Erosion and Glaciers

- In this lesson you will:

- 1.4.1 Define the terms outwash plain, terminal moraine, erratic, drumlin, and esker. (k)

Continental Glaciers vs. Alpine Glaciers

- **Continental glaciers** cover parts of continental land masses like Greenland
- **Alpine glaciers** are found high in mountain valleys, above the snow-line.


Continental glacier


Alpine glaciers

Differences: Alpine/Continental Glaciers

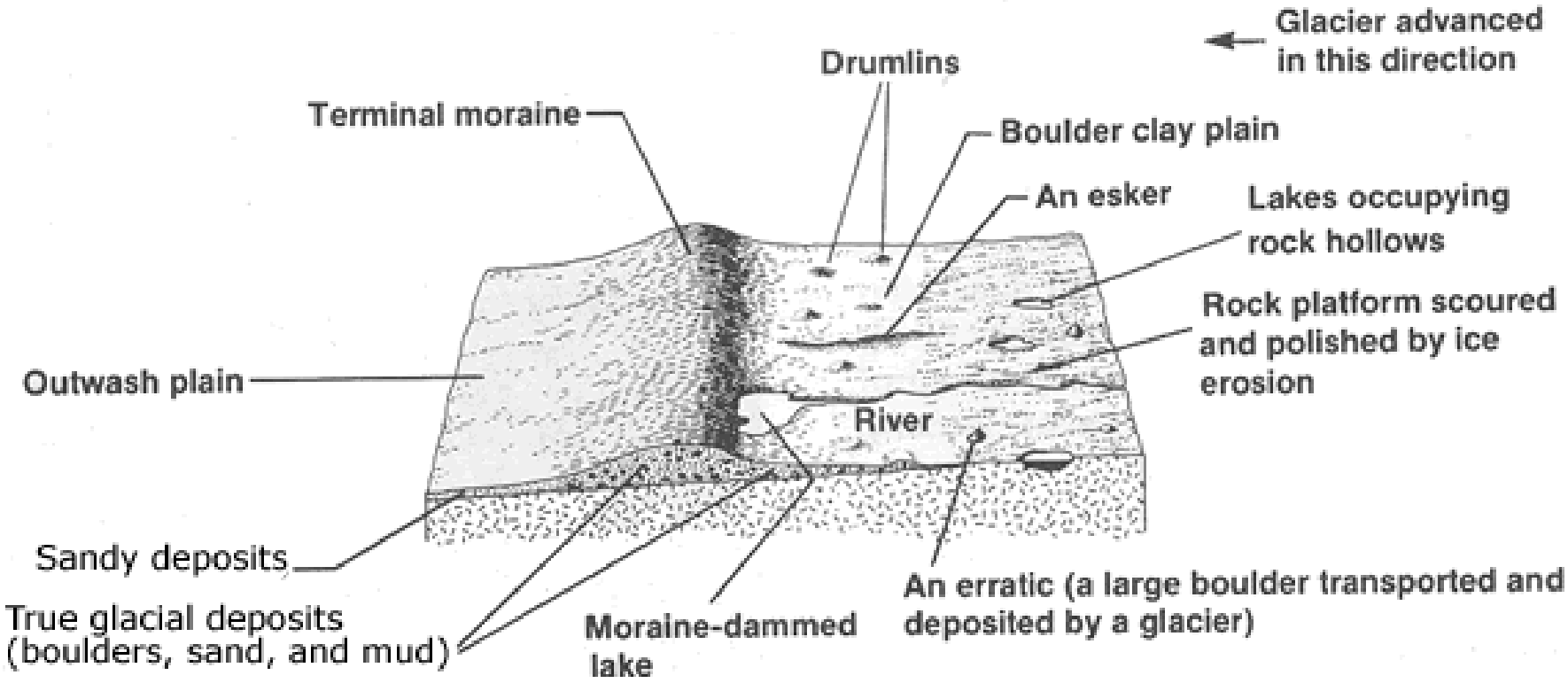
- **Location**:
  - Alpine glaciers are only found on **mountain tops**
  - Continental glaciers are **only found at the earth's poles** regardless of elevation.

