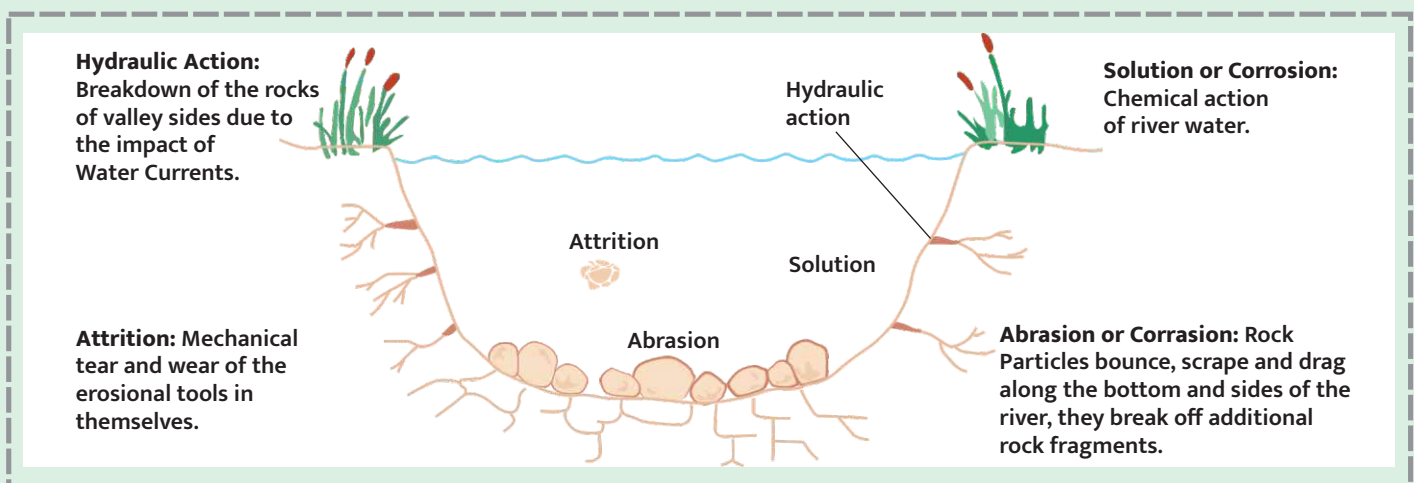


- Causes.
- Endogenic (tectonic forces) and Exogenic (gradational forces).
- Landforms and crustal order of relief.

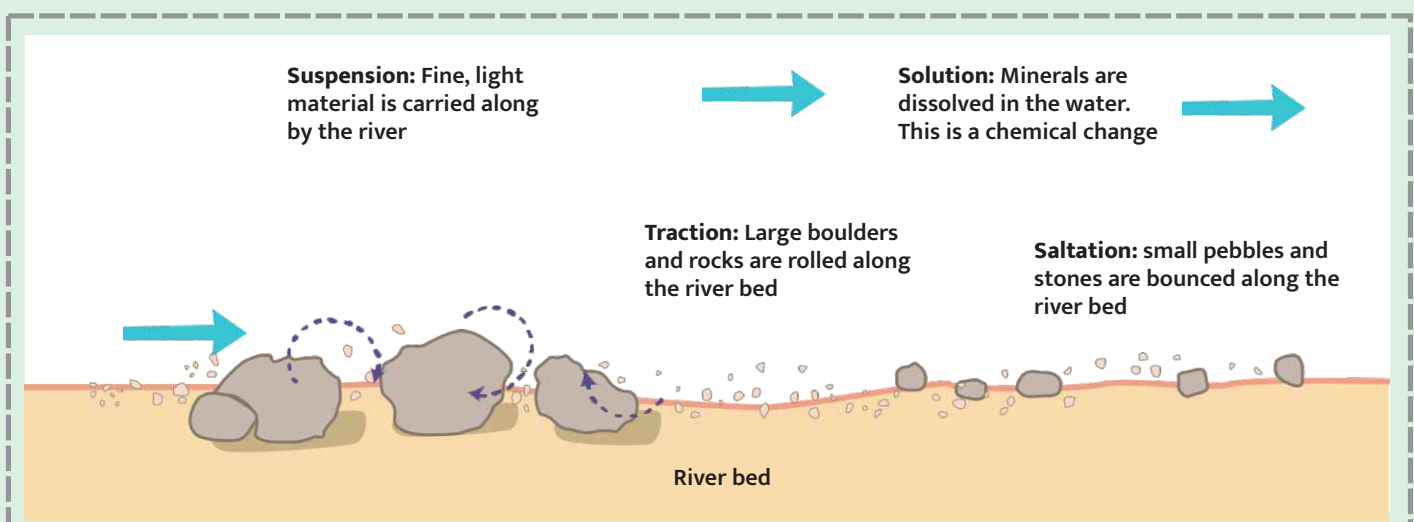
First order of relief	Continental platforms and the ocean basins.
Second order of relief	Mountains, plateaus, plains, continental shelves, continental slopes, abyssal plains, mid-oceanic ridges, submarine canyons and trenches.
Third order of relief	Mountain peaks, cliffs, hills, spurs, sand dunes, valleys, etc.

