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Landforms



Learning Objectives

- ✤ To understand the landforms produced by running water
- ✤ To describe the landforms created by glacial action
- $\boldsymbol{\diamond}$ To learn about the landforms which are produced by wind action
- To gain knowledge about land forms formed by sea waves.

Introduction

In the earlier class, we have learnt that the surface of the earth is not the same everywhere. The earth has an infinite variety of landforms named mountains, plateaus, plains, valley etc., Some parts of the lithosphere may be rugged and some flat. These landforms are a result of two processes. They are i. The Endogenic Process ii. The Exogenic Process

(i) The Endogenic Process

The *endogenic process* (internal process) leads to the upliftment and sinking of the earth's surface at several places.

(ii) The Exogenic Process

The *exogenic process* (external process) is the continuous wearing down and rebuilding of the land surface.

Gradation is the process of levelling of highlands through erosion and filling up of lowlands through deposition.

Landforms

The landscape is being continuously worn down by two processes – *weathering and erosion. Weathering* is the breaking and falling apart into small pieces of the rocks on the earth's surface. *Erosion* is the wearing down of the landscape by different agents like water, wind, ice and sea waves. The eroded material is carried away by water, wind, etc. and eventually deposited. This process of erosion and deposition create different landforms on the surface of the earth.

River

The water flowing from its source to river mouth, along a definite course is called a *River*. Rivers generally originate from a mountain or hill. The place of origin of the river is known as its *Source*. The place where it joins a lake or sea or an ocean is known as *River mouth*.

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Land forms formed by River

The running water in the river erodes the mountainous track, which creates a steep-sided valley like the letter 'V' known as '*V*' *shaped valley*.



'V' shaped valley

Falling of river water over a vertical step in the river bed is called *waterfall*. It is formed when the soft rocks are removed by erosion. E.g. Coutrallam falls across the river Chittar in Tamil Nadu.

Plunge pool is a hollow feature at the base of a waterfall which is formed by cavitation. **Alluvial fan** is a deposition of sediment occurs at which the river enters a plain or the **foot-hills.**

Tributary: A stream or river that flows into and joins a main river.

Distributary: A stream that branches off and flows away from a main stream.

The world's highest waterfall is Angel Falls of Venezuela in South America. The other waterfalls are Niagara Falls located on the border between Canada and USA in North America and Victoria Falls on the borders of Zambia and Zimbabwe in Africa.



As the river enters the plain it twists and turns forming large bends known as *Meanders*. Eg. Meanders along the River Vellar near Sethiyathope in Cuddalore District, Tamil Nadu. Due to continuous erosion and



Meanders

deposition along the sides of the meander, the ends of the meander loops come closer. In due course of time the meander loop cuts off from the river and forms a cut-off lake, also called an *Ox-bow lake*.





The term **'Meander'** has been named on the basis of Meander River of Asia Minor (Turkey), which flows through numerous curves and turns.

At times the river overflows its banks. This leads to the flooding of the neighbouring areas. As the river floods, it deposits layers of fine soil and other material called *sediments* along its banks. This leads to the formation of a flat fertile *floodplain*. The raised banks are called *levees*.

As the river approaches the sea, the speed of the flowing water decreases and the river begins to break up into a number of streams called *distributaries*. The velocity of the river becomes so slow that it begins to deposit its load. The collection of sediments from all the mouths form **Delta**. Deltas are excellent productive lands. E.g. *Cauvery delta*, *Ganges delta*, *Mississippi delta*.



Find out the names of a few rivers of the world that form a delta with the help of the Atlas.

Glacier

A large body of ice moving slowly down a slope or valley due to gravity is called a *glacier*. Glaciers are grouped into *Mountain or Valley Glaciers and Continental Glaciers*.

Continental Glacier: The glacier covering vast areas of a continent with thick ice sheets. E.g. *Antarctica, Greenland*

Mountain or Valley Glacier is a stream of ice, flowing along a valley. It usually follows former river courses and are bounded by steep sides. *E.g. The Himalayas and the Alps.*

Glaciers, expose the solid rocks of earth by removing the loose materials found on it.



Formation of a Cirque

Cirque is a glacially eroded rock basin, with a steep side wall and steep head wall, surrounding an armchair-shaped depression. E.g. *Corrie* – Scotland (United Kingdom), *Kar* – Germany.

As the ice melts, they get filled up the cirque with water and become beautiful lakes in the mountains called as *Tarn Lake*. When two adjacent cirques erode towards each other, the previously rounded landscape is transformed into a narrow rocky, steep – sided ridges called *Arete*.



Arete

U' Shaped Valley is found beneath the glaciers which is deepened and widened by the lateral and vertical erosion. The material carried by the glacier such as rocks - big and small, sand and silt get deposited. These deposits form *glacial moraines*.



Moraine

Have you ever visited a desert? Try to collect some pictures of sand dunes. An active agent of erosion and deposition in the deserts is *wind*.



Mushroom Rock

Winds erode the lower section of the rock more than the upper part. Therefore, such rocks have narrower base and wider top. Wider top rocks in the shape of a mushroom, commonly called *mushroom rocks*. An isolated residual hill, standing like a pillar with rounded tops are called *Inselbergs*. E.g. Inselberg in the Kalahari Desert of South Africa.