- **Size**:
  - **Alpine glaciers are smaller** compared to continental glaciers.

Similarities: Alpine/Continental Glaciers

- Both move and cause erosion
- Both change the landscape
- Both developed in constantly cold temperatures below freezing.
- Refer to Figure 2.13 on page 34 of your text.

Features of Continental Glaciation



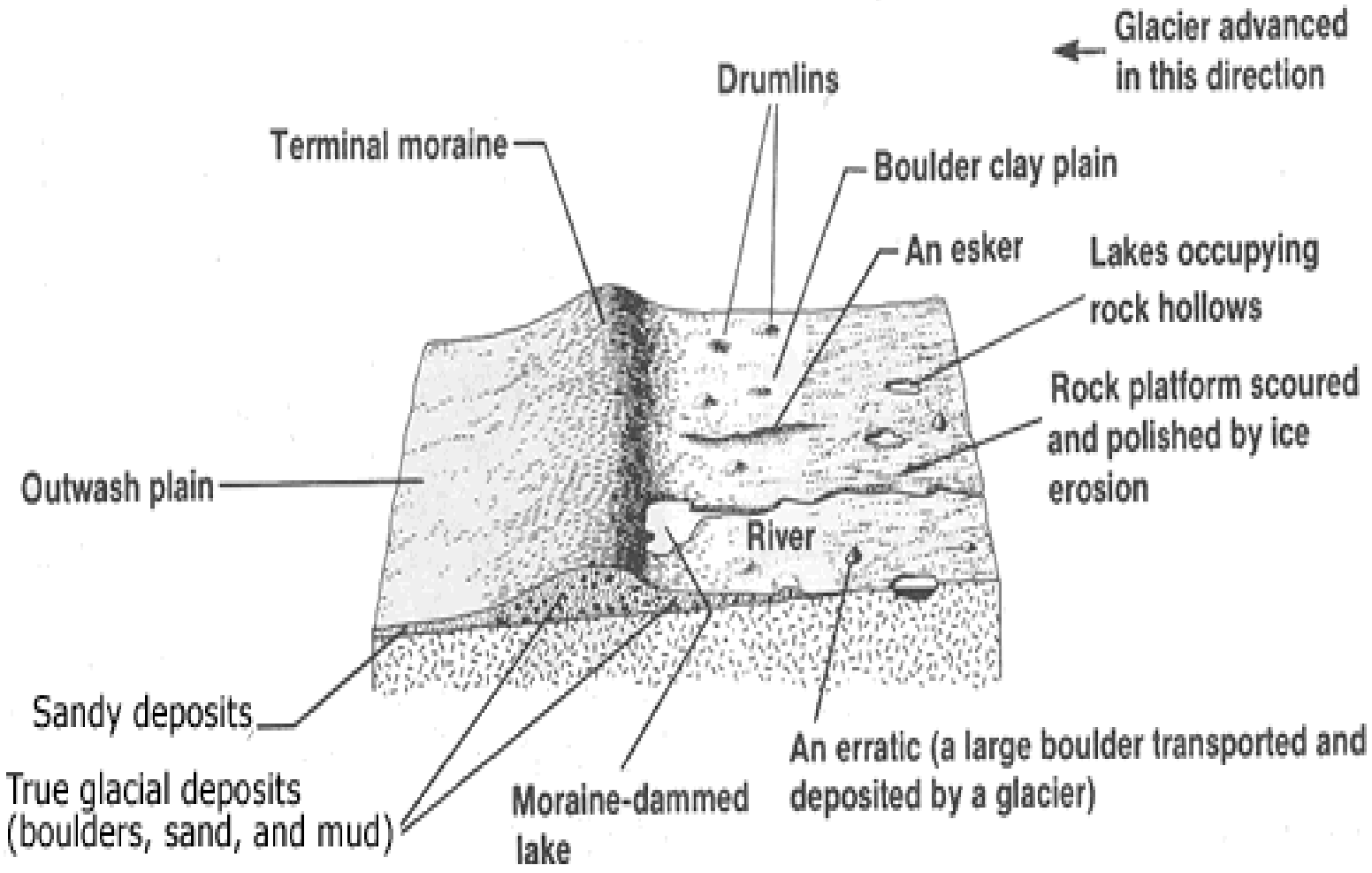
Features of Continental Glaciation

- Outwash plain
- Terminal Moraine
- Erratics
- Drumlins
- Eskers

Outwash plain

- Resembles a river delta
- **meltwater** flowing from a glacier **deposits silt** like river deltas
- silt is **deposited in layers**
- small particles are carried further away
- larger particles drop closer to the glacier.


Outwash Plain


Glacier advanced in this direction
Drumlins
Terminal moraine
Boulder clay plain
An esker
Lakes occupying rock hollows
Rock platform scoured and polished by ice erosion
Outwash plain
River
Sandy deposits
True glacial deposits (boulders, sand, and mud)
Moraine-dammed lake
An erratic (a large boulder transported and deposited by a glacier)

Terminal Moraine & Erratics

- **Terminal Moraine:**
  - **heap or ridge** of bulldozed gravel that **marks the end of the forward motion** of a glacier
  - as a glacier retreats it deposits debris/gravel.
- **Erratics:**
  - **large boulders** that were transported long distances and dropped
  - they now sit in a region and look very much out-of-place.

Terminal Moraine

Erratics

Erratics

Drumlins

- Egg-shaped hill
- formed **under** glaciers
- **sloped or pointy end points in direction of ice flow**
- How they form:

