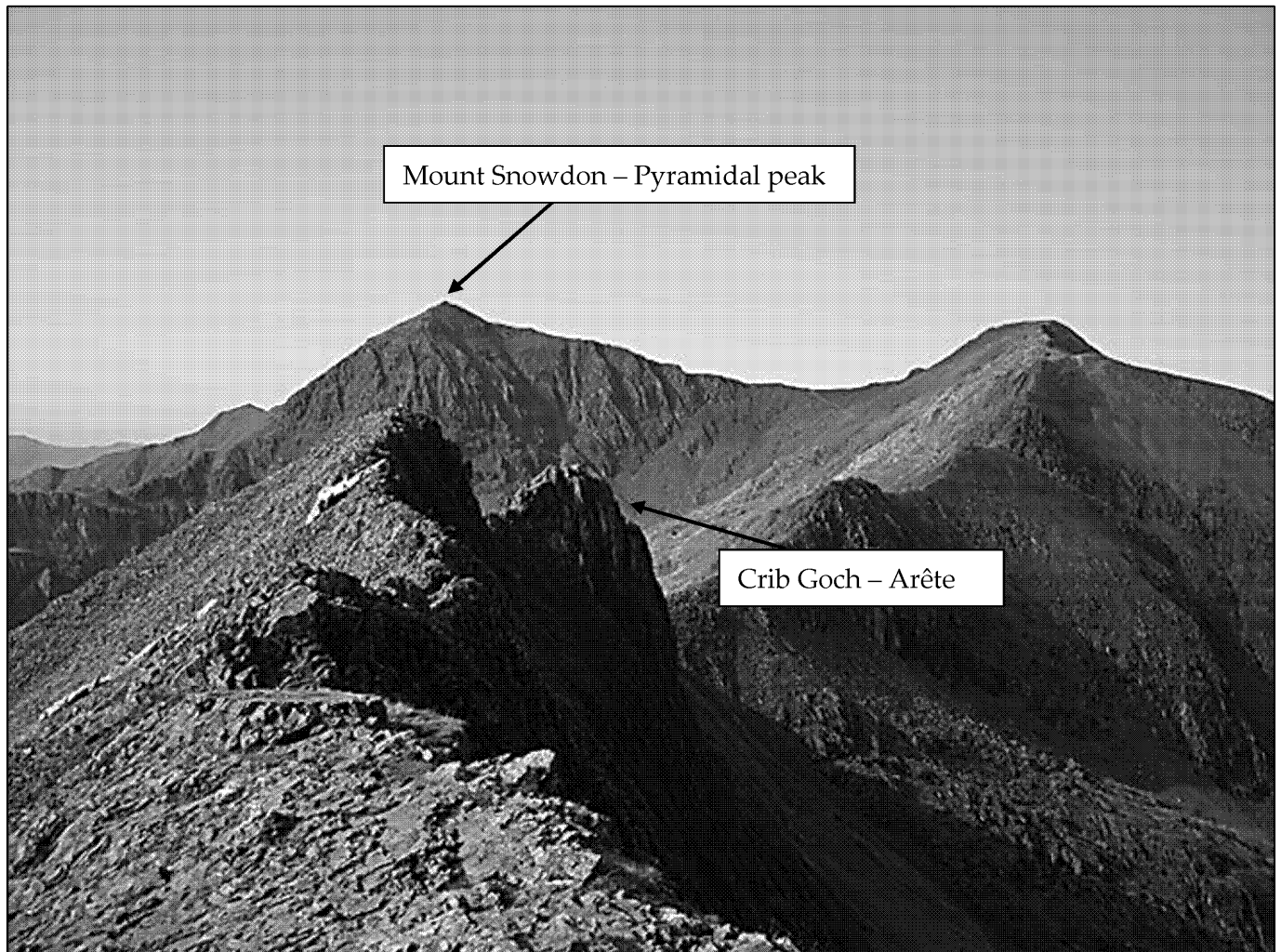


Figure 4: Mount Snowdon and Crib Goch, examples of glacial landforms in Snowdonia

Erosional Landforms on the River Valley:

Once the glacier has moved from the top of the mountain downwards it carves its way through the river valley creating different landforms.

U-shaped valleys are formed as the glacier flows through the old v-shaped valley. As it flows, the power of the ice erodes the sides and bottom of the valley through plucking and abrasion. This deepens and widens the valley floor, creating a u-shaped valley.

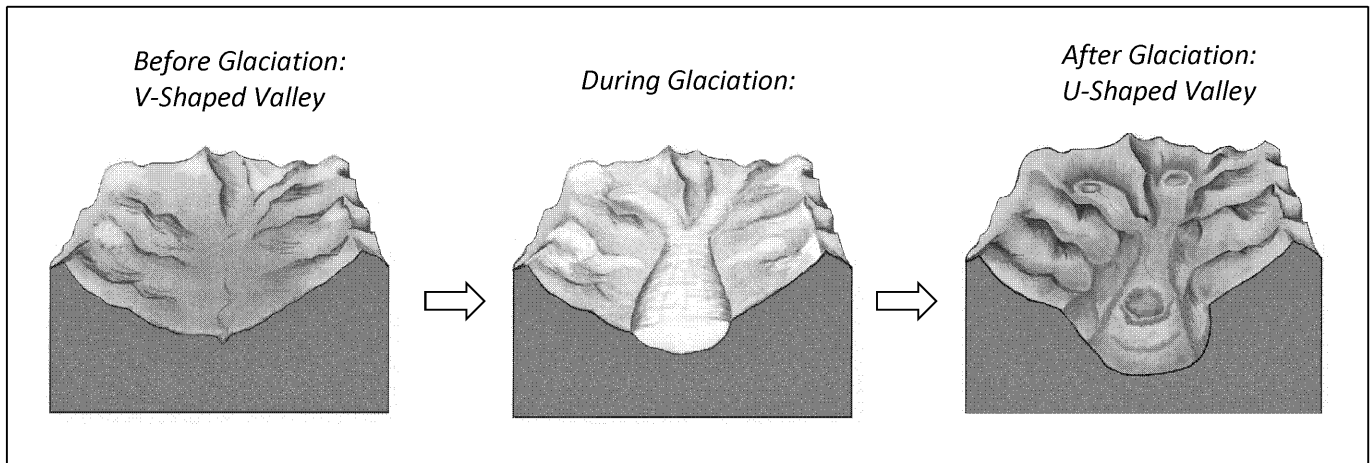


Figure 5: The formation of a u-shaped valley

Within the u-shaped valley other glacial landforms can be found:

- *Truncated spurs*: These are the remains of the interlocking spurs from the old v-shaped valley.
- *Hanging valley*: This is part of the old valley that was not affected by the main glacier but by smaller glaciers that eroded the valley at a slower rate. This left the old valley partway up the new valley sides. This feature is known as the hanging valley. As tributaries flow down these valley sides and over the steep edge of the hanging valley they form striking waterfalls.
- *Ribbon lake*: After the glaciers retreat, areas of the valley that were deepened by the glacier fill with water forming long lakes.
- *Roche moutonnée*: These are formed when there is a protruding section of rock on the valley floor that is more resistant to erosion than the surrounding rock. The rock gets smoothed down by erosion on the upstream side but made jagged on the downstream side through plucking and abrasion.

