4. Exogenetic Processes Part –II

Exogenetic processes:

We have learnt in the previous lesson that the earth's surface wears away because of erosion. The eroded material gets carried away by agents. When the speed of the agent reduces, the materials get deposited. The agents like running water (river), glaciers, wind, sea waves and groundwater, do the work of erosion, transportation and deposition. Because of these agents, the earth's surface keeps on undergoing changes and new landforms are formed. We will study some of these landforms in this lesson.

Work of rivers and landforms:

Can you tell?

- How will you differentiate between a rill, gully, stream and a river?
- What is a river?

Geographical explanation

Running water flows naturally in a direction according to gravity along the slope and makes its own way. This is called a flow of water. When many such flows of water come together, a river is formed.

Canyon

The slope of the land, the type of rock, volume of water flowing in the river and the length of the flow, volume of sediments in the river, etc, are the factors on which the erosional, transportational and depositional work of the rivers depend.

Erosional work of rivers:

The rivers originate at a much higher altitude from the sea level. Here, the river flows at a great speed and therefore, its power to erode is great. The riverbed and the river banks get eroded because of the fast flow of water, sand particles, pebbles. etc. and the various tributaries joining the main river. All these lead to the formation of gorges (canyons), V-shaped valleys and waterfalls.

Transportation and deposition by rivers:

A river flows down the slope from a hilly region. At the foothills, the change in the slope causes deposition of coarse sediments. As these are deposited in a triangular shape, they form an alluvial fan.

As the steepness of the slope decreases and the transporting capacity of the river reduces, it starts flowing slowly. It bends (meanders) often in its way in an effort to cross even small obstacles. By the time the river reaches the sea, its riverbed becomes very wide and its speed becomes very slow. The sediments of the river get deposited in its bed and on its banks. The factors that

Meandering of a river

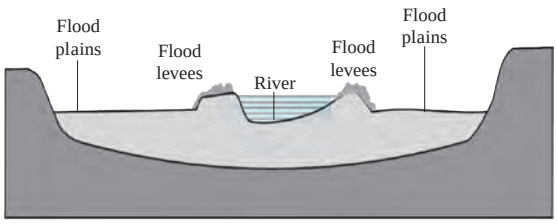


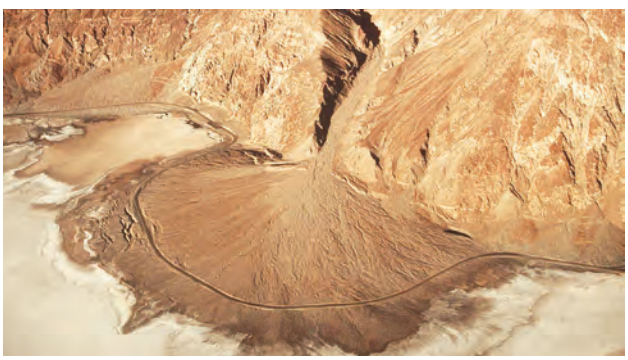
Figure 4.1 : Flood levees and flood plains

determine the deposition of sediments are the length of the rivers, volume of water, amount of sediments, and the slope of the river and the earth's surface. Thus, landforms like flood levees, flood plains and deltas are formed because of deposition of sediments. See fig. 4.1.

Try to understand the formation of landforms like gorges, V-shaped valleys, waterfalls, alluvial fans, meanders, flood levees, flood plains and deltas with the help of teachers.

Give it a try.

Some pictures of various landforms formed by the river are given. See them. Write the type of work done by the river in formation of those landforms in the box below.



Alluvial fans

Flood levees and flood plains

'V' shaped valley

Delta

Think about it.

☞ Many creeks are found in the coastal areas of Konkan but no delta. Why ?

Find out.

Is there any lake found near the meanders of the river? Obtain information about this.

