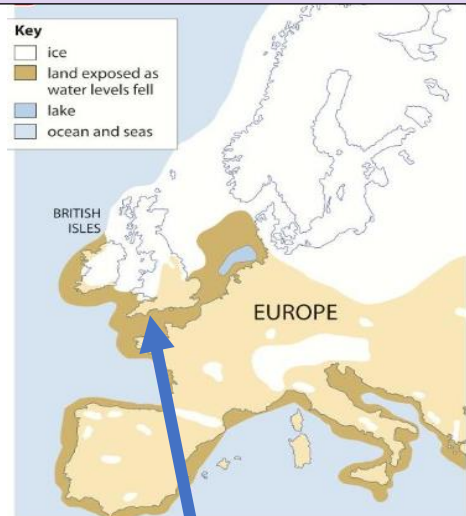


The last Ice Age

Ice ages are extremely cold periods, in which **glaciers**, which are slow moving rivers of ice made out of compact snow and **ice sheets** covered the majority of the land. In northern Europe and most of the British Isles, Ice did not melt until 10,000 years ago.



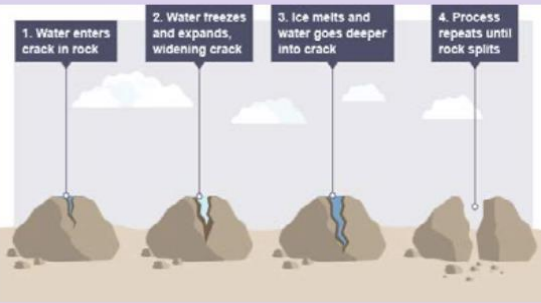
The English Channel didn't used to exist!

Since the sea level was lower than the present day (refer to orange shaded areas), due to the water being stored as snow or ice in ice sheets, the **British Isles** was connected to the land mass of Europe and the **English Channel** did not exist! This '**land bridge**' was responsible for plant and animal species moving from France or other parts of Europe to England on foot. such as the woolly Mammouth, migrating and living in Southern Britain's tundra region.

Glacial processes: EROSION

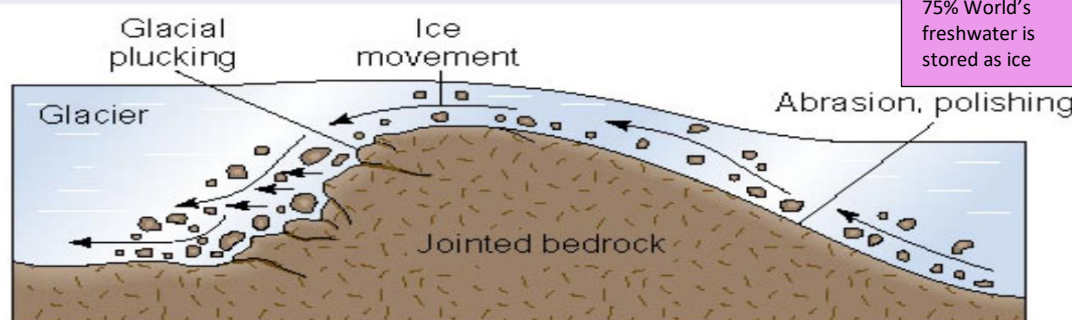
Freeze-Thaw Weathering

Water gets into cracks in the rocks. The water **freezes** and **expands**, putting **pressure** on the rock. The ice then **thaws**, **releasing the pressure**. The process **repeats itself many times** until the rock **shatters and breaks apart**.



Plucking

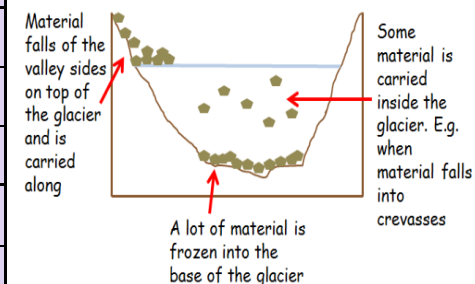
Melt water underneath, on the back or the sides of the glacier **freezes onto the rock**. As the **glacier moves forward it pulls** pieces of rock out.



Did you know?
75% World's freshwater is stored as ice

Glacial processes: TRANSPORTATION

As the glacier moves forward it pushes loose debris ahead of it effectively transporting it downhill; this process is called **bulldozing**.