In Snowdonia, examples of all these features can be found in the valley of Nant Ffrancon.

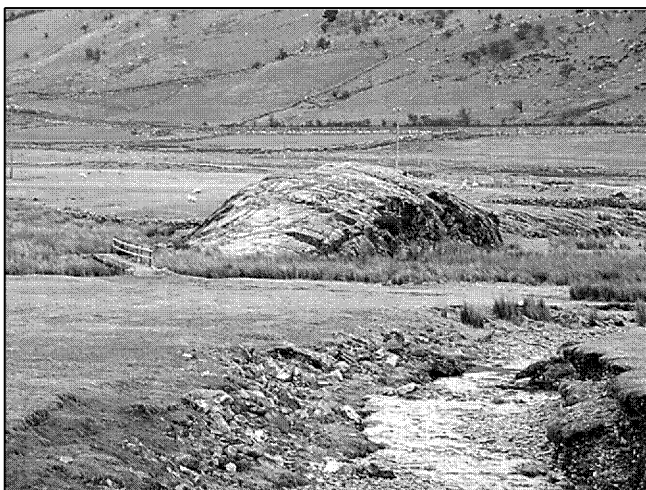


Figure 7: A roche moutonnée on Nant Ffrancon valley floor

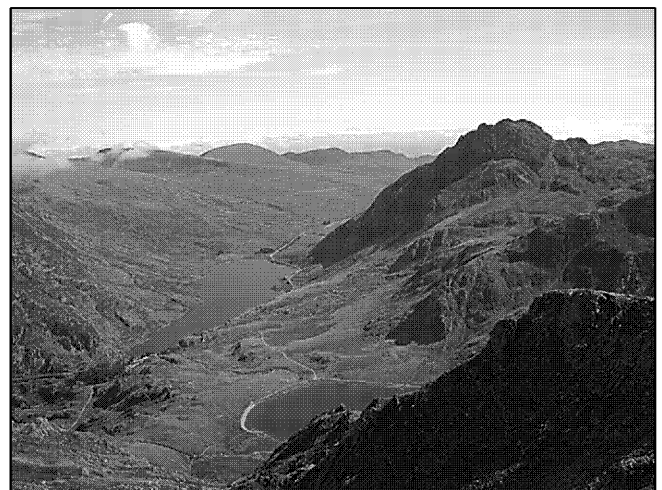


Figure 6: Llyn Ogwen is an example of a ribbon lake found in the Nant Ffrancon valley

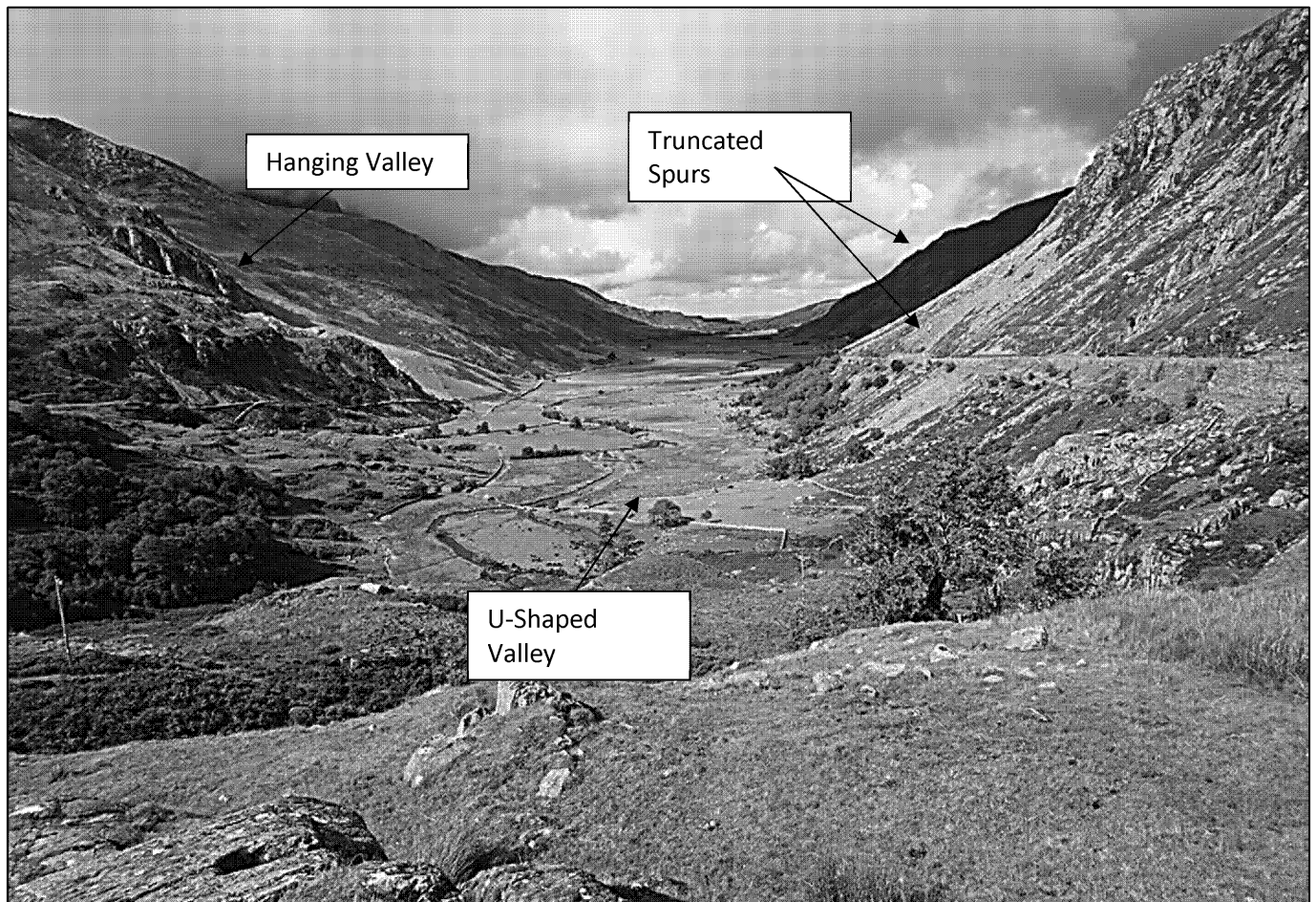


Figure 8: Nant Ffrancon glacial valley

Depositional Glacial Landforms:

Glaciers, being very powerful rivers of ice, can transport and deposit vast amounts of sediment. As the glaciers retreat, these deposits can still be identified and can help us trace the course of the glaciers. Snowdonia has many examples of these glacial depositional landforms.