Work of glaciers and landforms:

In regions where the temperatures are generally below freezing point, precipitation is in the form of snowfall. Layers of snow accumulate on the earth's surface because of snowfall. The heavy weight of these overlying layers makes the snow move along the slope. At the base of the layer, the snow starts melting because of the friction and the pressure from above. Glacier starts moving slowly along the slope.

Like the river, a glacier too carries out the work of erosion, transportation and deposition.

Erosion work by glaciers:

Though its velocity is less, the mass of the ice is more and hence the glacier erodes its own banks and its bed on a large scale. The erosional work of glaciers produces landforms like cirques, arêtes, horns, U-shaped valleys, hanging valleys and rôche moutonnées (or sheepbacks).

Transportation and deposition by glaciers :

The glaciers carry sediments with them. These sediments are called moraines. Depending on the location of the deposits, moraines can be divided into 4 types: ground moraines, lateral moraines, medial moraines and terminal moraines. Observe fig. 4.2.The depositional work of glacier produces landforms like drumlins, eskers, etc.

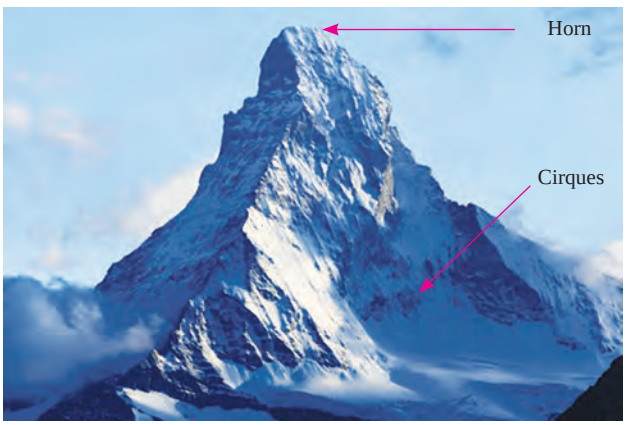
Try to understand the various landforms produced by the work of glaciers with the help of your teachers.

Do you know?

Glaciers move at different velocities daily ranging from 1cm to 1m. The Jacobshavn Glacier in Greenland is one of the fastest moving glaciers in the world. It moves at the rate of 46m per day.

Give it a try.

Some pictures of the landforms formed by glaciers are given below. Write in the box below the function because of which they have been formed.



Cirques and horn

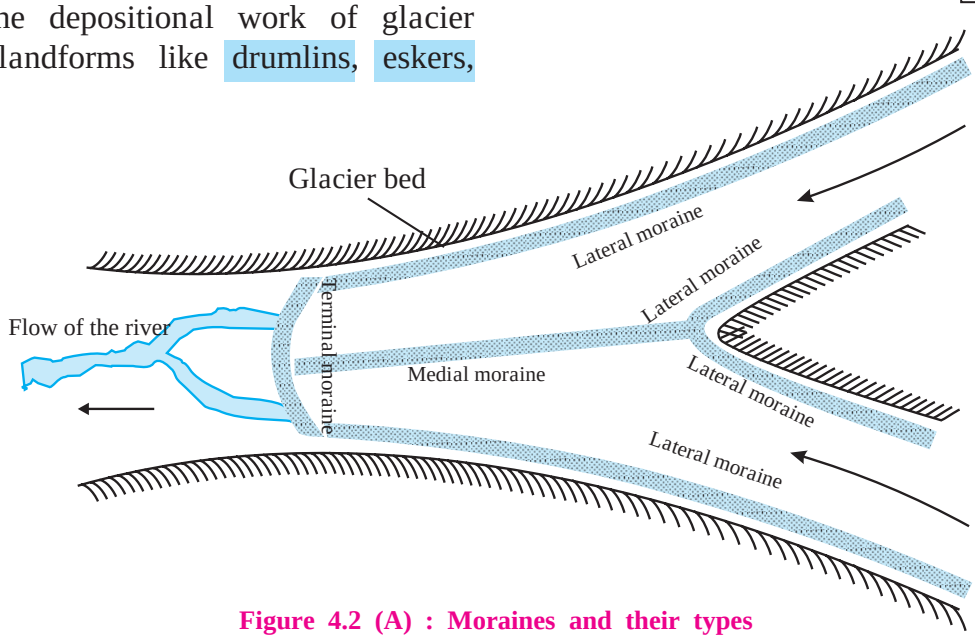
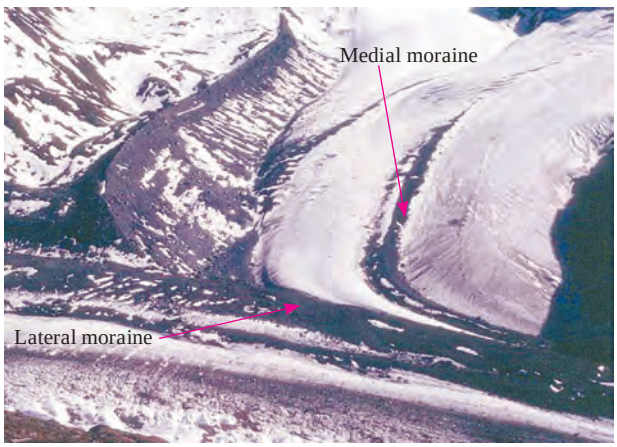