1. FLUVIAL (RIVER BASED) LANDFORMS

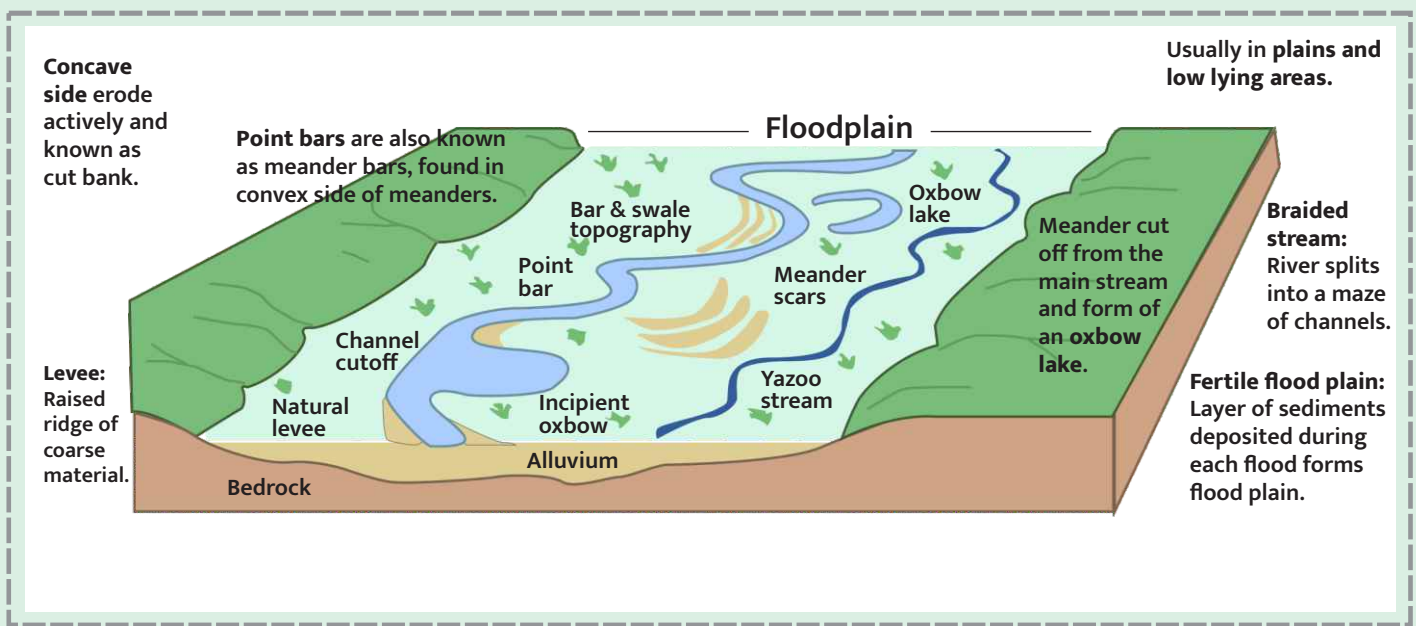
● 1.1 Erosion.



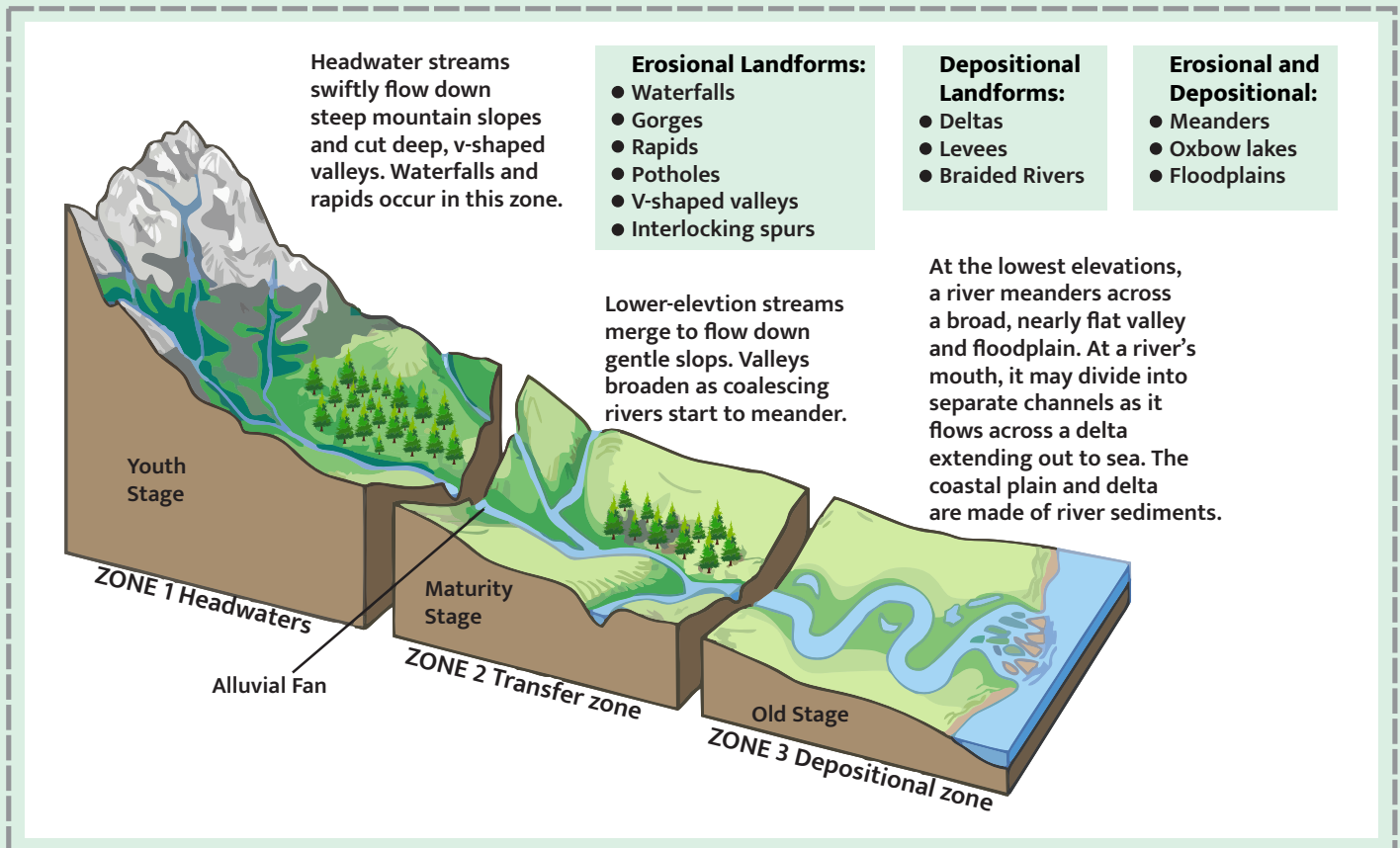
● 1.2 Transportation.



● 1.3 Deposition: Including the features formed due to deposition.



