Lesson Objectives

By the end of the lesson you will be able to:

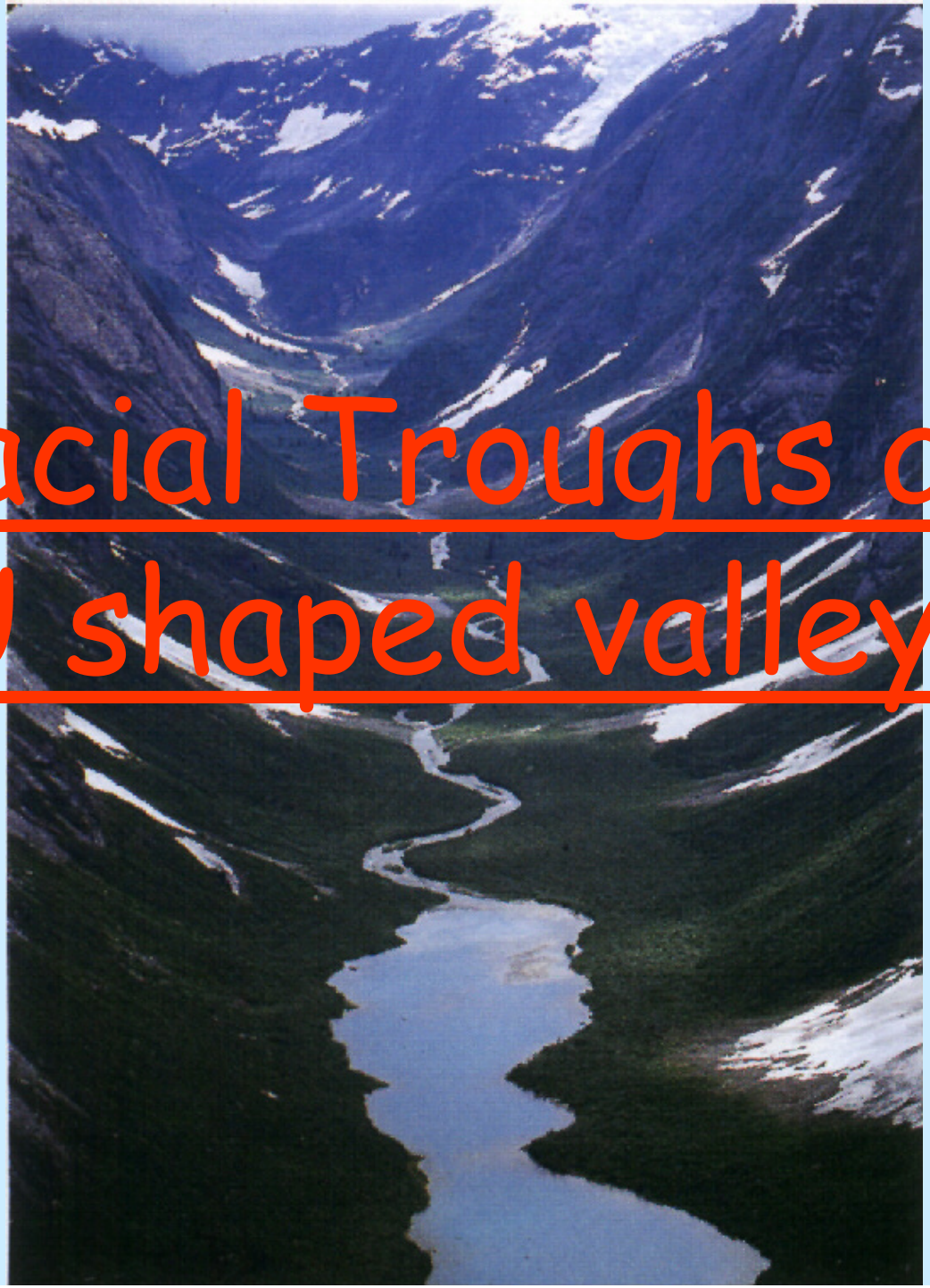
1. Appreciate how glaciers can erode and completely alter the landscape.