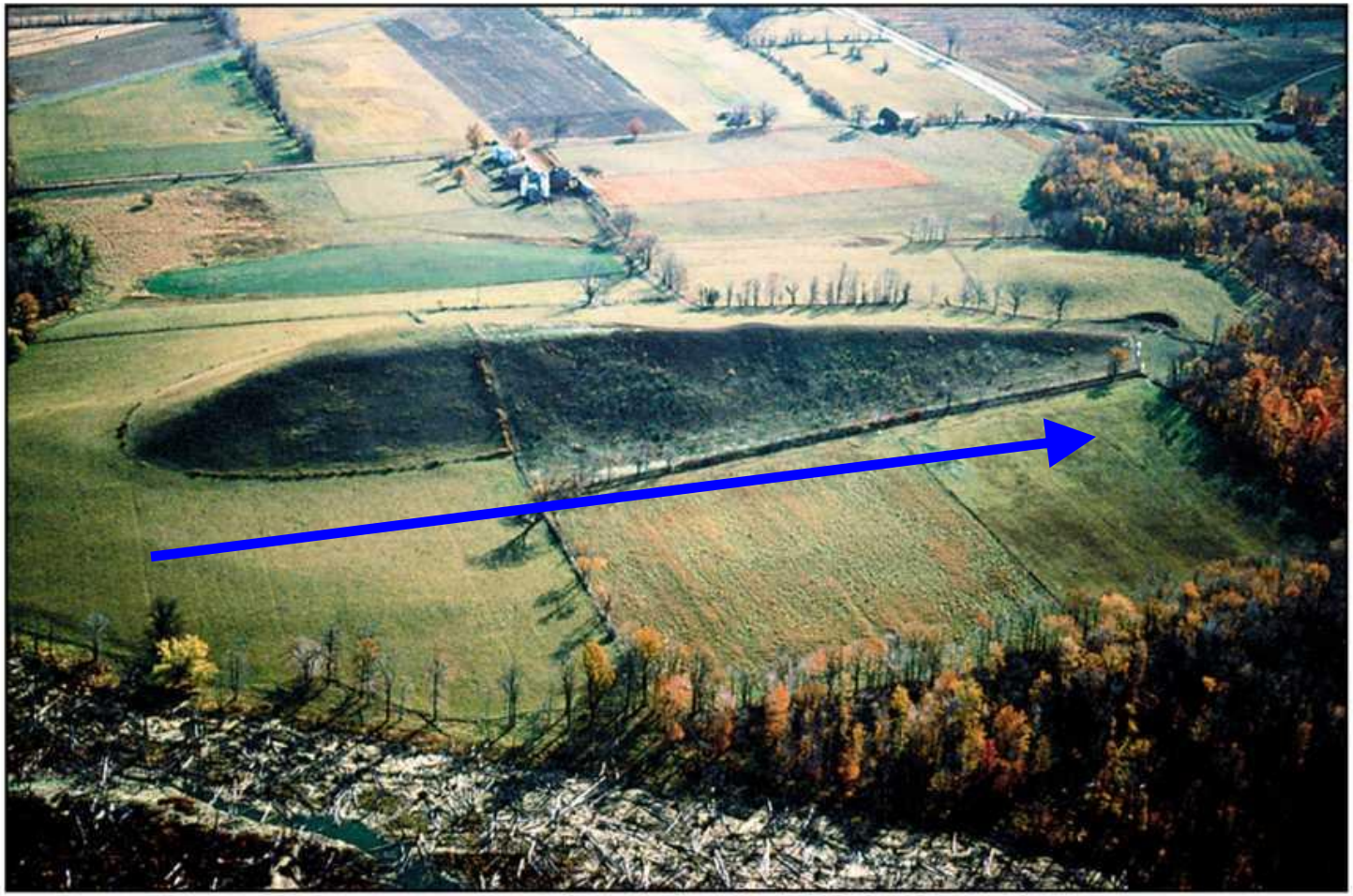
  1) ice melts under glacier

  2) deposits of gravel are made

  3) glacier moves forward

  4) deposits are bull-dozed along and catch up in rough areas forming piles or drumlins.

Drumlin- In which direction did it move?



Eskers

- **long deposits** of eroded glacial material
- formed by **sub-glacial streams** that deposit material like all rivers
- sometimes known as Highways of the North because they are good for traveling on with ATV's.

Esker

Alpine Glaciers

- In this lesson you will learn to…
  - 1.4.3 Define the terms cirque, arête, hanging valley, lateral moraine, and terminal moraine. (k)

Alpine Glaciers

- Alpine glaciers are like **very slow moving rivers of ice** flowing down high mountain valleys.
- Like continental glaciers, alpine glaciers create land forms by weathering and deposition.