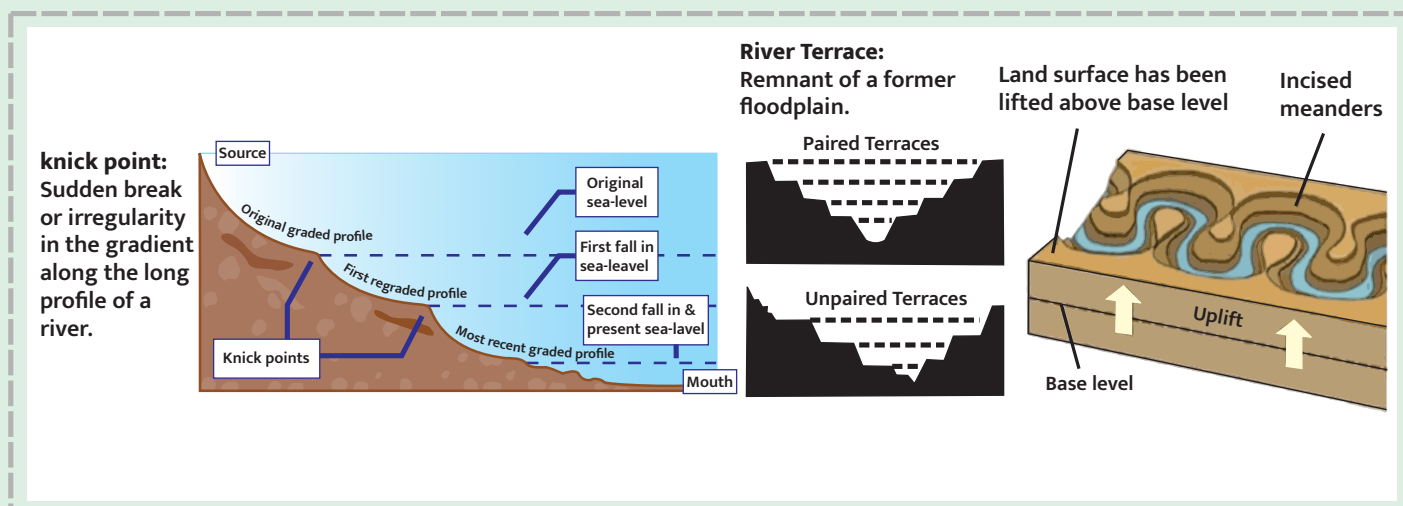
● Development of the river valley.



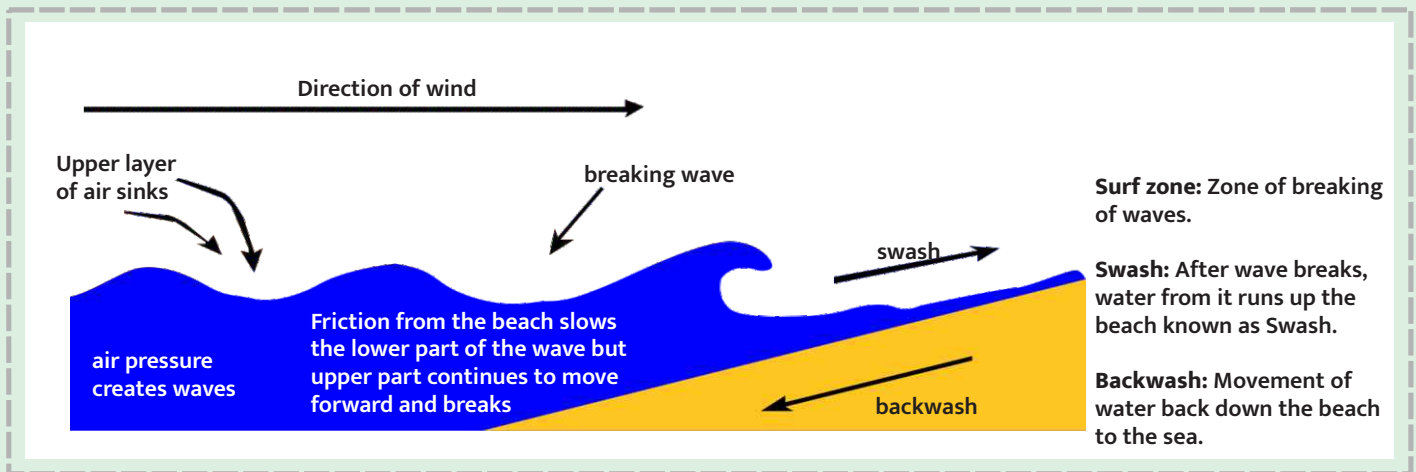
	Youthful Stage - Upper course	Mature Stage - Middle Course	Old Stage - Lower Course
Characteristics	• Vertical and headward erosion • Rough channel bed • High competence, low capacity • Large gradient / slope • High turbulence • Narrow channel • Straight course	• Vertical and Lateral erosion • Wider and deeper channel • Competence decreases, capacity increases	• Deposition • Lateral erosion • High discharge & velocity • High capacity, low competence • Meandering course • Wide flood plain • Channel depth & width at maximum • Low gradient / slope
Features	V-shaped valley, waterfalls, rapids, potholes, gorges, braided streams, interlocking spurs	Meanders, river, cliffs, slip, off slopes, flood plains,	Levees, deltas, point bars, sand bars, oxbow lakes, meanders, larger flood plain, raised banks

● River rejuvenation, River Terrace and Incised or Entrenched Meanders.