2. Understand how meltwater can erode and modify the drainage of some areas.

3. Recognise and explain the formation of glacial deposition features.

Skill – Group work and independent learning

Glacial Troughs and U shaped valleys



Shape of glacial troughs…

- Glacial troughs have steep sides and a relatively flat bottom.
- Although they are referred to as U-shaped, few are actually U-shaped because of mass movement, deposition and erosion by rivers, since the last glaciation.

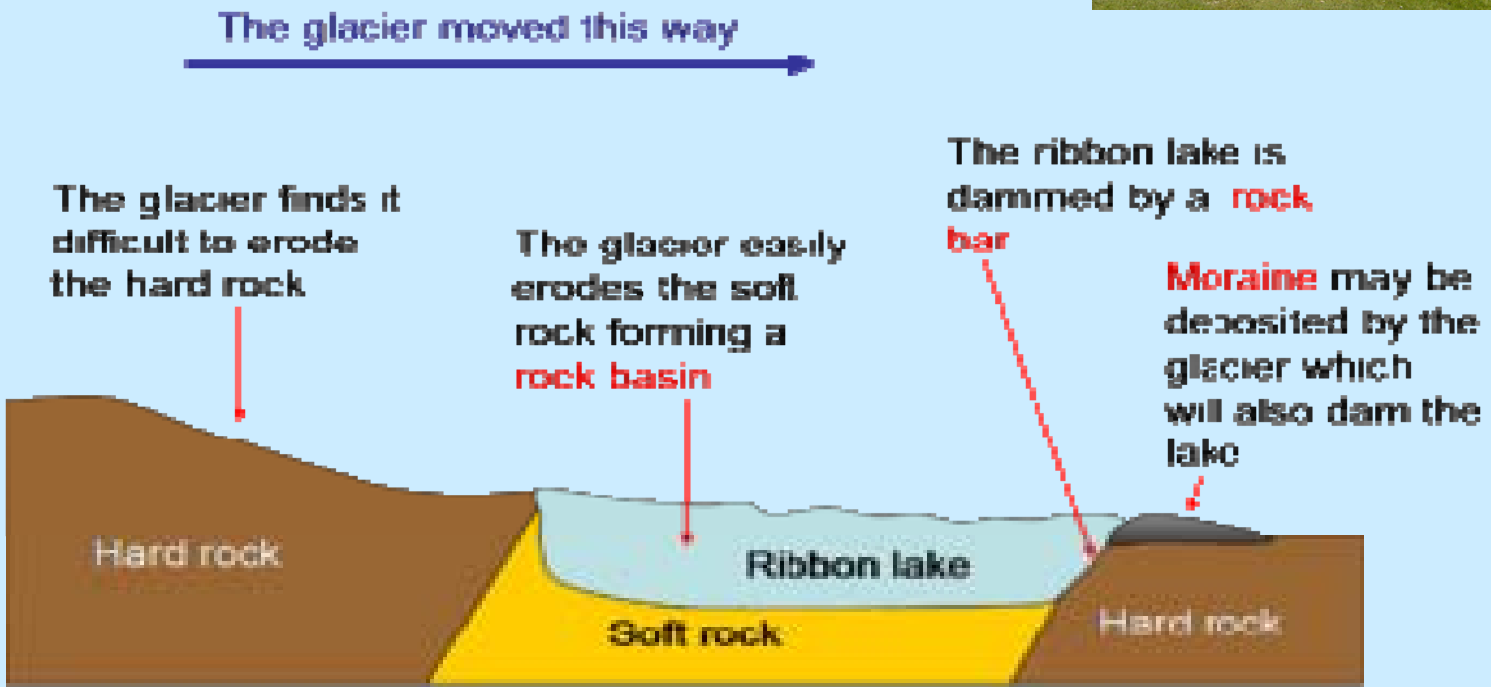
Formation of Glacial troughs/ U-shaped valleys…

- Before the onset of glaciation, freeze-thaw weathering under periglacial processes weakens the floor and sides – preparing it for erosion.

- At the end of a glacial period there will be pressure release as the weight of the ice is reduced (Pressure release – sigh of release- type of weathering in which the rock is able to expand and therefore cracks appear.

- During glaciation the eroding power of ice will cause valley to become U-shaped.