Figure 4.2 (A) : Moraines and their types

'U' shaped valley



Lateral and medial moraines

Drumlins

Rôche moutonnées

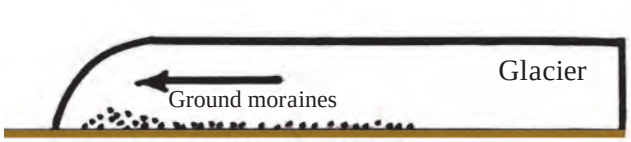
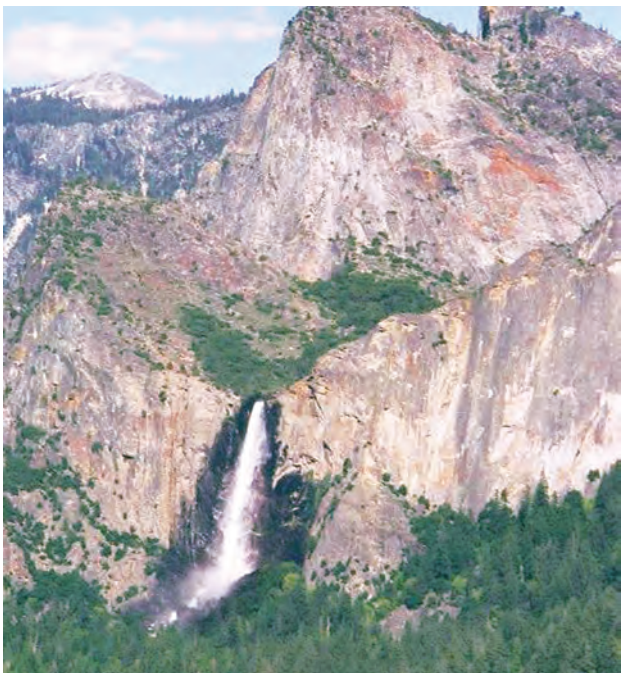
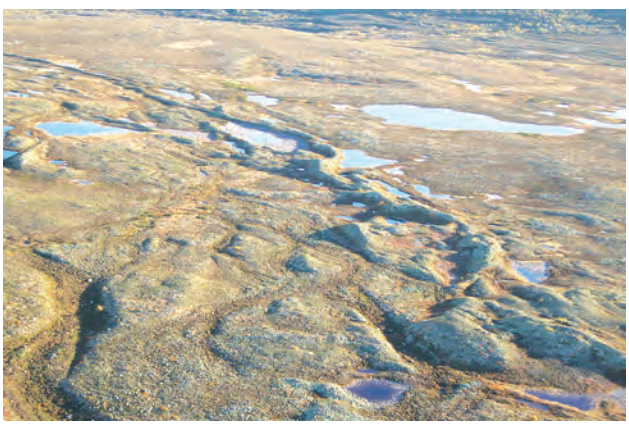


Figure 4.2 (B) : Ground moraine



Hanging valley



Eskers

Can you tell ?