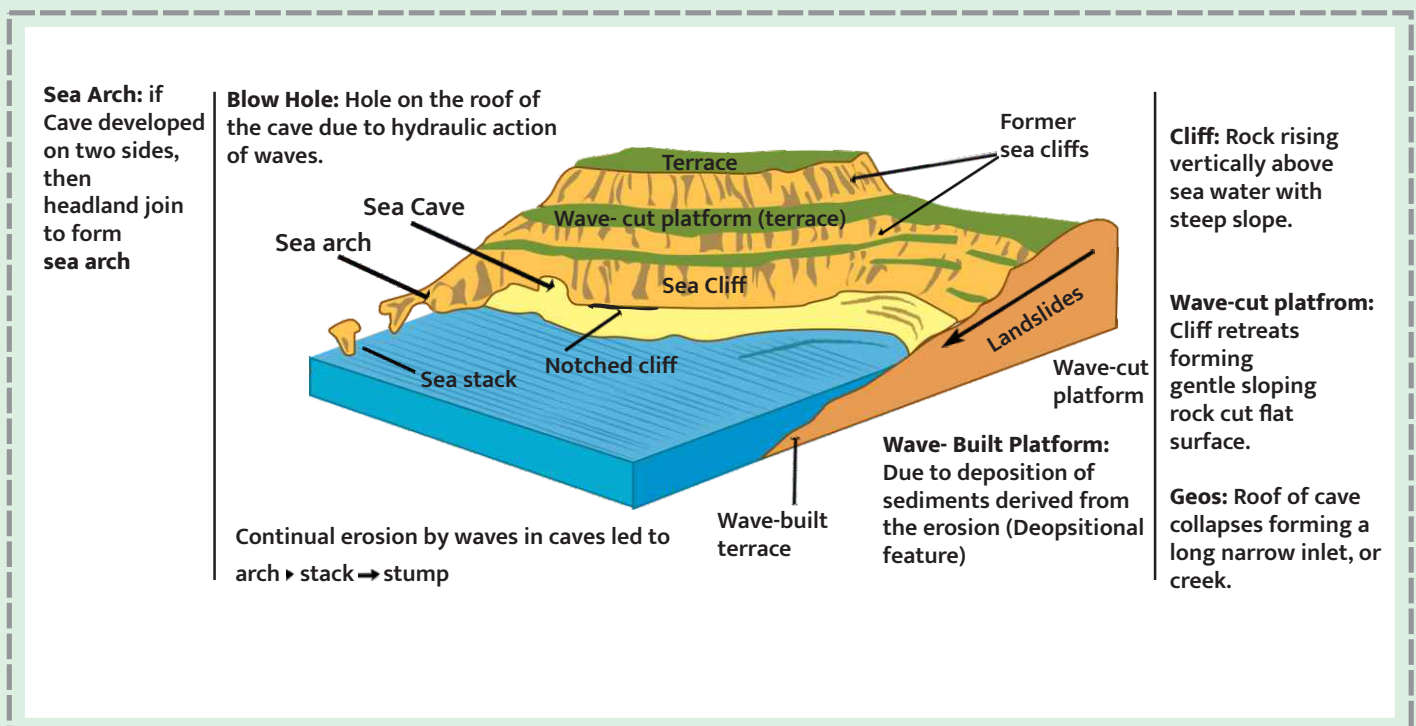
River rejuvenation : Either due to a fall in sea level relative to the level of the land or a rise of the land relative to the sea.



2. COASTAL LANDFORMS: PROCESS INCLUDED TIDES, CURRENT AND WAVES.



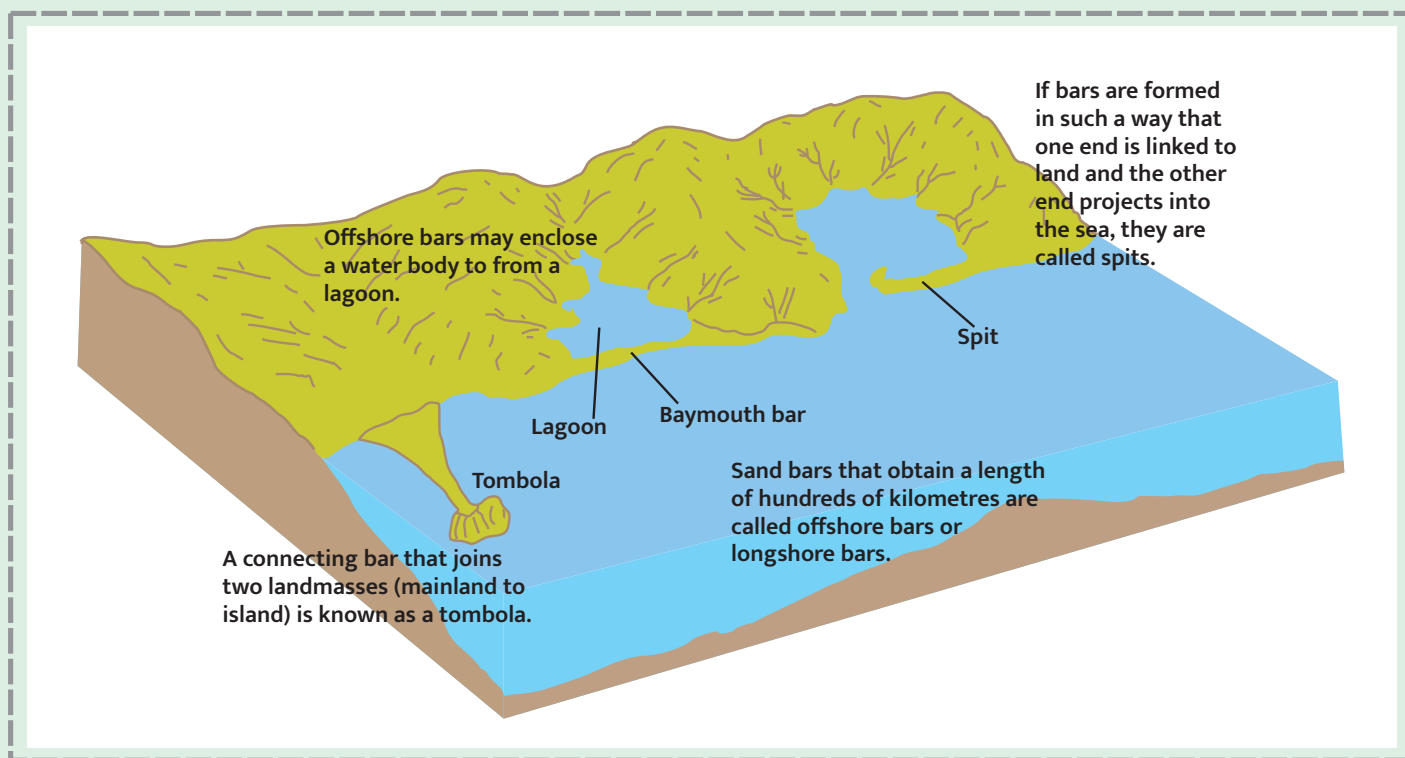
● 2.1 Coastal erosion.



● 2.2 Depositional Features.