- The valley will become straight (was winding) as the interlocking spurs are bulldozed out to leave truncated spurs.
- Extrusion in the ice can cause the ice to erode deep rock basins in the valley floor – later occupied by ribbon lakes.



The addition of a tributary glacier can also develop a hanging valley .

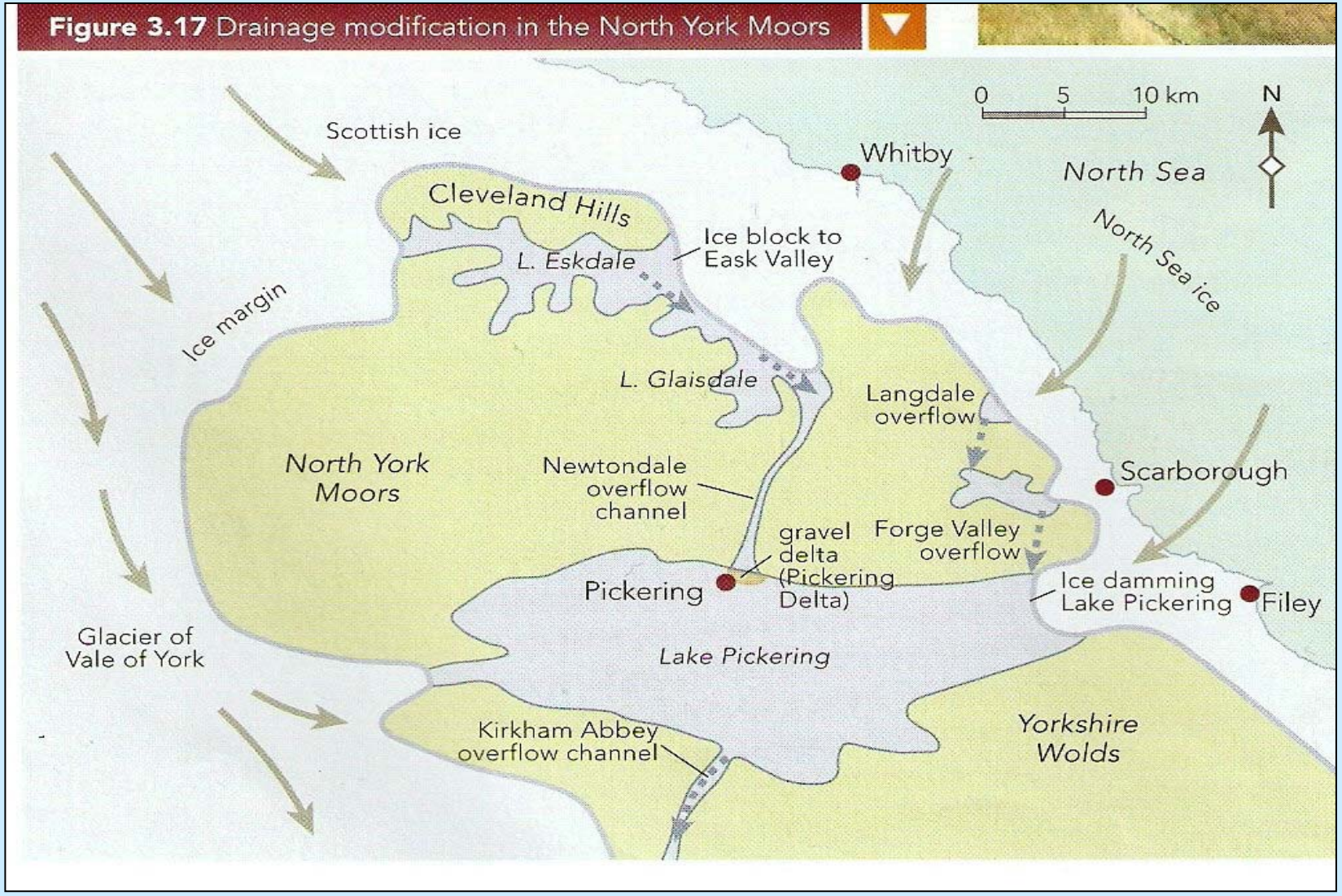
The small tributary glacier does not have the weight or power to cut down to the depths of the main trough, therefore the hanging valley is formed.