Moraines are the build-up of rock debris that has been deposited by the glacier. A variety of types of moraine can be found in Cwm Idwal and Nant Ffrancon.

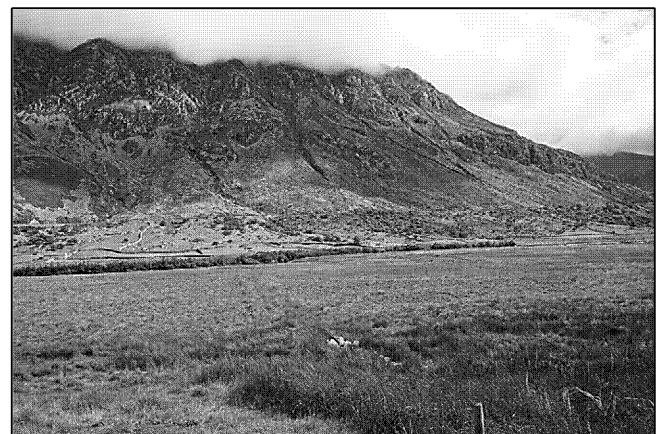


Figure 9: Moraine on the slopes of Nant Ffrancon

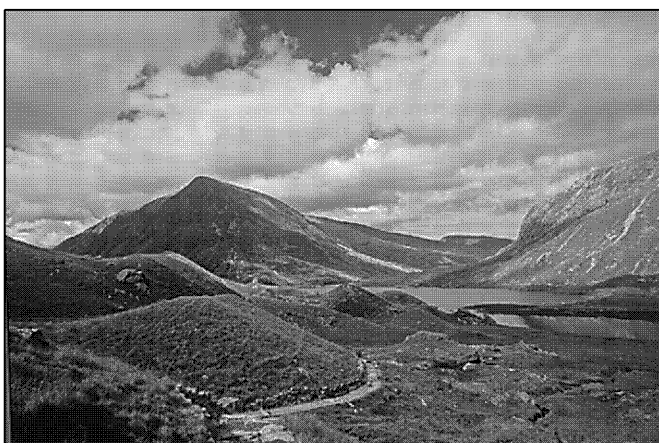


Figure 10: Drumlins near Cwm Idwal

Drumlins are another feature of glacial deposition. They are formed from the ground moraine underneath the glacier being sculpted by the ice to form streamlined, egg-shaped hills. They can be found near Cwm Idwal and in the Conwy Valley in Snowdonia.

Human Activities in Snowdonia:

There is no escaping the fact that Snowdonia's landscape has also been shaped by human activity. People have lived in the area for thousands of years using the land for farming and forestry. Since the Victorian era people have been visiting the park as tourists, coming to escape the built-up cities and enjoy the fresh country air. Today Snowdonia is home to 26,000 people who all live and work in the National Park. The land is continuing to be used and shaped by human activities in various ways.

- Snowdonia Population Fact File:
- Home to 26,000 people
 - There are more sheep than people
 - 24 villages
 - 43 towns
 - 58.6% of the population speak Welsh
 - Average age is 46 years old

How human activities have shaped Snowdonia:

Farming:

Farming used to be the main occupation in Snowdonia, with the uplands used for sheep farming and the lowlands for growing crops. Agriculture is less prominent in the region than it used to be but despite this it has probably had the most influence over the shape of Snowdonia. The lowlands were stripped of vegetation in order to plant crops and in the uplands vegetation is constantly being eaten by sheep which can lead to overgrazing. Farmers have also built drystone walls across Snowdonia to keep control of their livestock. Despite how significantly farming has changed the natural landscape of the region it is now considered integral to the culture of Snowdonia and the farmers are the main managers of the land.



Figure 11: Sheep farming in the uplands

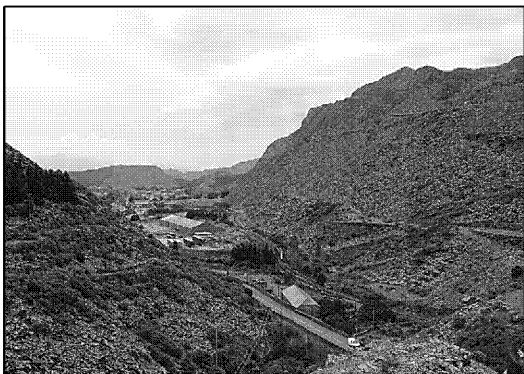


Figure 12: An old quarry in Snowdonia

Quarrying:

Slate quarrying has taken place in Snowdonia since Roman times, as well as metal mining of copper and even gold. Nowadays these quarries are no longer in use and only the remnants remain. Some people think that these quarries significantly scarred and polluted the landscape of Snowdonia. However, many now see them as part of the heritage of the landscape with the history and culture of the quarries attracting tourists; there is even a National Slate Museum!

Hydroelectric Power:

The climate in Snowdonia is extremely wet and windy so perfect for renewable energy! Hydroelectric power stations have been built on the edges of the park, such as Dinorwig Power Station. Despite the disruption during the construction of the station, the company have tried to ensure the preservation of the natural environment by building the station inside the mountain, hence the power station's alternative name of 'Electric Mountain'. Dinorwig Power Station has even become a tourist attraction! However, the damming of the water and the creation of the reservoir does affect the water flow downstream; this may cause some damage to the environment or make life more difficult for farmers.



Figure 13: Electric Mountain, Snowdonia

Tourism in Snowdonia:

Tourism is a growing industry in Snowdonia with the region receiving around 10 million visitors each year. In 2013, the total amount of money spent by tourists in the region was £433.6 million. The main industries are now retail, tourism and catering which shows just how important it is for the area.

Why do tourists come to Snowdonia?

- To see and experience the beautiful natural landscape
- To get away from the city to the countryside
- To experience the culture and history of the area
- To climb Snowdon or even get the train up it!
- For the adventure sports, such as climbing, kayaking or gorge scrambling. Snowdonia is also home to the longest zip wire in Europe!



Figure 14: A climber in Snowdonia National Park

What are the impacts of tourism on Snowdonia?

There are many benefits of tourism in Snowdonia, however with these benefits often come some downsides too.