2.2.1 Wave-Built Platform or Terrace (Included in coastal erosion dig)

2.2.2 Beaches called **shingle beaches** contain excessively small pebbles and even cobbles.

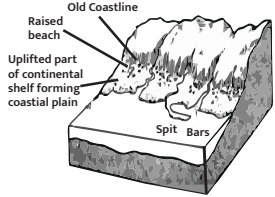
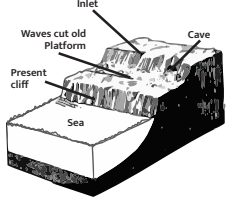


● 2.3 Types of Coasts.

2.3.1 Coastlines of submergence: Become lowered below current sea level.

Type of Coast	Features	Examples	Image
Ria Coasts	Formed when a non-glaciated highland coast becomes submerged and the valleys filled with sea water. Often "V" shaped.	North-western Spain and south-western Ireland.	
Fjord (Fjord) Coasts	Fjord is a narrow, high-walled, and very long submerged glacial valley. Formed when a descending glacier carves a U-shaped valley into the bedrock.	Fjord coasts of Norway.	
Dalmatian or Longitudinal Coasts	Formed when a mountain ridge running parallel to the sea coast is submerged. Alternating crests and troughs runs parallel to the sea coast.	Dalmatian coast of Yugoslavia.	
Estuarine Coast	Coasts where lowland coast are submerged, flooding river. Their entrances are sand and silt free.	Thames of Britain.	

● **2.3.2 Coastlines of Emergence:** The coast has been raised (due to fall in sea level or a rising of the crust) and the ocean waves now erode a lower level.

Type of Coast	Features	Examples	Image
Emerged Upland Coasts	Formed when coastal plateau lands are raised above sea level. Raised beach or cliff-line.	Northern part of west coast of India	 The diagram illustrates an emerged upland coast. It shows a cross-section of the land and sea. A dashed line represents the 'Old Coastline'. A solid line represents the 'Raised beach'. The land is labeled as the 'Uplifted part of continental shelf forming coastal plain'. A 'Spit' and 'Bars' are also indicated.
Emerged Lowland Coasts	Produced by the uplift of part of the neighbouring continental shelf. Main feature: spits lagoons, bars, marshes and beaches.	Coasts of Kerala and Tamil Nadu	 The diagram illustrates an emerged lowland coast. It shows a cross-section of the land and sea. A dashed line represents the 'Waves cut old Platform'. A solid line represents the 'Present cliff'. An 'Inlet' and a 'Cave' are also indicated.

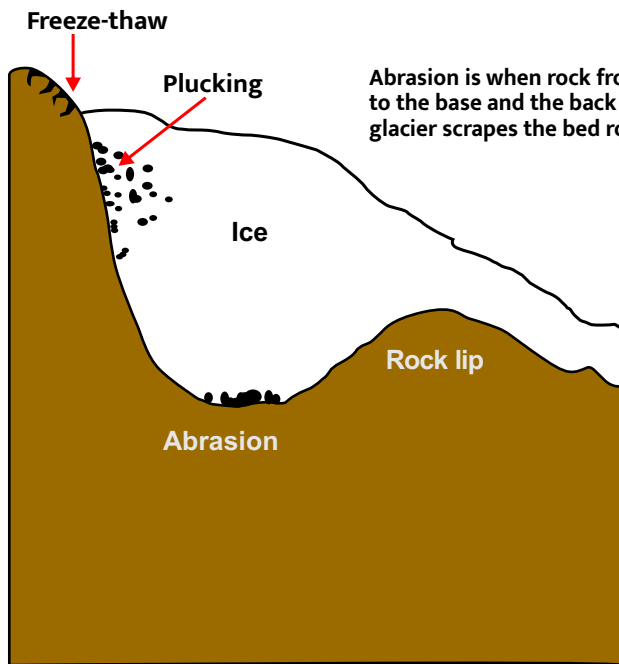
3. GLACIAL LANDFORMS: MOVING MASS OF ICE AND SNOW. PROCESSES INVOLVED ARE OF ACCUMULATION, COMPACTION AND RE-CRYSTALLISATION OF SNOW.

● 3.1 Action of Glacier.

Freeze-thaw is when melt water or rain gets into cracks in the bed rock and at night the water freezes, expands and causes the crack to get larger.

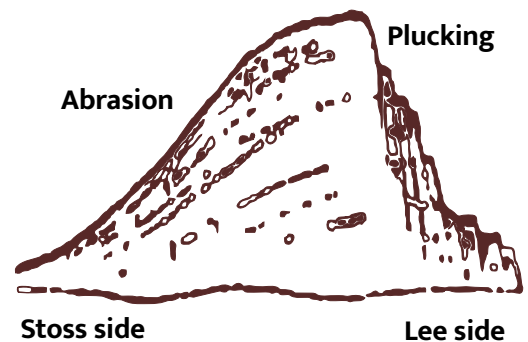
Plucking is when melt water from a glacier freezes around lumps of cracked and broken rock. When the ice moves downhill, rock is plucked from the back wall.

Abrasion is when rock frozen to the base and the back of the glacier scrapes the bed rock.



Roche moutonnee: Rock hill shaped by the passage of ice to give a smooth up-ice slide (stoss side) and a rough plucked surface on the down-ice side (lee side)

Roche moutonnee



● 3.2 The Landforms created by glacial erosion.

Pyramidal Peaks or Horns: Formed when three or more corries form in the side of one mountain.

Arete: Narrow, knife edge ridge separating two corries.

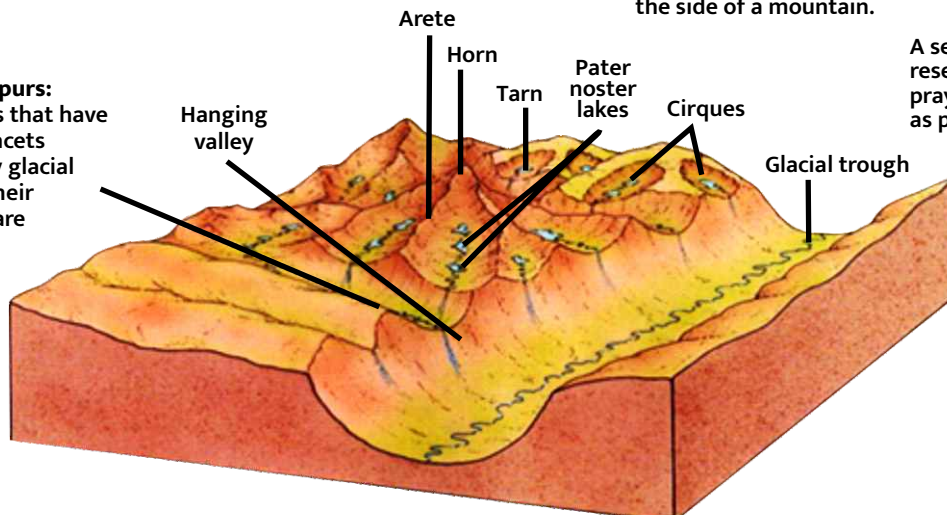
Bergschrund: Crevasse or wide crack opens along the headwall of a glacier.