How are Fjords formed?

Features resulting from meltwater (fluvioglacial) erosion

- The meltwater is produced from the melted ice of the glacier.
- Meltwater streams have a great erosive power and can erode deep channels in the land.
- In many cases these channels have helped lead to modifications of drainage such as the drainage modification in the North York Moors.

Drainage modification in the North York Moors



Drainage modification in the North York Moors

During the last glaciation, ice sheets up to 300m thick, spread south and south west surrounding the North York Moors, leaving the moors as an island of uncovered ice-free land.

As the ice moved south, it first blocked the mouth of the River Esk and stopped its water from reaching the North Sea. An alternative outlet for the river was also blocked.

The result was the accumulation of water in the low-lying dales, forming lakes that found temporary outlets across ridges between one dale and another. The water cut cols or spillways

- Eventually the lake waters joined and the water surface stood 215m above the present sea level.

- The water then split over the lowest point of the main divide and began to flow southwards, increasing in energy, eroding the trench at Newtondale.

- This area is known as an overflow channel. It is a 75m deep trench with very deep sides cut into the surrounding plateau.

- The east and west ends of the Vale of Pickering were also blocked by ice creating another vast lake.
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- The Newtondale overflow water entering the lake (Lake Pickering) deposited the Pickering delta.

Annotate your map to show how the North York Moors was effected by meltwater erosion.

Depositional Features

Why do glaciers deposit?

Glacial Deposition

- Ice is able to transport huge amounts and sizes of material.
- The material is carried on the ice surface, within the ice or dragged along the base of the ice.
- Unstratified material – unsorted glacial deposits – variable in size and no distinct layers.
- Meltwater flowing from the ice also deposits material – rounded/ stratified material

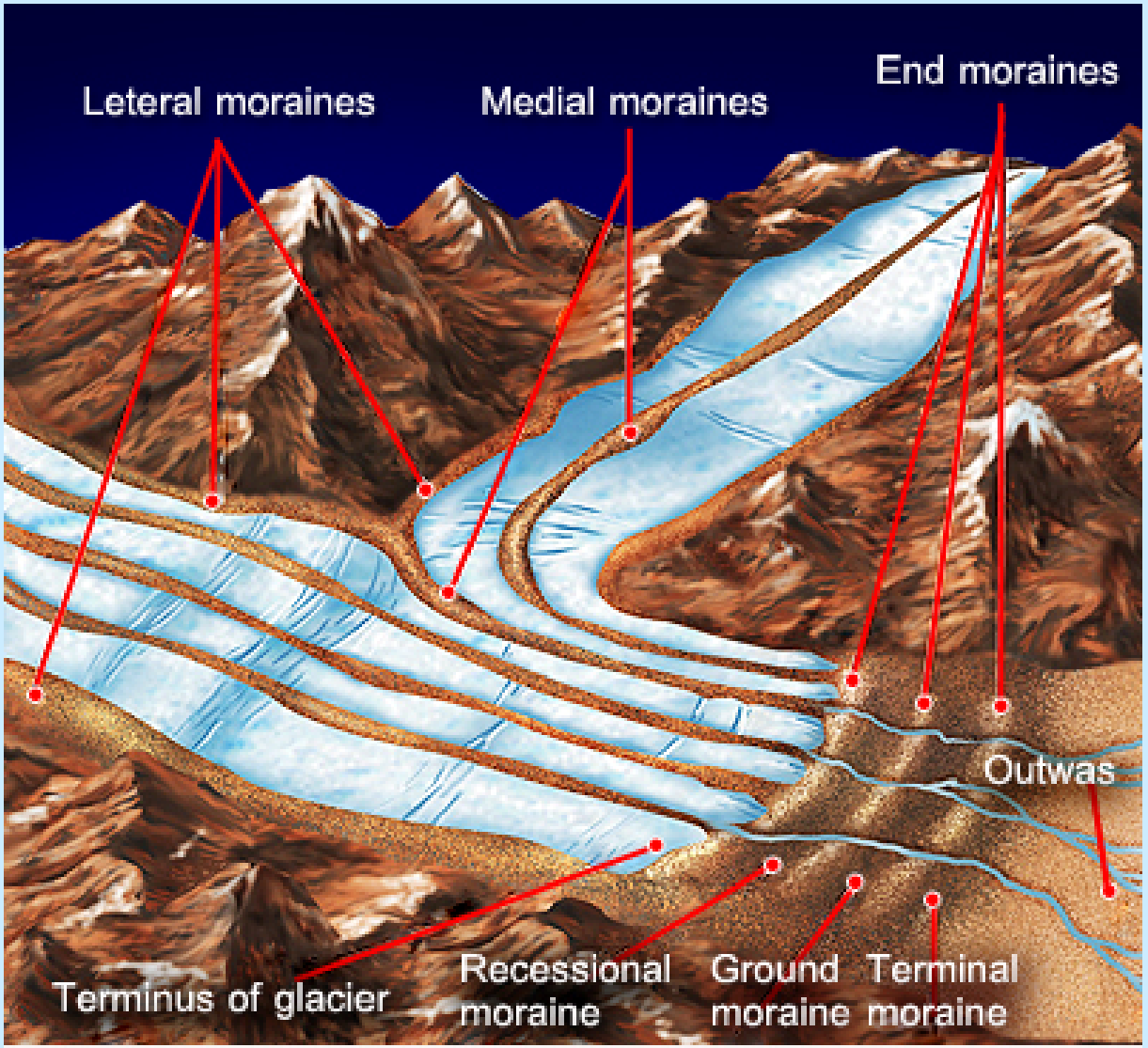
Working in 3/4s complete the table for one depositional feature. You must be able to explain to the rest of the class what it is and how it is formed.