	Positives impacts of tourism	Negatives impacts of tourism
Social	<ul style="list-style-type: none">• Provides more income for local residents who work in tourism.• Helps to preserve the culture and heritage of Snowdonia by promoting it as a tourist attraction.	<ul style="list-style-type: none">• 14% of homes in Snowdonia are holiday homes which drives up the house prices for locals making it difficult for them to stay in the area.• Concerns over whether the traditional welsh farming culture has been lost to tourism.
Economic	<ul style="list-style-type: none">• Provides an income for the region.• Provides an extra 4000 jobs for local people.• Allows farmers to diversify to B&Bs and holiday accommodation bringing in more money for them.	<ul style="list-style-type: none">• The jobs it provides are only seasonal work; locals have to find extra work in the winter months.• Tourism season can make the cost of living in the area increase.
Environmental	<ul style="list-style-type: none">• People learn about the landscape, its history and geology and why it needs protecting.• Persuades people to be more active and get outside.• Increased environmental awareness.	<ul style="list-style-type: none">• There are 2,398 km of footpaths that are being eroded by the number of tourists walking the paths every year.• Some walkers stray from the footpaths which can cause damage to the plants and soil in the landscape.• Around 90% of visitors to Snowdonia travel by car. This means that traffic congestion and pollution can be high especially around the honeypot towns and villages.• There is an increased amount of litter left by tourists.

How are these impacts managed?

Tourism is a necessity for Snowdonia, so the negative aspects of tourism have to be managed to reduce their impact. There are several ways this is happening in Snowdonia:

1. Green Snowdonia

This project encourages the tourism businesses located in the park to be as sustainable as they can be. Whether that's by using less fuel, buying products locally, recycling waste or encouraging their visitors to use public transport. All these things are helping to preserve and maintain the beautiful Snowdonia landscape while allowing visitors to enjoy it.

2. Car free days and plans

There are guides online about how you can enjoy Snowdonia without having to use your car. Organisations also promote the use of the public transport they have in place that can take visitors from their accommodation to various walking sites across the park. These plans help to reduce traffic congestion and pollution across the park.

3. Affordable housing

The Snowdonia National Park Authority (SNPA) is helping to ensure the provision of affordable house prices for locals to reduce the impact of people from outside the region buying holiday homes.

4. Footpath erosion management

Various organisations that help to manage Snowdonia encourage volunteers to help to restore and maintain the footpaths. They do this by removing any loose rocks and clearing ditches to stop soil erosion. They also try to make the footpaths clearly marked to stop visitors from accidentally going astray and causing damage elsewhere.

5. Litter on Snowdon

The Snowdonia Society has a team of volunteers that help to pick up any litter found on the paths up to Snowdon to keep the landscape as pristine and natural as possible.



Figure 15: Public transport in Snowdonia



Figure 16: Sign asking visitors to avoid littering



Figure 17: A footpath being repaired in Snowdonia



Fact Table

Location:	North Wales
Area:	2,132 km ²
Height of Snowdon:	1085 metres
Population:	26,000 people
Annual number of visitors:	10 million
Retreat of last ice age:	10,000 years ago
Erosional landforms at the source:	Corries, e.g. Cwm Idwal Arêtes, e.g. Crib Goch Pyramidal peaks, e.g. Snowdon
Erosional landforms on the river valley:	U-shaped valley Truncated spurs Hanging valley Ribbon lake Roche moutonnée
Name of valley where these features can be found:	Nant Ffrancon
Depositional landforms:	Moraines Drumlins
Number of villages:	24
Number of towns:	43
Percentage of the population that speaks Welsh:	58.6%
Human activities that shape Snowdonia:	Farming Quarrying Hydroelectric power Tourism
Tourist expenditure in 2013:	£433.6 million
Percentage of holiday homes:	14%
Number of jobs provided by tourism:	4,000
Amount of footpaths:	2,398 km
Percentage of visitors who arrive by car:	90% approx.
Tourist management:	Sustainable tourism businesses Car-free days Affordable housing projects Repairing eroding footpaths Litter picking



Videos

'Electric Mountain'

 https://www.youtube.com/watch?v=d-Gbs_kXK8Q

Footpath management

 <https://www.youtube.com/watch?v=UJjl2D5OJzE>

News:

BBC – Litter on Snowdon

 <http://www.bbc.co.uk/news/uk-wales-north-west-wales-34770312>

BBC – Footpath erosion

 <http://www.bbc.co.uk/news/uk-wales-38887453>

Google Trekker – Explore Snowdonia!

How to use:

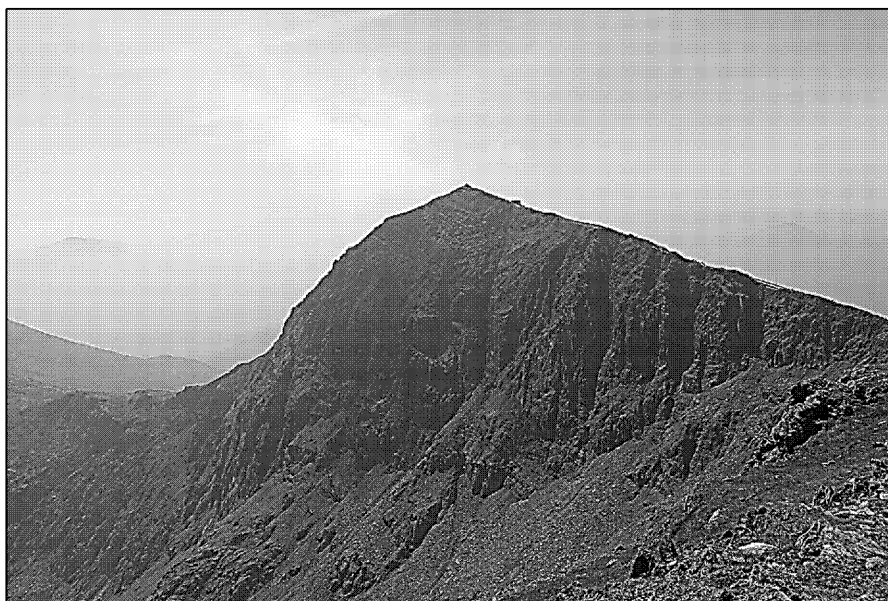
 <https://www.youtube.com/watch?v=FjxPBV73TeA>

Maps:

 <https://www.google.co.uk/maps/place/Snowdon/@53.0685969,-4.0746901,6461m/data=!3m1!1e3!4m5!3m4!1s0x4865098216d283bd:0x7fe2ceeb3aa47434!8m2!3d53.068504!4d-4.0762766?hl=en>