Truncated spurs: These ridges that have triangular facets produced by glacial erosion at their lower ends are termed as truncated spurs.

Tarn: Lake found in a corrie

Cirque: Arm chair shaped hollow found in the side of a mountain.

A series of Tarns lakes, resembling a string of prayer beads, are known as paternoster lakes.



● 3.3 Glacial landforms resulting from deposition.

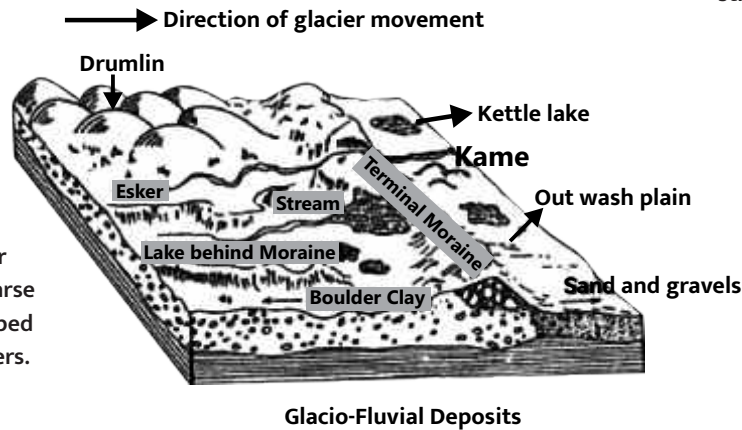
Drumlins are elongated hills of glacial deposits.

Erratics: Boulders of considerable size are deposited far from their origin.

Outwash Deposits: Rock debris washed down and deposited. Outwash deposits are roughly stratified and assorted.

Eskers: Sinuous ridges of sand and gravel

Glacial till or Boulder Clay: Unassorted coarse and fine debris dropped by the melting glaciers.

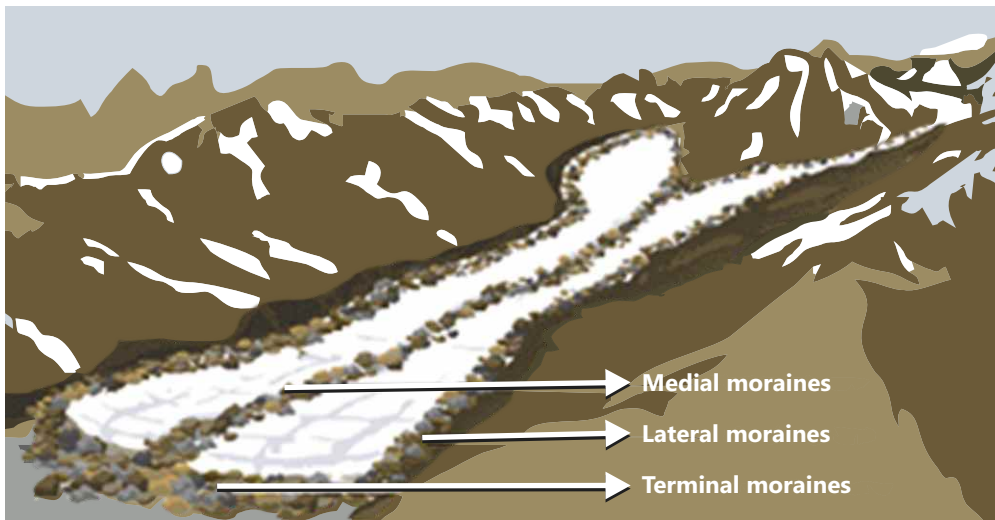


Kames: Rounded mounds/hills of fluvioglacial deposits.

Outwash Plain: Broad surface of stratified drifts is formed.

Kettle: Depressions found between the outwash plains.

Glacio-Fluvial Deposits



Terminal moraines are found at the terminus or the furthest (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, sizes and of differing rock types.

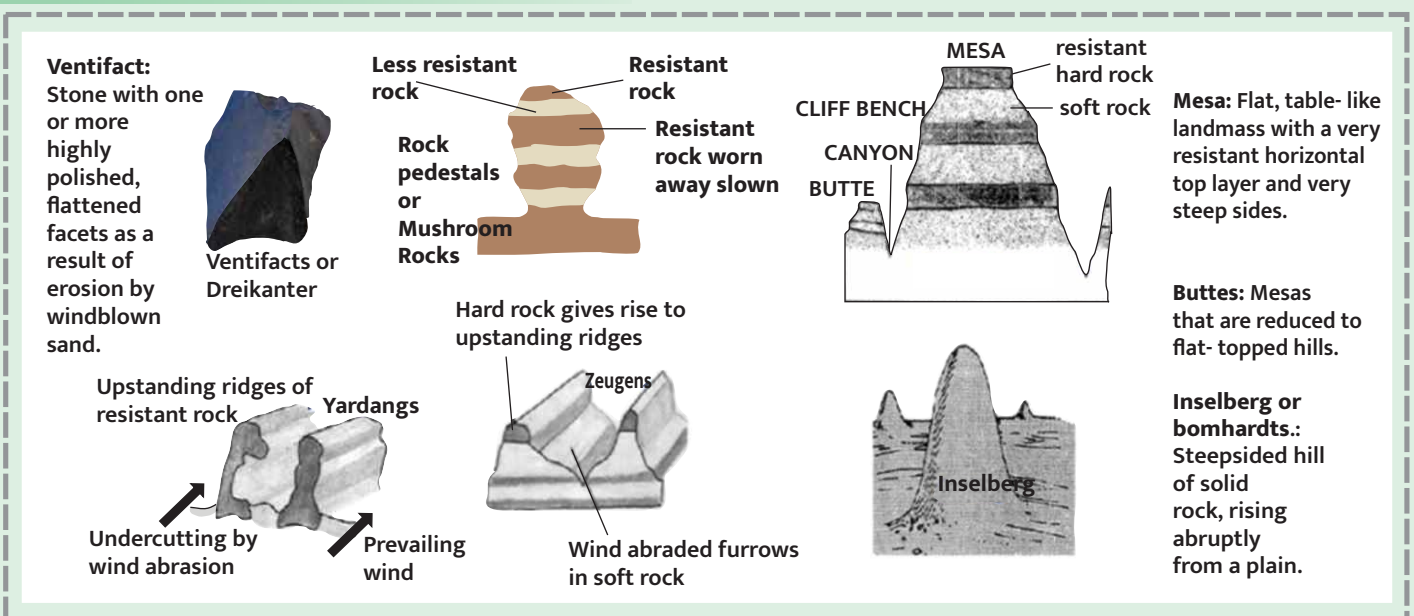
4. LANDFORM BY THE ACTION OF WIND (AEOLIAN): MOST OF THE DESERTS ARE CONFINED WITHIN THE 15° TO 30° NORTH AND SOUTH LATITUDINAL BELTS. FACTORS INCLUDING: MEAN ANNUAL RAINFALL, COLD CURRENTS, CONTINETIALITY, ETC.