Inselberg

When the wind blows, it lifts and transports sand from one place to another. When it stops blowing the sand falls and gets deposited in low hill – like structures. These are called *sand dunes*. The crescent shaped sand dunes are called *Barchans*.



Barchans

(A

Wind

When the grains of sand are very fine and light, the wind can carry it over very long distances. When such sand is deposited in large areas, it is called *Loess*. Large deposits of loess are found in China.



Loess



Northern China loess deposits are brought from the Gobi Desert.

Sea waves

A part of the land adjoining or near the sea is called the **Sea coast**. The boundary of a coast, where land meets water is called the **Coast line**. The coastal areas are subject to change due to wave erosion and wave deposition.



Coastal Landforms

The erosion and deposition of the sea waves give rise to coastal landforms. *Sea Cliffs* are steep rock faces formed, when the sea waves dash against them. Sea waves continuously



Sea Cliff

strike at the rocks. So Cracks develop. Over time they become larger and wider. Thus, hollow like caves are formed on the rocks. They are called *Sea Caves*.



Sea cave

As the cavities of sea caves become bigger and bigger only the roof of the caves remains, thus forming *Sea Arches*. Further, erosion breaks the roof and only walls are left. These wall like features are called *Sea Stacks*.



Sea arch and Sea stack

The sea waves deposit sediments of sand and gravel along the shores forming **Beaches**. **Sand bar** is an elongated deposition of sand or mud found in the sea, almost parallel to the coast.



Beach and Sand Bar

Lagoon is a shallow stretch of water partially or completely separated from the sea. E.g. Chilika lake in Odisha, Pulicat lake

in Tamil Nadu and Vembanad lake in Kerala are the famous lagoons in India.





The longest beach in the world is the **Miami beach** in South Florida in U.S.A. The second longest beach in the world is the **Marina beach** in Chennai.



Summary

KNOW

- ◆ The landscape is being continuously worn down by weathering and erosion.
- ✤ River, glacier, wind and sea waves are the major agents of exogenic forces.
- From its source to its mouth, the river is constantly reshaping the land and giving rise to different landforms.
- The river begins to break up into a number of streams called distributaries.
- Deltas are excellent productive lands.
- Glacier is large body of ice moving slowly down a slope due to gravity.
- ✤ Moraines are glacial deposits.
- Wind is the active agent of erosion and deposition in deserts.
- ◆ The sea waves deposit sediments of sand and gravel along the shores forming beaches.

Glossary				
Gradation	The process of leveling of highlands through erosion and	சமநிலைப் படுத்துதல்		
	filling up of lowland through deposition.			
Weathering	Breaking and crumbling up of rocks on the earth's surface.	வானிலைச் சிதைவு		
River mouth	The place where the river joins a lake or an ocean.	ஆற்று முகத்துவாரம்		
Tributary	A stream or river that flow into and joins a main river.	துணை ஆறு		
Meander	Twists and turns forming large bends in the river.	ஆற்று வளைவு		
Delta	Large Fan shaped sediments formed by river deposition	டெல்டா		
Cirque	The arm chair shaped depression with steep sleep sided	சர்க்		
	wall formed by glacial erosion.			
Barchans	The crescent shaped sand dunes.	பிறைவடிவ		
		மணற்குன்று		
Lagoon	A shallow stretch of water partially separated from the sea.	காயல்		



III. Match the following

- 1. Breaking and crumbling Glacier of rocks
- 2. Abandoned meander Barchans loops
- 3. Large body of moving Lagoon ice
- 4. Crescent shaped sand Weathering dunes
- 5. Vembanad lake Oxbow lake

IV. Consider the following statement and tick (✓) the appropriate answer

1. Assertion (A): The deltas are formed near the mouth of the river.

Reason (R) : The velocity of the river becomes slow when it approaches the sea.

- a) Both A and R are correct
- b) A is correct and R is wrong
- c) A is wrong and R is correct
- d) Both A and R are wrong
- **2.** Assertion (A): Sea arches in turn become Sea Stacks.

Reason (R) : Sea Stacks are the results of wave deposition.

- a) Both A and R are correct
- b) A is correct and R is wrong
- c) A is wrong and R is correct
- d) Both A and R are wrong

V. Answer the following

- 1. Define erosion.
- 2. What is a plunge pool?
- 3. How are Ox bow lakes formed?
- 4. Name the major landforms formed by glacial erosion.
- 5. Give a note on Mushroom rocks.
- 6. What is a lagoon? Give an example.

VI. Distinguish the following

- 1. Tributary and Distributary
- 2. 'V' shaped valley and 'U' shaped valley
- 3. Continental glacier and Mountain glacier

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VII Give Reason

- 1. The ends of the meander loops come closer and closer.
- 2. Flood plains are very fertile.
- 3. Sea caves are turn into stacks.

VIII Answer in a paragraph

- 1. Explain different landforms produced by river erosion.
- 2. Describe the landforms associated with wind.
- 3. How are aretes formed?

Activity

1. Fill in the corresponding columns with reference to the landform features given below

[Barchan, 'V' Shaped valley, Cliff, Arete, Inselberg, Moraine, Alluvial fan, Lagoon]

- 2. Identify any one of the following features near your home town and write a note on them.
 - 2. Waterfall
 - 3. River (or) stream 4. Beach.

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S No	Natural Agents	Landforms	
3.100		Erosion	Deposition
1	River		
2	Glacier		
3	Wind		
4	Sea wave		