You will then complete your notes through the groups presentations.

Erratic

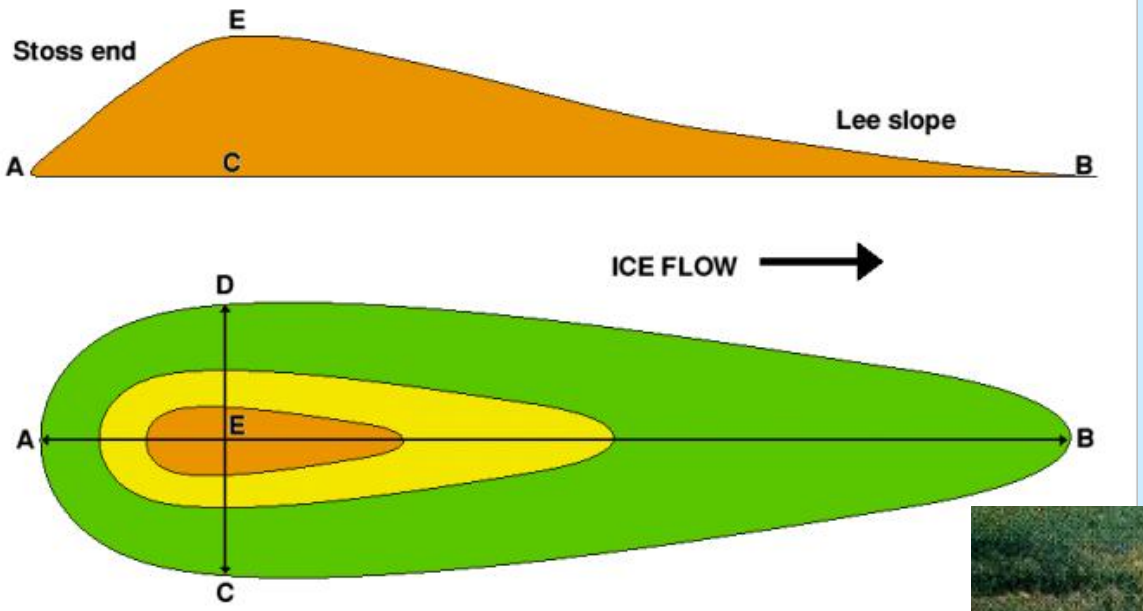
Till

Moraines



Types of Moraines

Drumlins



Glacial deposition