- Processes involved: Attrition, Deflation, Abrasion or Corrosion, etc.

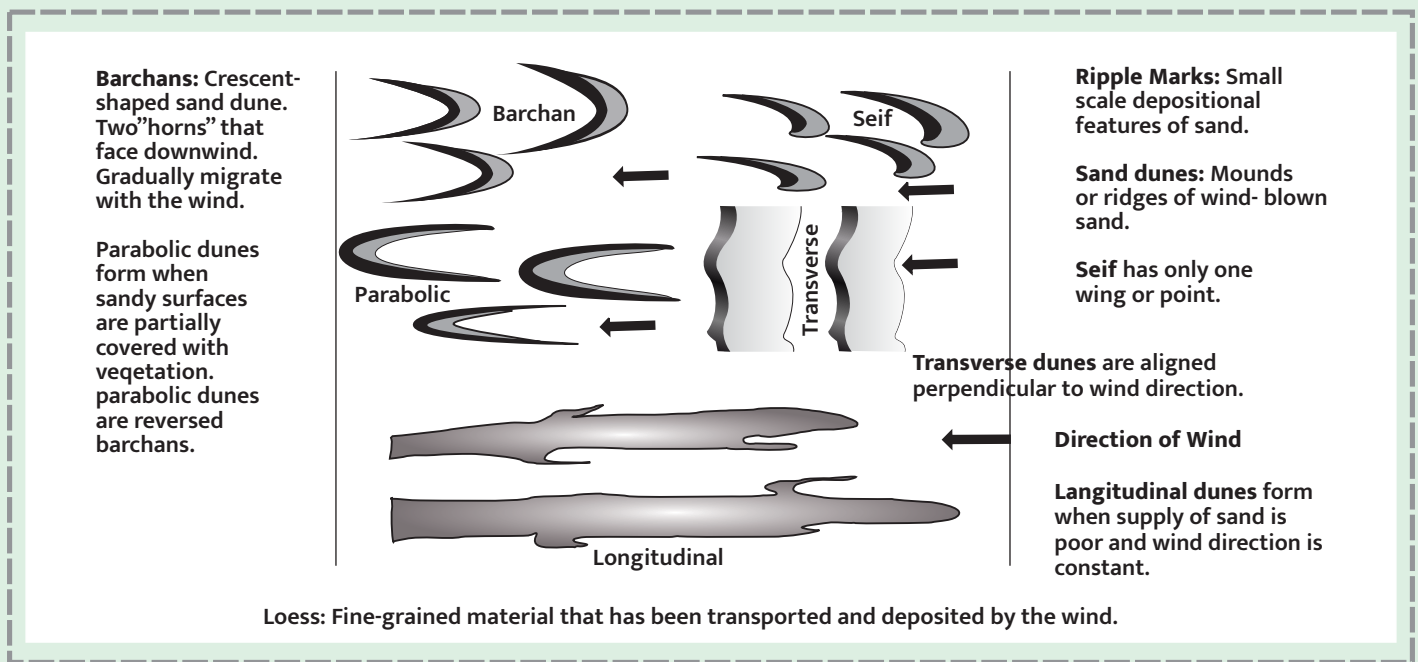
- Surfaces formed in desert.

Surface	Features	Example
Erg (Sandy or True Desert)	Almost horizontal, sand sheets or of regular dune lines, or of an undulating sand sea.	Erg in the Sahara and Saudi Arabia, koutum in Turkmenistan.
Stony Desert	Stony desert, horizontal sheets of smoothly angular gravel cover the Surface.	Reg in Algeria and Serir in Libya and Egypt.
Badland	Characterised by deep dissection, ravines, gullies, and sharp- edged ridges.	South Dakota, U.S.A.
Hamada or Rocky Desert	Large areas of sand and dust, with patches of barerock.	Deserts in Sahara are known as Hamada.
Mountain Desert	In highlands, mountain ranges and the plateau areas.	Ahaggar Mountain and Tibesti mountain of Sahara.