- Where can you see the work by glaciers in India?
- In which natural region can you see the work of glaciers at sea level?

Think about it.

Can you see a glacier moving just as you can observe the movement of river water?

Work of the wind and the landforms produced:

You have learnt earlier that the movement of air is called wind. Wind is a gaseous agent of erosion. The erosional, transportational and depositional work of wind is more prominent in deserts and semi-arid regions. As mechanical weathering occurs on a large scale here, powdered rock and sand spreads over a large area. There is hardly any obstacle in the transportational work of the wind. Sand particles also get transported along with the wind and they are carried over longer distances and get deposited where the speed of the wind reduces. In this way the wind does the work of erosion, transportation and deposition.

Erosional work of wind:

Wind carries small sand particles, small pebbles, etc. along with it. These particles cause erosion along rocks coming in the way due to friction. This leads to formation of mushroom rocks, deflation hollows, yardangs, etc. See fig 4.3.

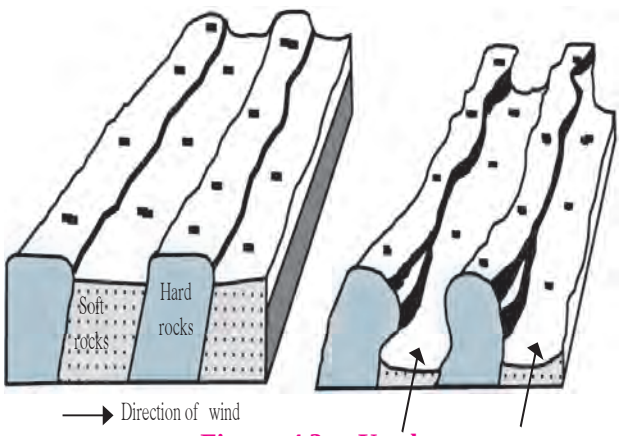


Figure 4.3 : Yardangs

Depositional work of winds:

Sand particles that blow with the wind are of different shapes and sizes. Those particles which are very fine are carried over larger distances while the larger ones get transported to shorter distances only. These sand particles get deposited in deserts and semi-arid climates. As a result, specific landforms are formed. Sand dunes, barchans, seifs, ripple marks, loess plains, etc. are formed by wind deposition.

Try to understand the various landforms produced by the work of winds with the help of your teachers.

Give it a try.

Some pictures of landforms produced by the work of the winds are given below. See the pictures and write in the box whether they have been formed by erosion or deposition.