Alpine Glaciers

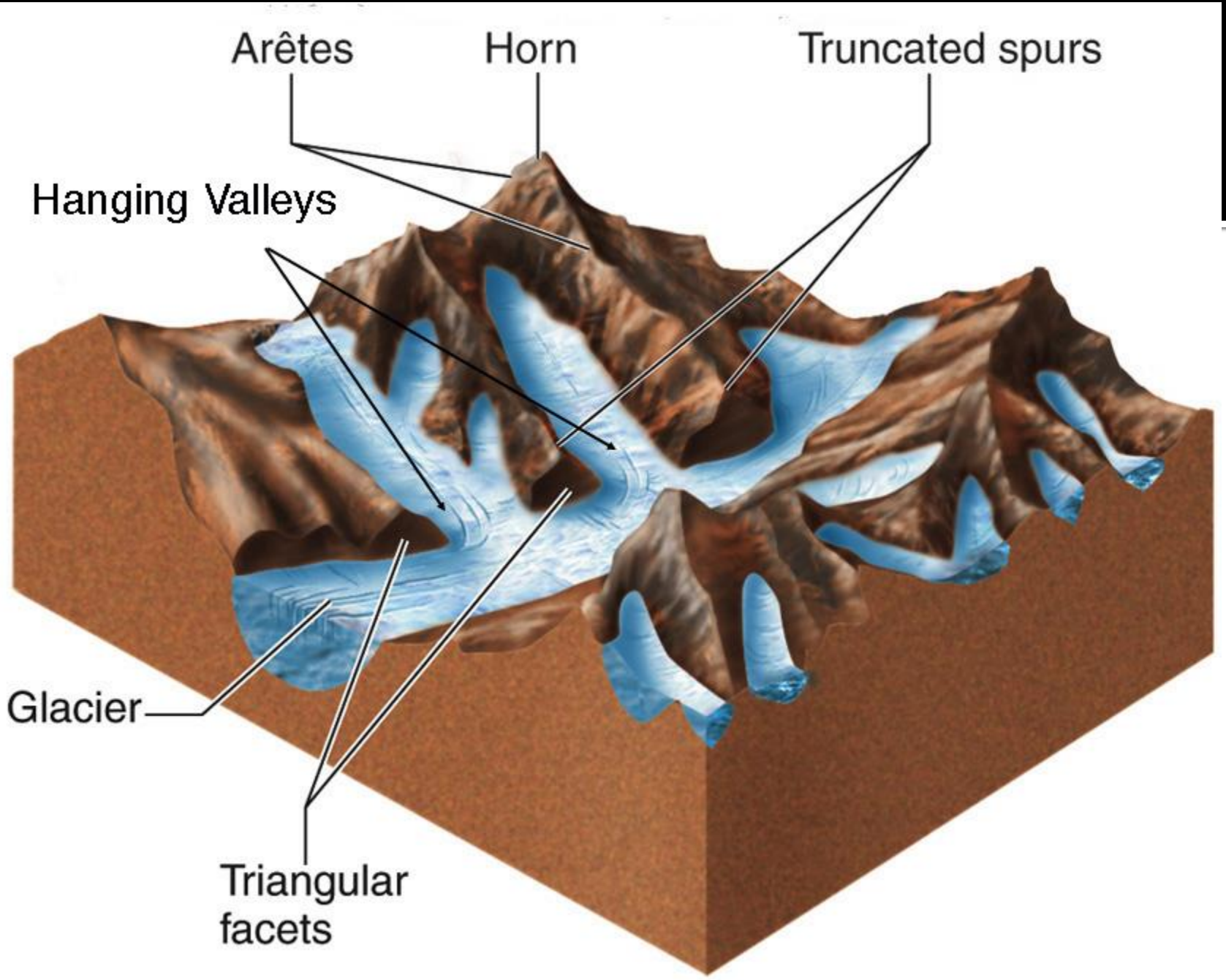
- They **typically erode** the mountain beneath them into a **U-shaped valley with steep sides**.
- Some alpine or valley glaciers are 1000m thick and up to 160 km long, though most are only a few km in length.

Features of Alpine Glaciation

- Cirque
- Arête
- Hanging Valley
- Lateral Moraines
- Terminal Moraines
- Fjords

Cirque

- a **circular hollow cut into bedrock** during glaciation
- **side and back walls are steep** but front wall opens downward.
- **Cirque Formation**
  - alpine glacier freezes onto mountain valley
  - as it proceeds (moves downhill) it plucks/gouges rock from the mountain top leaving the cirque shape.


Arêtes
Horn
Truncated spurs
Hanging Valleys
Glacier
Triangular facets

Cirque

Arête & Hanging Valley

- **Arête**
  - **steep knife edged ridge between two cirques** in a mountainous region.
- **Hanging Valley**
  - a **high level tributary valley** from which the **ground falls sharply** to the level of the lower, main valley.

Arête

Hanging Valley

Lateral Moraines & Terminal Moraines

- **Lateral Moraines**
  - land-form deposited at the side of a glacier.
- **Terminal Moraines**
  - deposits that mark the farthest extent of the alpine glacier the same as with continental glaciers.

Alpine Glaciers

- In this lesson you will learn to…
  - 1.4.4 Define the term fiord. (k)

Fjords

- How they form:

1) alpine glaciers **erode troughs and valleys** in the mountain
2) glacier valley **reaches the coast**
3) glacier melts and **sea water floods the valley**

- fjords are very common in Norway as well as in Gros Morne National Park.

Fjord

Western Brook Pond, Gross Morne National Park