Keyword	Definition
Ice age	A time period when ice advances from the north and south poles towards the equator, with global sea levels at a low due to water locked up as land-based ice. Ice ages last for hundreds of thousands of years.
Ice sheet	A large, expansive body of ice, 1-2 miles thick which covers a land surface, covering continental areas.
Tundra	Permanently frozen bedrock and soil found at the fringes of the glacial areas. Today, Alaska, Canada and Siberia are tundra covered areas.
Glacier	A frozen land-based river like feature, flowing from the upland areas down towards the low-lying coastal areas. Formed through the accumulation of snow turning into ice over hundreds of thousands of years.
Abrasion	A type of glacial erosion, when the ice wears away the bedrock using the rock and pebbles being carried in the base of the glacier. It is often referred to as the sandpaper effect.
Plucking	A type of glacial erosion. When the base of glaciers freezes onto bedrock and pulls up large pieces of bedrock as it flows over the land surface.
Freeze-thaw weathering	The action of water flowing into cracks, freezing as ice (when temperatures drop or an ice age sets in), and widening the cracks so much that rock breaks apart. It is also known as frost-shattering and slowly breaks the rock apart.
Moraine	Material that has been transported (moved/ carried) and deposited by the glacier.

Glacial erosion landform: CORRIES

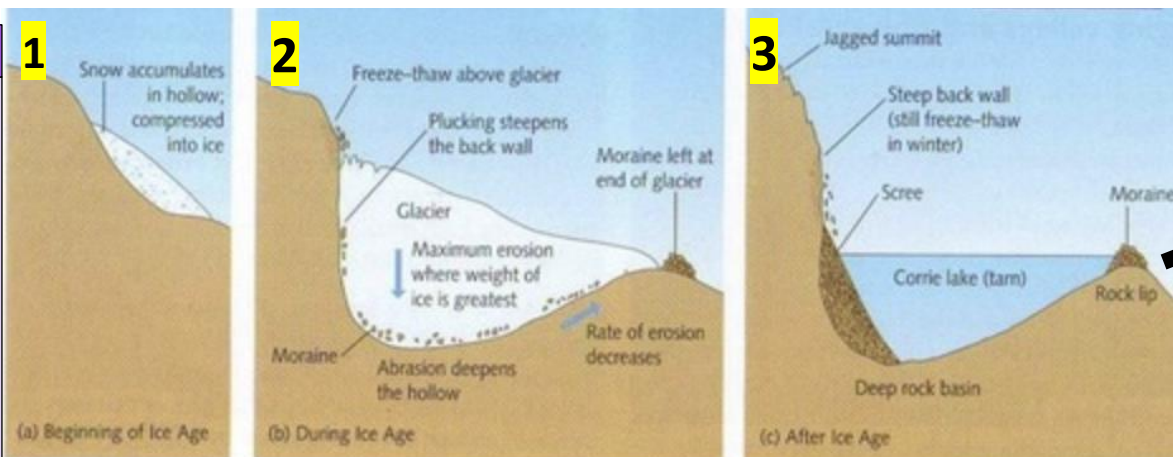
Corrie formation: A corrie begins as a sheltered hollow, where snow builds up year after year.

1) The snow **compacts** to ice. When the ice is thick enough, it starts to **flow downhill** due to gravity. It is now a glacier! First, meltwater lubricates its downhill flow into the hollow

2) Through **plucking and abrasion** the hollow grows deeper and the walls steeper. Freeze-thaw weathering helps.

Eventually the glacier is big enough to flow over the curved edge of the corrie, this is called rotational slip. The glacier will then continue its journey down the mountain.

3) Once the glacier melts, the corrie is revealed. It



**EXAMPLE OF A TARN IN A CORRIE:
CWN CAU, SNOWDONIA NATIONAL PARK, WALES**

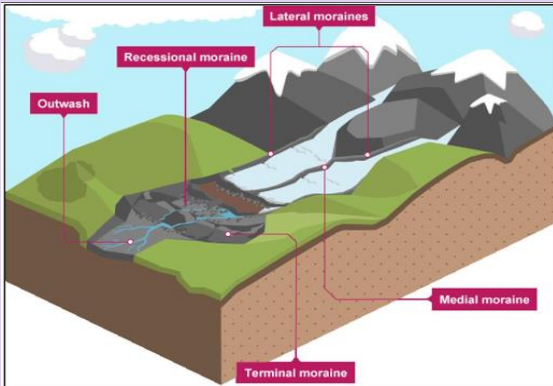
Glacier Landscapes in the UK

Glacial processes: Deposition and depositional landforms

Material that has been carried and deposited by the glacier is called **moraine**

Different types of moraine (deposited sediment)

- Terminal moraines** are found at the snout or (end) point reached by a glacier.
- Lateral moraines** are found deposited along the sides of the glacier.
- Medial moraines** are found at the junction between two glaciers.
- Ground moraines** are disorganised piles of rocks of various shapes and sizes



Deposition occurs when the ice melts. As most melting occurs at the front (the snout) of a glacier, this is where most deposition takes place. As a glacier slowly retreats it leaves behind a bed of broken rock fragments called till (or moraine). Due to the lack of water to transport it, till is poorly sorted, with jagged rock fragments of all sizes.