Mushroom rock ☐

Sand dune (Barchan) ☐

Ripple marks ☐

Seif (Sand mounds) _____

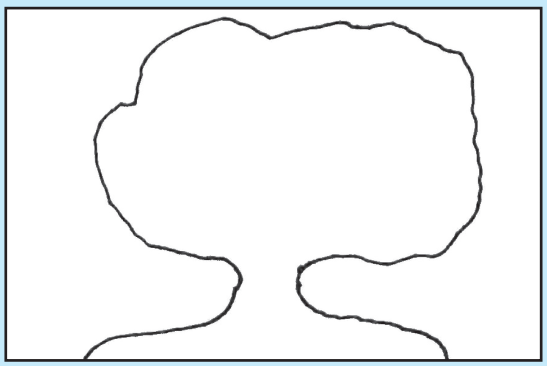
Yardang _____

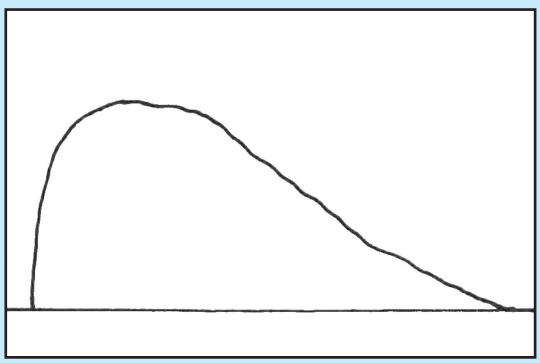
Hamada _____

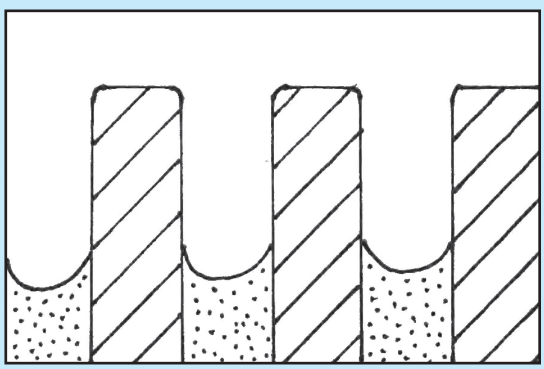
Find out.

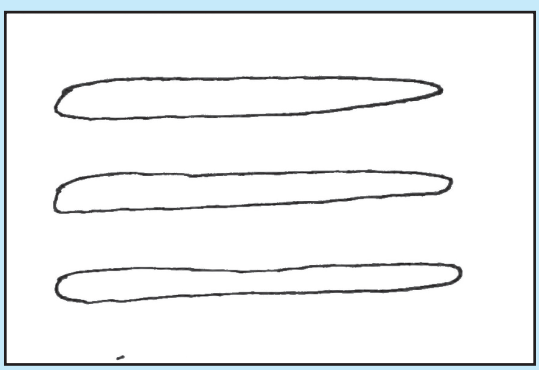
- Where will you find mushroom rocks in the Deccan Plateau?
- Can you find the work of wind near coastal areas? What landforms will be formed there?

- Write the name of the landforms with which the following diagrams are associated.
- Colour the eroded and the remaining part, if any, in the given diagram.









Work of Sea Waves and the landforms:

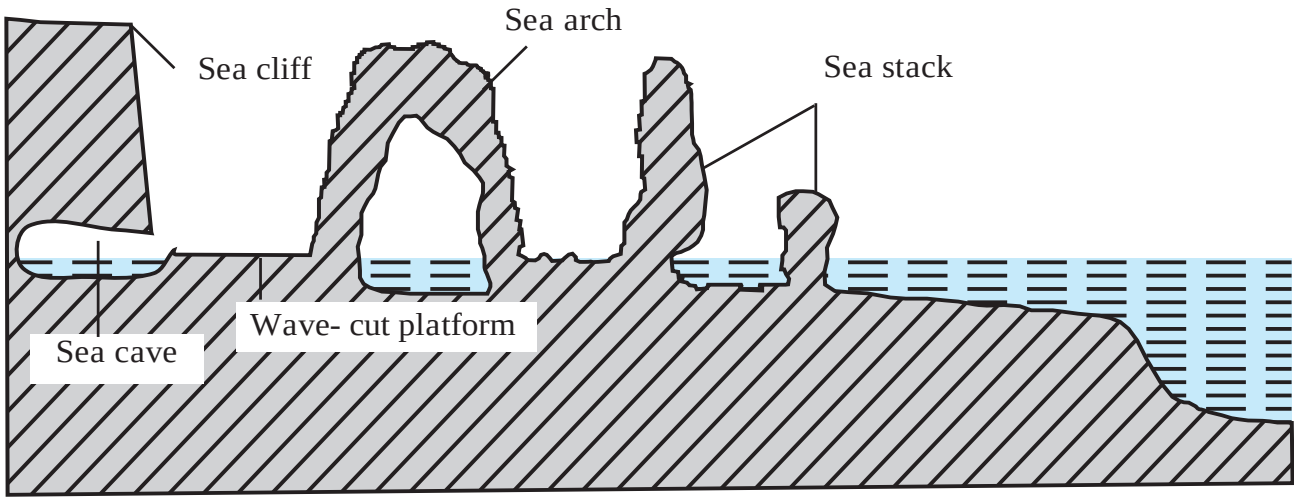


Figure 4.4 : Landforms at the sea coast

In coastal areas, sea waves carry out erosional, depositional and transportational work. Winds and tides cause the movements of sea water and as a result, waves come to the coast. Because of their hitting the rocks at the coasts, erosion of the rocks occurs. In coastal areas having wide beaches, waves carry out depositional work.