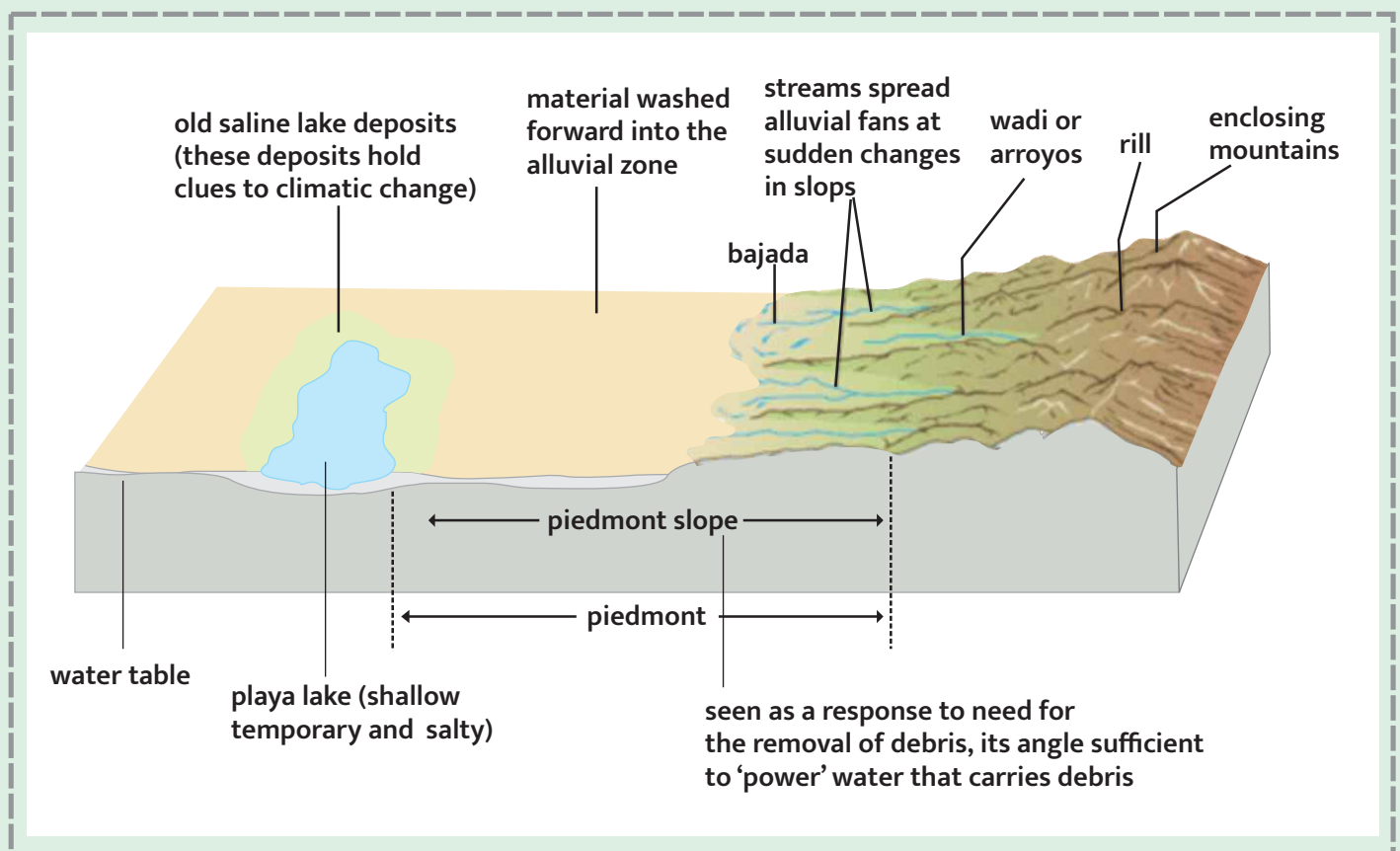
4.1 Erosional Landforms-Wind.



● 4.2 Depositional Landforms-wind.



● 4.3 Fluvial Desert Landforms: Influenced by the action of running water.



5. KARST TOPOGRAPHY: LIMESTONE OR DOLOMITIC REGION SHOWING TYPICAL LANDFORMS PRODUCED BY THE ACTION OF GROUNDWATER THROUGH THE PROCESSES OF SOLUTION AND DEPOSITION IS CALLED KARST TOPOGRAPHY.

● 5.1 Erosional landform.

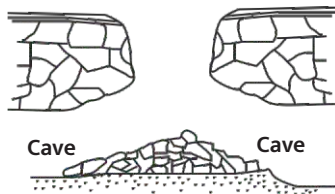
Sequence:

Sink hole->
Swallow hole->
Doline->Uvalas

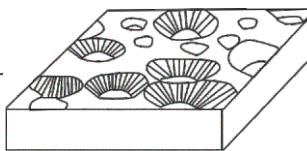
Caves having openings at both the ends are called tunnels.

Uvalas are extensive depression.

Section of collapse sink



Sink holes

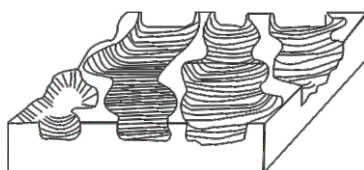


Sink Hole: Surface depression or hole in a region of limestone terrain.

Swallow hole: Coalescence of closely spaced sink holes into one large hole.

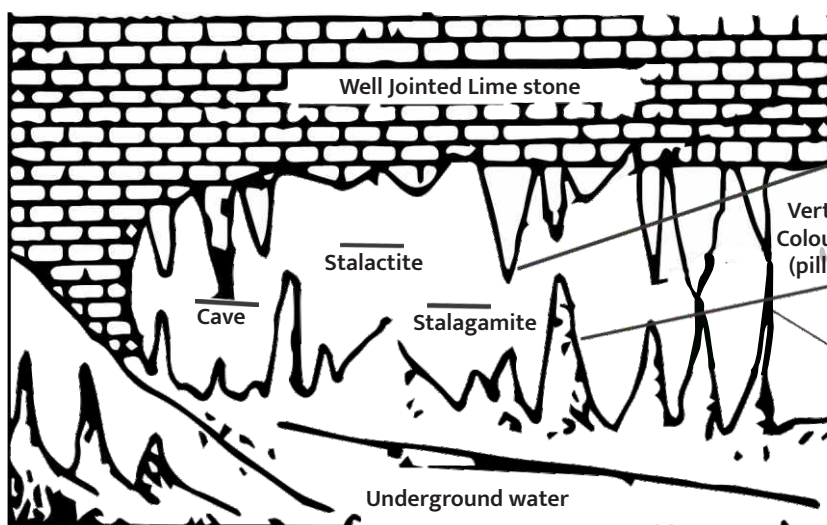
Dolines: Further Larger depression.

Valley sinks/ Uvalas



Lapies: Weathered limestone surface found in karst regions.

● 5.2 Depositional Landforms.



Stalactite: The deposit of limestone grows downwards like pillars.

Stalagmite: The deposit grows upward from the floor.

Pillars: Both stalactite and stalagmite often join together to form vertical column.