Ahead of the glacier, meltwater rivers will carry sediments away. The process of attrition (rocks knocking into each other) will cause the rock fragments to become smaller and more rounded. Sediment will be well sorted, with larger rocks deposited close to the ice and finer material carried many kilometres away.

Glacier Landscapes in the UK

U-shaped valleys
 Glacial valley landforms-glacial trough, truncated spurs, hanging valleys, ribbon lakes
 Aretes and pyramid peaks

Depositional landforms: drumlins and erratics

Ice stupas- Himalayan -

How can people use the land in a glaciated area?

Quarries and Mining

- ✓ Erosion by glaciers exposes lots of rock, making it easy to get to. Glacial landscapes are often quarried for slate, granite and limestone.
- × Quarrying damages habitats. The noise of the blasting and trucks can scare the wildlife and spoil the peacefulness of the area. Large scars from quarrying may also put tourists off visiting as the area won't look as attractive. This could mean loss of income for local businesses such as hotels and restaurants.

Forestry

- ✓ Coniferous (evergreen) forests are often planted in upland areas because these trees can cope with the cold weather and high rainfall. The trees are used for timber for building materials and paper.
- × When the trees are chopped down for timber this scares off wildlife and damages habitats.

Farming

- ✓ It's usually too cold to grow crops, but grass is grown to make hay to feed the sheep and cows.
- ✓ Cattle are kept on the flatter valley floors.
- ✓ Sheep farming is common in the upland glaciated areas because the steep slopes and poor soils makes it unsuitable for any other type of farming.

Tourism

- ✓ Glaciated areas have dramatic landscapes, making them attractive places to visit. Popular activities in these areas include; hiking, climbing, boating, mountain biking and skiing.
- × Tourist developments such as hotels and attractions may spoil the natural scenery. For example there is a visitor centre on the top of Mount Snowdon in North Wales.
- × Large numbers of tourists can damage stone walls, scare sheep, leave gates open and drop litter. Some farmers don't want lots of tourists walking on their land. They may try to block footpaths by putting up fences.

Impacts of tourism can be good and bad

Tourism offers employment to local people who work in hotels, shops, cafes & other services. However, these jobs are often only during peak months & are low paid.

Tourism keeps local services going. Local buses and shops would have closed down if it wasn't for the tourists. Locals are able to make use of these facilities. However, sometimes these facilities are closed in the winter months when tourist numbers are low.

Increased traffic causes problems as the country lanes are often narrow and winding. Congestion is common and there isn't enough car parking available. Lack of car parking spaces mean tourists often park on the side of the roads on grass verges. This damages vegetation. However, developing facilities such as car parks can increase income from tourism (e.g. car park charges). This can be invested into the area to pay for improvements such as repairing footpaths, planting trees and conserving habitats.

The Lake District

Problems with Tourism

- × The **average price** of a house in the village of Grasmere is over **£350,000**, while the **average household income** is only **£27,000**. Many local people **cannot afford** to stay living in the area.
- × An estimated **89%** of visitors to the Lake District **arrive by car**. This makes **roads very busy**.
- × **Businesses** in tourist hotspots like Ambleside **cater mainly for tourists**. About **40%** are **cafes, restaurants & hotels** and around **10%** sell **outdoor clothing**.
- × **More than 16%** of properties in the Lake District National Park are **second homes or holiday homes**. This means there are **fewer people living in the area in winter**, so some **shops and services close down** for several months.

Strategies to Manage the Problems

- ✓ **Zoning schemes** mean that some water sports are only allowed in some lakes. **Lake Windermere** has a **10 knot speed limit** for all boats. This keeps **peaceful areas** for people to enjoy.
- ✓ In **2012**, planning permission was granted for **134 affordable homes** and **141 houses** that **only local people are allowed to buy** – they cannot be used as holiday homes or lets.



➤ The Lake District gets **16.4m visitors every year**.



➤ Tourism **employed over 16,000 people in 2014** and **visitors spent over £1 billion**.