Erosional work of sea waves:

When the waves break at the coast, they bring with them water, transported stones, pebbles, sand particles, etc. This leads to the erosion of the coast. Because of the chemical and hydraulic action of the sea wave too, erosion occurs. Landforms like wave-cut platforms, sea caves, sea arches, sea cliffs, etc. are formed because of the erosional work of the waves. See fig 4.4.

Depositional work of sea waves:

The eroded materials accumulate at the sea bed. Because of tides, they keep on moving towards the coast and away from the coast. They become fine because of attrition and hitting each other. Deposition of such materials occurs at the places where the effect of waves is less. Landforms like beaches, sand bars, lagoons are formed due to depositional work of the sea waves.

Try to understand the various landforms produced by the work of sea waves with the help of teachers.

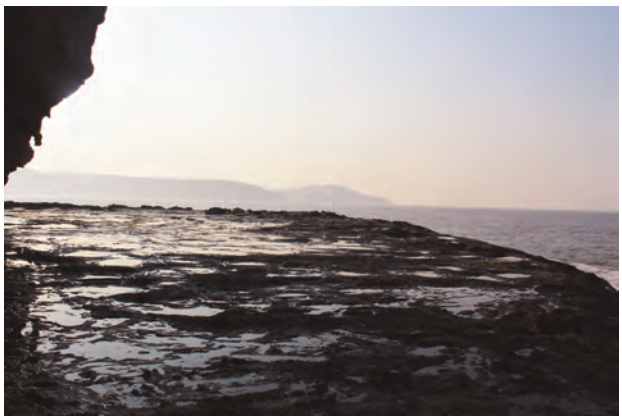
Give it a try.

- Some pictures of landforms produced by the work of the sea waves are given below. See the pictures and write in the box whether they have been formed by erosion or deposition.
- With the help of internet, obtain information regarding the places along Konkan coast where you will find the landforms formed by sea waves.

Sea caves

Lagoon

Sea cliff

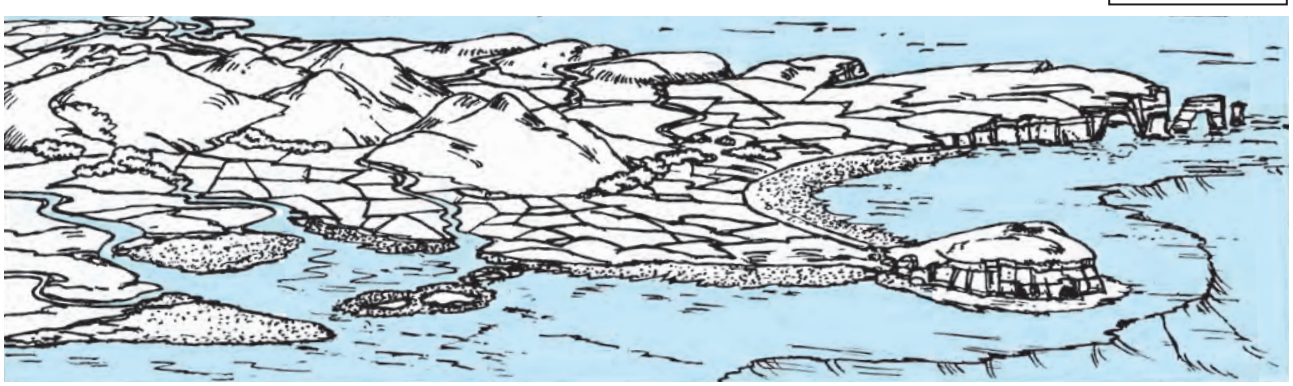


Wave - cut platform

Beach

Sea arch

Sand bar



Identify the land forms made by waves and write their names in the given picture.

