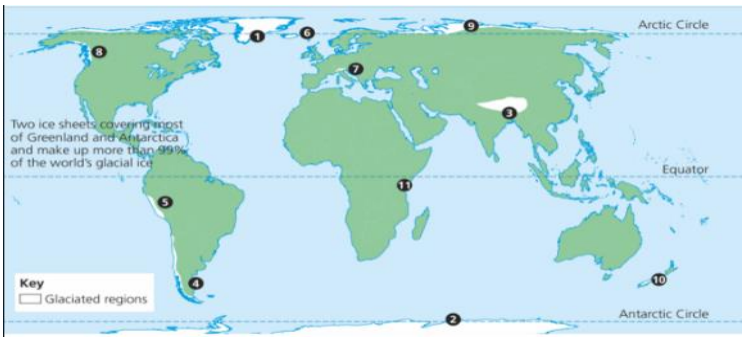
Knowledge organiser: How do glaciers shape the land?

KEY VOCABULARY	
Plucking – a type of erosion where melt water freezes onto rocks and as the ice moves it plucks or pulls out large pieces of rock along joints.	**Meltwater -** water from the melting of ice and snow.
Compaction – when particles (of rock, sand or ice) are pressed together other time so that the space between them gets smaller.	**Glacial Till –** the rocks and sediment deposited by a glacier. When till accumulates different types of moraine are formed.
Accumulation - the collection of snow in the valley which compacts to increase the glaciers size.	**Ablation** - the removal of snow or ice from a glacier.
Glacier – a sheet of ice or thickened ice mass that moves slowly down a valley due to gravity.	**Firn** - snow that is at least one year old and has survived a melt season.
Moraine – landforms made from rock debris and material eroded from the valley floor and sides which has been transported and deposited by glaciers.	**KEY WORDS FROM OTHER TOPICS**: Y7 – Erosion/Deposition/Transportation/Valley/Free-thaw weathering Y8 – Sustainability Y9 – Natural Hazard

Where do we find glaciers and what are they like?

Glaciers form in **mountain or higher latitude** locations where:

- Average annual temperatures are near freezing.
- Large amounts of snow fall during winter months.
- Temperatures are consistently not high enough to melt previous accumulations of snow and firn.
- Glaciers can come in all shapes and sizes 2 main types: **alpine glaciers** (which form in mountains) and **continental ice sheets** (which spread over large areas).



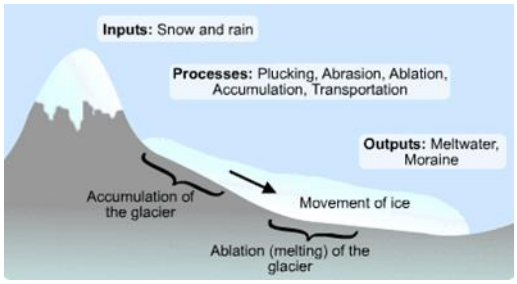
How do glaciers form?

Snow **accumulates** in upland or polar areas. As it falls it is compressed into ice by its own weight. Gradually over time the snow turns to **firn** then **hard ice** and starts to flow down hill under its own weight.

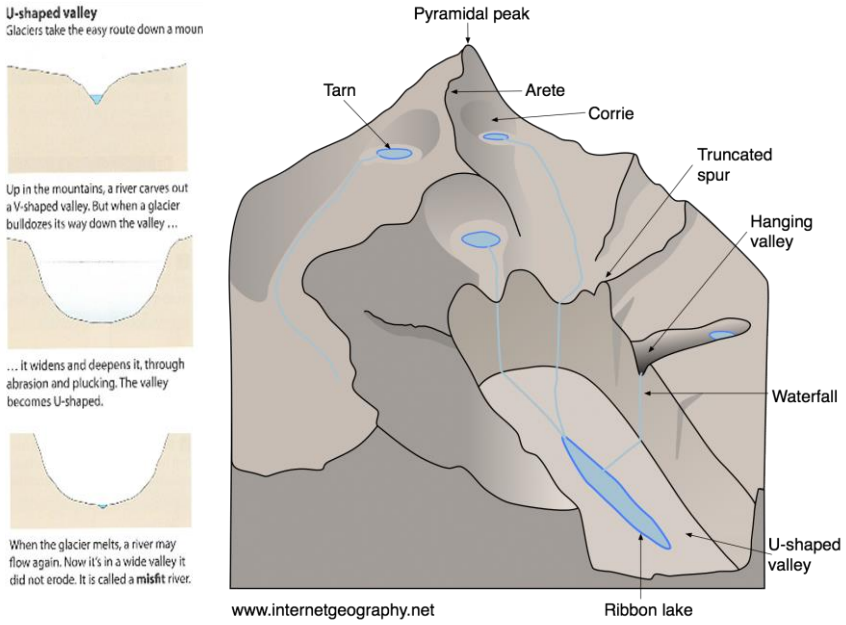
The **zone of accumulation** is the area where more ice is gained the lost.