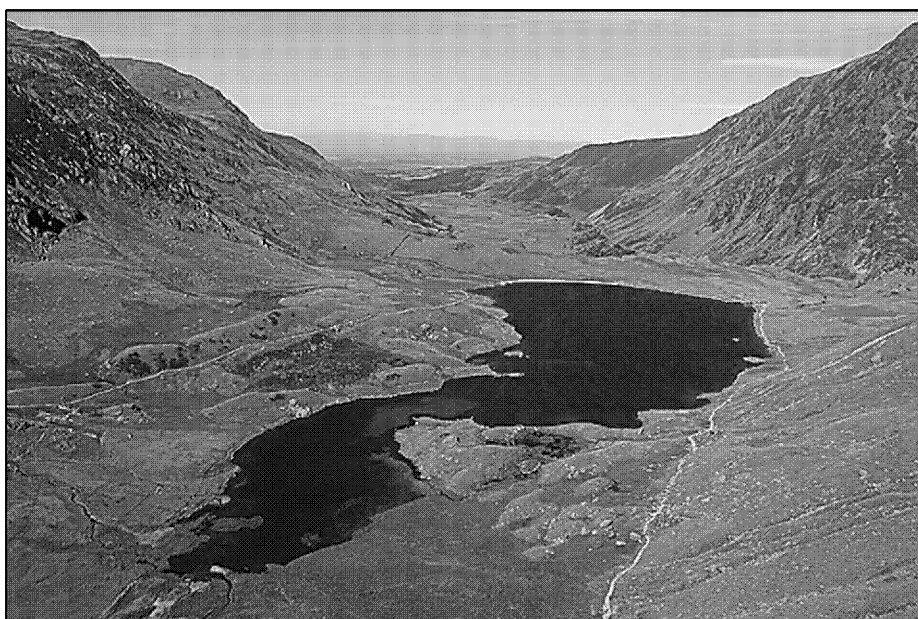


Springboard 1



1. Discuss how Snowdon may have formed.
2. What glacial landforms can be seen in this photo?
3. What weathering and erosional processes helped to form these features?

Springboard 2



1. How was this u-shaped valley formed?
2. What other glacial landforms can be seen?
3. Suggest how this landscape would have looked during an ice age thousands of years ago.

Springboard 3

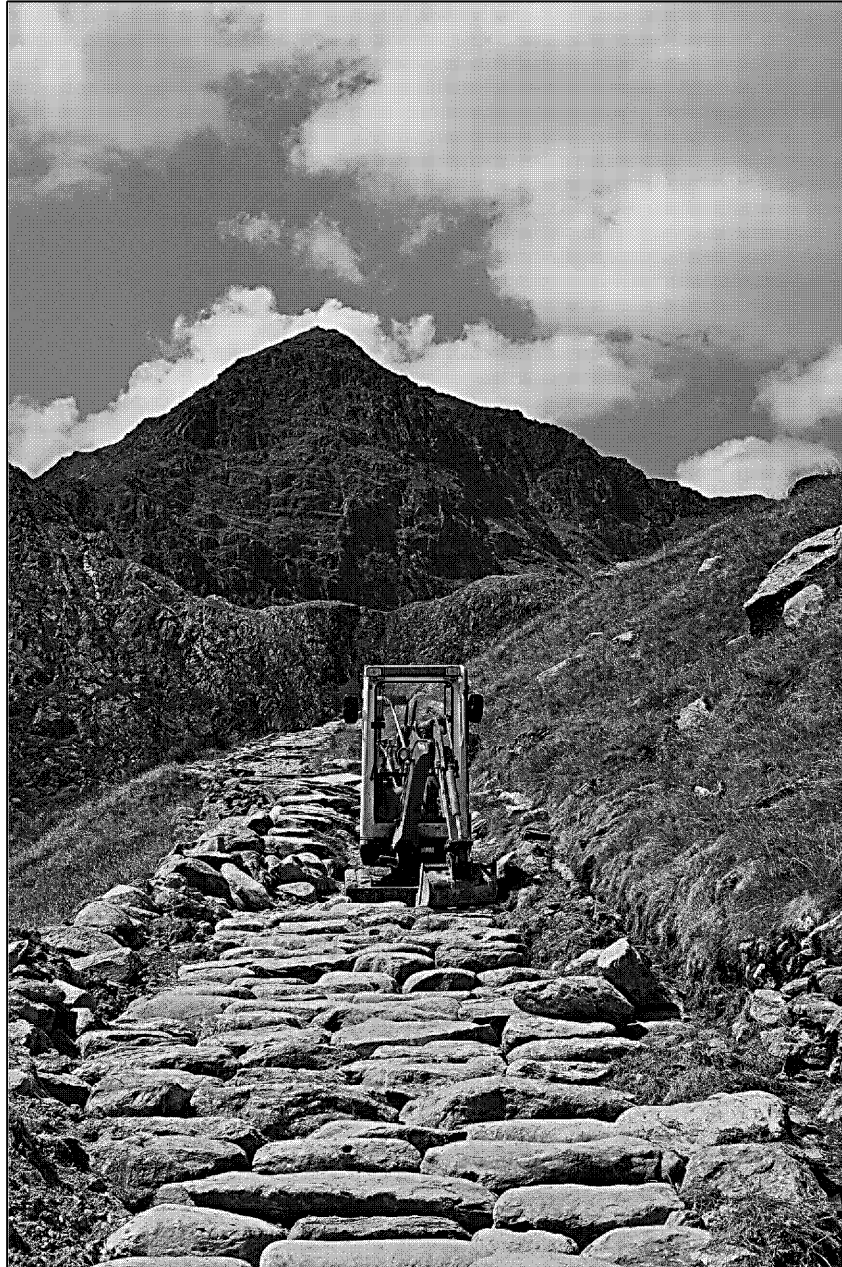


1. How has farming affected the landscape of Snowdonia?
2. In what ways have farms diversified in Snowdonia, and why?
3. Suggest other ways human activities have changed the landscape in Snowdonia.

Springboard 4



1. Suggest why Snowdonia is a popular destination for tourists.
2. What benefits do tourists bring to Snowdonia?
3. What negative impacts can tourism bring?



1. What is the image showing?
2. Suggest why the negative impacts of tourism need to be managed.
3. How is the impact of tourism managed in Snowdonia?



Springboard Suggested Answers

Springboard 1

1	<ul style="list-style-type: none">• It formed millions of years ago through stages of volcanic activity and plate movement causing the land to fold and uplift.• It would then have been shaped by various types of erosion and weathering and ice ages.• Corries from the glaciers gave the mountain its sharp point.
2	<ul style="list-style-type: none">• Pyramidal peaks• Arêtes• Moraine• Edges of corries
3	<ul style="list-style-type: none">• Plucking• Abrasion• Freeze-thaw weathering• Other types of weathering

Springboard 2

1	The u-shaped valley was formed by the glacier carving its way through a v-shaped valley and eroding the sides. This made the valley floor wider and flatter and the valley sides steeper so forming a u-shaped valley.
2	<ul style="list-style-type: none">• Ribbon lake• Truncated spurs• Hanging valley• Drumlins• Moraine
3	<ul style="list-style-type: none">• Glacier would have filled the valley up to the point of the hanging valleys.• Whole area covered in ice and snow.• Moraine may have also been visible on the glacier.