If temperatures are low and snowfall high, the glacier will advance downwards.

How do glaciers shape the land? The weight of glacier and gravity causes the glacier to slide very slowly downhill. Glaciers shape the land through erosion, weathering, transportation and deposition. The main glacial processes are: **plucking, abrasion and freeze-thaw wreathing** these shape the landscape and create erosional landforms such as **corries and u-shaped valleys when** the glacier flows downhill.

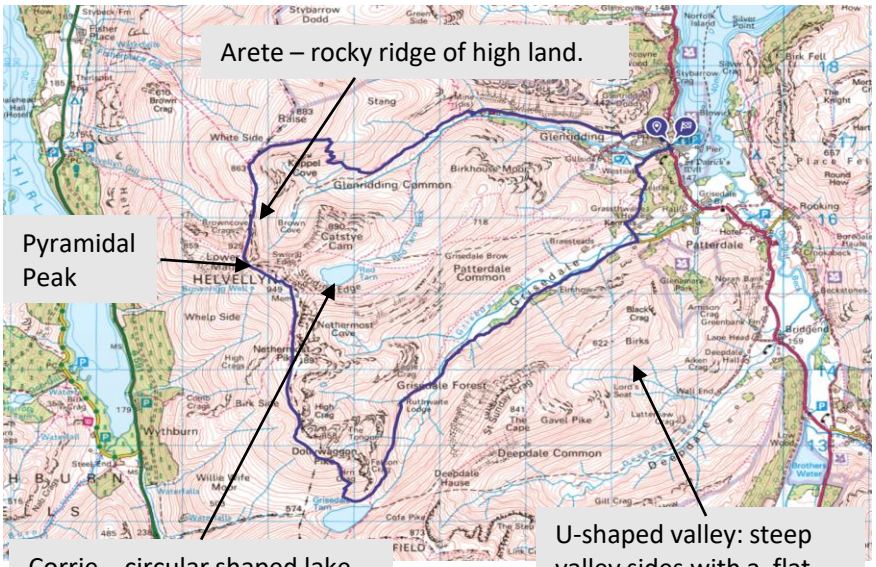


How are landforms shaped by glacial erosion?

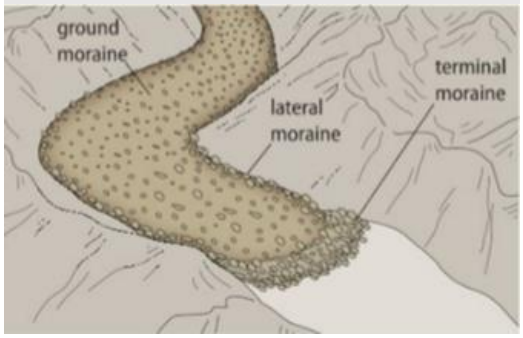


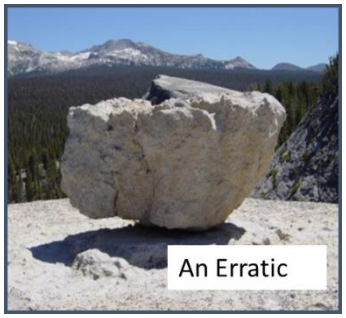
How are landforms shaped by glacial deposition?

Deposition happens when a glacier melts and drops rocks and sand (glacial till) to the floor of the valley in lowland areas. Glaciers melting leaves behind **moraines, glacial eratics** (random rocks different to the rocks around it) and **drumlins** (elongated hills of glacial deposits).



Different types of moraine left by a melted glacier.





UK Example of a glaciated landscape – The Lake District in the NW of England.

What threats do glaciated landscapes like the Lake District face? Human use of glaciated areas can cause environmental damage if not managed carefully.

Industries such as quarrying were once common in glaciated areas of the UK but have declined.

Conflict can occur if different stakeholders have different opinions on how the land should be used.

Glenridding in the Lake District is an example where there is conflict over the use of a former quarry and creating a zipline.

Several other threats exist in glaciated areas around the world today. These include:

Avalanches/Climate Change /Glacial Flooding/Tourism /Urbanisation /Deforestation

What are the economic opportunities of glaciated landscapes such as the Lake District?

Glaciated uplands are environmentally sensitive and areas of outstanding natural beauty.

Humans can use these areas for economic opportunities —**Agriculture, Forestry, Quarrying & Tourism.**

Economic activities are important as they provide jobs and income for local people.

Are we managing glaciated landscapes well?

Effective management can reduce the impact of tourism and conflict over glaciated landscapes.

Example of Lake District management:

Go Lake Travel programme – a £6.9 million initiative which aims to reduce congestion through public transport, create hire bicycles and continues walking, cycling and wheelchair user route.

Fix the fells - £500 million programme to reduce the severe footpath erosion from the 15 million tourists that visit the Lakes to walk each year.

Nurture Lakeland – a charity camping that encourages local businesses and tourists to donate money to conservation projects and encourages tourists to behave responsibly whilst on holiday by sticking on marked footpaths and not dropping litter.