Springboard 3

1	<ul style="list-style-type: none">• Stripped the lowlands of vegetation in order to grow crops• Created fields by building drystone walls• Sheep and cattle graze in the uplands and this can cause overgrazing
2	Farms have had to diversify as the farming industry has declined in Snowdonia. A lot of farms have diversified by becoming holiday accommodation and running B&Bs alongside their farms to increase their income.
3	<ul style="list-style-type: none">• Quarrying• Hydraulic power stations• Tourism

Springboard 4

1	<ul style="list-style-type: none"> • Idyllic landscape and countryside • Walking and hiking • Experience the culture and history • Adventure sports • Any other valid point(s)
2	<ul style="list-style-type: none"> • Increases income for the region • Brings more jobs for local people • Allows farmers to diversify into tourism bringing them more income • Increases environmental awareness of the area • Any other valid point(s)
3	<ul style="list-style-type: none"> • Raised cost of living and houses for locals • Traffic congestion and pollution during busy tourist seasons • Litter can be an issue • Footpath erosion • Any other valid point(s)

Springboard 5

1	Footpath erosion management. Using a digger to repair and maintain the footpath as well as making sure the footpath is as clear as possible to stop walkers from straying onto the land.
2	Tourism is overall very good for Snowdonia and to keep the benefits the negative impacts have to be managed so everyone can enjoy the landscape in its preserved state.
3	<ul style="list-style-type: none"> • Promoting and providing good public transport services • Educating visitors with leaflets and signs explaining how they should stick to the paths and clear away their litter • Trying to make more affordable housing for locals • Encouraging tourist businesses in the area to be as sustainable as possible • Getting teams to litter pick • Any other valid point(s)

Summary



Snowdonia

Introduction:

- Snowdonia is an upland region located in North Wales in the counties of Gwynedd and Conwy.
- It spans 2,132 km² and is characterised by high mountain ranges, lakes and waterfalls.
- It became a National Park in 1951 to ensure the preservation of the beautiful landscape and culture.
- Its highest point is Snowdon at 1085 metres.
- It has a population of 26,000 that live and work in the park and receives around 10 million visitors every year.
- It was formed over 400 million years ago through volcanic activity and tectonic uplift.
- The landscape was then further shaped by a number of ice ages, the last one retreating 10,000 years ago and leaving behind many glacial landforms.

Glacial Landforms in Snowdonia:

- Snowdonia has many great examples of erosional and depositional glacial landforms.
- High on the mountainside where the source of the glacier would have been, the erosional landforms of corries, arêtes and pyramidal peaks can be found. Examples of these in Snowdonia are Cwm Idwal, Crib Goch and Snowdon.
- As the glacier flowed down the old river valleys it formed many new erosional landforms.
- A good example of where this happened in Snowdonia is in Nant Ffrancon. Here you can find u-shaped valleys, truncated spurs, hanging valleys, a ribbon lake and a roche moutonnée.
- Moraine and drumlins, both examples of depositional features can also be found in Snowdonia.

Human Activities in Snowdonia:

- The landscape of Snowdonia has been shaped by human activity for thousands of years.
- People have occupied the land and used it for farming and forestry for centuries.
- It has been a popular tourist destination since the Victorian era.
- Farming was once the main occupation in Snowdonia and it has had significant impact on the landscape.
- The uplands are used for farming sheep that graze on the vegetation which can lead to overgrazing. Areas of the lowlands have been stripped of their natural vegetation to make way for growing crops.
- Despite the changes farming has made, it is considered integral to the culture of Snowdonia and farmers make up one of the main groups managing the land.
- Quarrying for slate has also had an impact on the landscape. Although it no longer takes place the evidence of it is still apparent on the landscape.
- Some people see this as destruction of the landscape and others consider it part of the culture.
- Hydroelectric power stations have also been built in the area.
- To minimise the disruption caused by the power station, the energy company built the station inside the mountain so as not to ruin the aesthetics of the park.

Tourism in Snowdonia:

- Tourism is now the main industry in Snowdonia.
- People visit Snowdonia to enjoy the beautiful countryside, climb Snowdon and take part in adventure sports.
- There are many benefits to tourism for Snowdonia such as more income, more jobs and the promotion of environmental awareness.
- However, there are also downsides to the tourism in Snowdonia such as traffic congestion, footpath erosion and holiday homes driving up the cost of living and houses for locals.
- These negative impacts are being managed in various ways across Snowdonia such as by promoting sustainable businesses and car-free plans as well as providing affordable housing and carrying out footpath repairs.



Quick-fire Questions

1	Where is Snowdonia located?	
2	How big is Snowdonia?	
3	In what year did Snowdonia become a National Park?	
4	How tall is Snowdon?	
5	How many people live in Snowdonia?	
6	How many tourists visit the region every year?	
7	When did the last ice age retreat?	
8	Name one erosional landform made by a glacier near its source.	
9	What is 'Cwm Idwal' an example of?	
10	Name one erosional process that helps to form a corrie.	
11	Name two other erosional glacial landforms often found in a u-shaped valley.	
12	Name an example of a u-shaped valley found in Snowdonia.	
13	What types of glacial depositional landforms can be found in Snowdonia?	
14	What percentage of the population in Snowdonia speak Welsh?	
15	When did tourism start in Snowdonia?	

16	Name one human activity that that has affected the landscape of Snowdonia.	
17	How much money did tourism bring to the region in 2013?	
18	Name one reason why tourists visit Snowdonia.	
19	What percentage of homes in Snowdonia are holiday homes?	
20	How many extra jobs does the tourism industry provide in Snowdonia?	
21	How many kilometres of footpath are there in Snowdonia?	
22	What percentage of visitors travel by car to Snowdonia each year?	
23	Name one advantage of tourism in Snowdonia.	
24	Name one disadvantage of tourism in Snowdonia.	
25	Name one tourism management strategy used in Snowdonia.	



Quick-fire Answers

1	Where is Snowdonia located?	<i>North Wales across the counties of Gwynedd and Conwy</i>
2	How big is Snowdonia?	<i>2,132 km²</i>
3	In what year did Snowdonia become a National Park?	<i>1951</i>
4	How tall is Snowdon?	<i>1,085 metres</i>
5	How many people live in Snowdonia?	<i>26,000</i>
6	How many tourists visit the region every year?	<i>10 million</i>
7	When did the last ice age retreat?	<i>10,000 years ago</i>
8	Name one erosional landform made by a glacier near its source.	<i>Corrie Arête Pyramidal peak</i>
9	What is 'Cwm Idwal' an example of?	<i>A corrie</i>
10	Name one erosional process that helps to form a corrie.	<i>Plucking Abrasion</i>
11	Name two other erosional glacial landforms often found in a u-shaped valley.	<i>Hanging valley Truncated spurs Ribbon lake Roche moutonnée</i>
12	Name an example of a u-shaped valley found in Snowdonia.	<i>Nant Ffrancon</i>
13	What types of glacial depositional landforms can be found in Snowdonia?	<i>Moraine Drumlins</i>
14	What percentage of the population in Snowdonia speak Welsh?	<i>58.6%</i>
15	When did tourism start in Snowdonia?	<i>In the Victorian era</i>

16	Name one human activity that that has affected the landscape of Snowdonia.	<ul style="list-style-type: none"> • Farming • Quarrying (not any more) • Hydroelectric power • Tourism
17	How much money did tourism bring to the region in 2013?	£433.6 million
18	Name one reason why tourists visit Snowdonia.	<ul style="list-style-type: none"> • For the picturesque landscape • For the quiet countryside • For walking, in particular • To experience the culture • For adventure sports
19	What percentage of homes in Snowdonia are holiday homes?	14%
20	How many extra jobs does the tourism industry provide in Snowdonia?	4,000
21	How many kilometres of footpath are there in Snowdonia?	2,398 km
22	What percentage of visitors travel by car to Snowdonia each year?	90%
23	Name one advantage of tourism in Snowdonia.	<ul style="list-style-type: none"> • More jobs • More income for the region • Helps farms diversify • Encourages environmental protection • Increases knowledge of the area • Any other valid point
24	Name one disadvantage of tourism in Snowdonia.	<ul style="list-style-type: none"> • Increases house prices • Concerns over whether the area is being lost • Jobs it does provide are seasonal • Footpath erosion • Litter • Traffic congestion and parking problems
25	Name one tourism management strategy used in Snowdonia.	<ul style="list-style-type: none"> • Promoting sustainable tourism • Encouraging car free zones • Creating more affordable accommodation • Managing footpath erosion • Getting a team to clean up

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Extension Questions

1. Describe the landscape of Snowdonia.
2. Explain how the landscape of Snowdonia formed.
3. Describe what a corrie is, explain how it forms and describe the other erosional landforms it can create.
4. Explain how a glacier erodes a river valley and creates the landforms it produces.
5. Describe how a drumlin forms.
6. Suggest how human activity has affected the landscape in Snowdonia.
7. Discuss the positives and negatives of hydroelectric power stations in Snowdonia.
8. Examine whether the social, economic or environmental disadvantages of tourism have the greatest negative impact on Snowdonia.
9. Suggest why Snowdonia's tourism management plan is sustainable.
10. Suggest further ways tourists could be managed in Snowdonia.



Extension Answers

1.
 - Snowdonia is an upland area.
 - It is characterised by mountainous regions, lakes and waterfalls.
 - It is a rugged landscape with a small human population.
2.
 - The landscape began its formation over 400 million years ago.
 - During this time the landscape was sculpted by volcanic activity, tectonic plate movements and the deposition of sediment. There was also a significant uplift which caused the land to become so mountainous.
 - Over time the landscape has been eroded by climate, rain and ice ages. The ice ages in particular have carved the landscape in a way that has created distinct glacial landforms.
3.
 - Corries are large hollows found where the source of a glacier would have been, which is usually high on the mountainside. In the UK these are on the north-east side of the mountain as it is the most sheltered.
 - They form when snow and ice accumulate in a small hollow and compact over time. This puts pressure on the rock below causing the rock to weaken. The hollow is then made deeper through the processes of plucking and abrasion of the weak rock. Freeze-thaw weathering also helps to erode the headwall and make the hollow even deeper. Once the glacier retreats, a lake often forms in the hollow.
 - Where two corries lie side by side or back to back, steep ridges called arêtes form.
 - Where three or more corries form around a mountain they can create a sharp pointed mountain known as a pyramidal peak.
4.
 - Glaciers move down mountainsides into river valleys through the force of gravity.
 - The power of the ice erodes the sides and floor of the valley, turning it from a v-shaped to a u-shaped valley.
 - It erodes the interlocking spurs of the river valley creating truncated spurs.
 - The old valley can be seen high on the valley sides where the main glacier did not erode and where a hanging valley has been created.
 - Ribbon lakes can also form where the glacier has deepened areas of the valley floor.
 - Roche moutonnées can also be found on the valley floor where the glacier flows over a section of more resistant rock than the remainder of the valley floor creating a distinctive feature.
5. Drumlins are depositional landforms of glaciers. They are formed from the debris that gathers under the glacier (ground moraine) from the processes of plucking and abrasion. The glacier sculpts the moraine into a streamlined egg-shaped hill.
6.
 - Human activity has had an influence over Snowdonia for thousands of years.
 - Farming has shaped the landscape through the clearing of vegetation in lowland areas and the grazing of sheep in upland areas.
 - Quarrying has also had an impact on the landscape with centuries of slate mining taking place. It can leave significant scarring in the mountainsides and valleys but many now see this as a historical part of the landscape.
 - Hydroelectric power stations have also been built on the outskirts of Snowdonia. Although these are destructive to the landscape, energy companies have tried to compensate for this by building the stations inside the mountains.
 - Tourism is now the biggest industry in Snowdonia and is having increasing effects on the landscape. For example, it can create traffic congestion and pollution and cause footpath erosion.

7. Positives:

- Hydroelectric power is a sustainable source of energy so in being good for the environment it can help promote positive environmental messages in Snowdonia
- Provides jobs for people in the region
- Helps to meet the increasing demand for power in the region as tourism grows but in a sustainable way
- Some of the power stations have become tourist attractions in themselves
- Any other valid point(s)

Negatives:

- It causes damage to the environment during construction
- Creating a reservoir and using the water can change the flow of rivers downstream creating problems elsewhere
- Can affect the water used for agriculture and as farming is common in Snowdonia this could cause problems and disputes
- Any other valid point(s)

8. Students must discuss social, economic and environmental disadvantages of tourism and decide which category they think has the most impact on Snowdonia.

Indicative content:

Social

- 14% of homes in Snowdonia are now holiday homes which increases house prices for locals making it difficult for them to stay in the area.
- Worries over whether the traditional Welsh farming culture is getting lost to tourism.

Economic

- The jobs tourism does provide are only seasonal.
- Tourism season can make cost of living increase for locals as prices increase.

Environmental

- Visitors can increase the rate of footpath erosion which harms the landscape and needs to be repaired.
- Some visitors will stray from the footpaths causing damage to the vegetation and soil elsewhere.
- 90% of visitors travel by car causing congestion and pollution.
- There is an increase of litter.

9. Sustainable because:

- Promoting public transport so there is less pollution
- Encouraging tourism businesses to be as sustainable as possible by reducing fuel use, waste and buying locally
- Promoting affordable housing helps locals to stay in Snowdonia so its history and culture aren't lost
- Managing the footpaths and the litter also helps to maintain the landscape keeping it in use for all tourists
- Any other valid point(s)

10. Further tourist management ideas:

- Could limit the number of people coming to the National Park or limit the number of people climbing Snowdon
- Increase the amount of public transport available
- Produce fliers to help tourists understand and alleviate the environmental damage they can cause
- Make accommodation cheaper if you do not bring a car
- Any other valid idea(s)

Exam-style Question

Assess the extent to which glaciers have shaped the landscape in Figure 1.

9 marks (+3 SPaG)

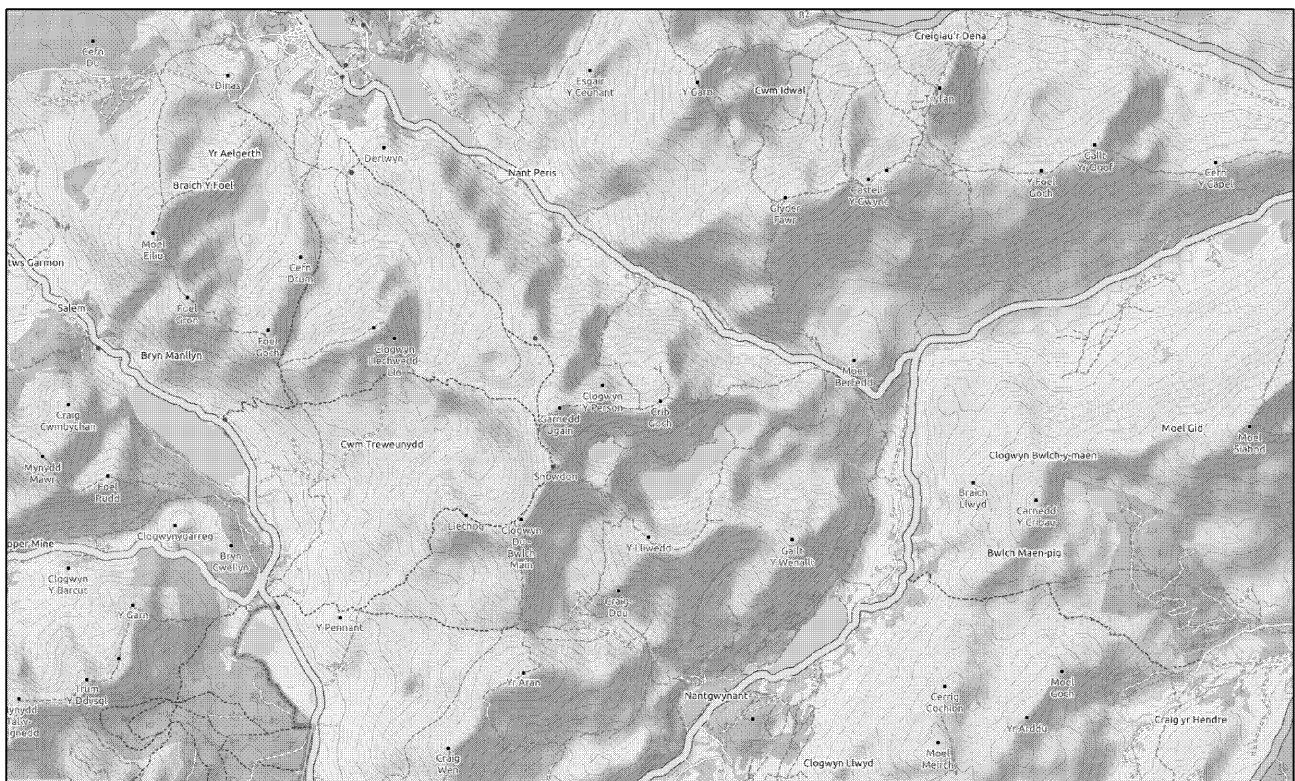


Figure 1: Map showing a section of Snowdonia National Park

Level Marking

Level	Mark	Description
1	1–3	<ul style="list-style-type: none">• The student evidences basic knowledge of the topic in question. (AO1)• The student evidences limited understanding of the connections that exist between places, environments and processes. (AO2)• A limited ability to evaluate is evidenced through basic application of knowledge and understanding. (AO3)
2	4–6	<ul style="list-style-type: none">• The student evidences some knowledge of the topic in question. (AO1)• The student evidences good understanding of the connections that exist between places, environments and processes. (AO2)• A reasonable ability to evaluate is evidenced through adequate application of knowledge and understanding. (AO3)
3	7–9	<ul style="list-style-type: none">• The student evidences thorough knowledge of the topic in question. (AO1)• The student evidences a firm understanding of the connections that exist between places, environments and processes. (AO2)• A strong ability to evaluate is evidenced through logical application of knowledge and understanding. (AO3)

Indicative Content

- Students should offer an assessment of the extent to which glaciers have shaped the landscape indicated in Figure 1.
- Knowledge of glacial landforms and how to identify them on a map must be shown.
- Students must also offer other factors that may have shaped the landscape, e.g. rivers, weathering (climate) and human activity.
- They may use specific examples of glacial landforms in Snowdonia.
- The student should clearly demonstrate an assessment of the map in exploring the extent to which glaciers may have shaped the landscape compared to the other factors mentioned. Lower level marks will be given for students who do not form an argument.

Suggested Content

- It is clear from the map that Snowdonia has been shaped by glaciers. This is shown through the various glacial features that can be seen on the map such as corries, arêtes and u-shaped valleys.
- There are a number of each of these different landforms indicating the extent to which glaciers shaped the landscape.
- There are some lakes and rivers on the map which also indicate that the erosional and depositional processes of rivers will have shaped the landscape.
- The climate will also have had some influence over the shape of the landscape, e.g. through weathering.
- There is also evidence of human activity on the map, such as roads and small settlements. The construction of these as well as the impact of humans living in the environment could also influence the shape of the landscape.

Spelling and Grammar (SPaG) – Total of 3 marks.

For 1 mark:

- Student shows some ability to spell and punctuate correctly.
- Student shows limited use of grammar to convey their argument.
- Student utilises a basic range of geographical phrases.

For 2 marks:

- Student generally uses good spelling and punctuation throughout.
- Student shows some accurate use of grammar to convey their argument well.
- Student utilises an adequate range of geographical phrases.

For 3 marks:

- Student uses correct spelling and punctuation throughout.
- Student shows accurate use of grammar to clearly convey their argument.
- Student utilises a broad range of geographical phrases.