Work of groundwater and landforms produced :

The rainwater seeps below the earth's surface through porous rocks or cracks in the rocks. This water accumulates in the non-porous layer of the rock. This accumulated water is called groundwater.

The soluble minerals in the water get dissolved and flow with the groundwater. This is the erosional work of the groundwater.

When the groundwater evaporates or the volume of soluble minerals is more than the solubility of the groundwater, the deposition of dissolved materials starts. Landforms like sinkholes, limestone caves, stalactites and stalagmites are formed.

Thus, the groundwater carries out the erosion, transportation and depositional work.

Groundwater table:

The upper surface of the water accumulated below the ground is called the water table. Factors like seasons, porosity of rocks, amount of rainfall, etc. affect the level of water table. The water table is closer to the ground during rainy seasons while it is deeper in the summers.

Find out.

- Where are limestone caves, stalactites and stalagmites found in Maharashtra?
- Why are the landforms formed in limestone called Karst?

Think about it.

Ramu has to dig a well in his farm. But he is in a dilemma as to which season he should dig so that there is water supply for a longer time. What will you suggest to Ramu?

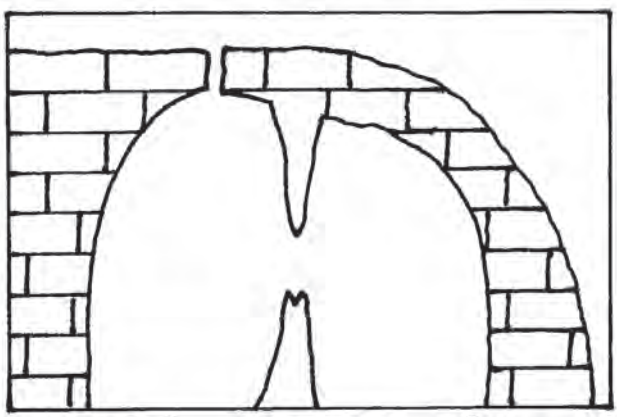
Give it a try.

See the pictures of the landforms produced by the work of groundwater. Write in the box below them whether they are formed through the work of erosion or deposition.

Sinkhole

Stalactite and stalagmite and cave

Identify the landforms formed by groundwater in the given diagram.



Think about it.

Which agent has the most kinetic energy of all – wind, river or glacier?

Exercise

Q 1. Rewrite the correct statement :

(1) The temperature range helps the wind in its work.

(2) River's work is more prominent than other agents of erosion in desert regions.

(3) The work of groundwater is effective in the area with soft rocks.

(4) The work of wind is not limited like river, glacier or the sea waves and takes place everywhere.

Q 2. Correct and rewrite the incorrect statements :

(1) The ice on the lateral side of the glacier moves faster than the ice at the base.

(2) The depositional work by rivers happens because of gentle slope, reduced speed and transported sediments.

(3) A river flows at a faster speed than the glacier.

(4) The speed of the glacier is more on both the banks than in the middle.

Q 3. Identify the wrong pair :

(1) Deposition - V–shaped valley

(2) Transport - Ripple Marks

(3) Erosion - Mushroom Rocks

Q 4. Identify and name the landforms in the following diagrams :

4PLN2H

Q 5. Complete the following table by classifying the landforms according to their agents of erosion.

(waterfall, delta, cirque, arête, barchans, moraine, pothole, mushroom rock, sinkholes, beach, pillars, lagoons)

Rivers	Wind	Glacier	Sea Waves	Ground-water

Q 6. Answer the following questions in brief.

(1) List the landforms that are a result of the erosional work of the rivers.

(2) Which agent is responsible for formation of stalactites and stalagmites and where are they formed?

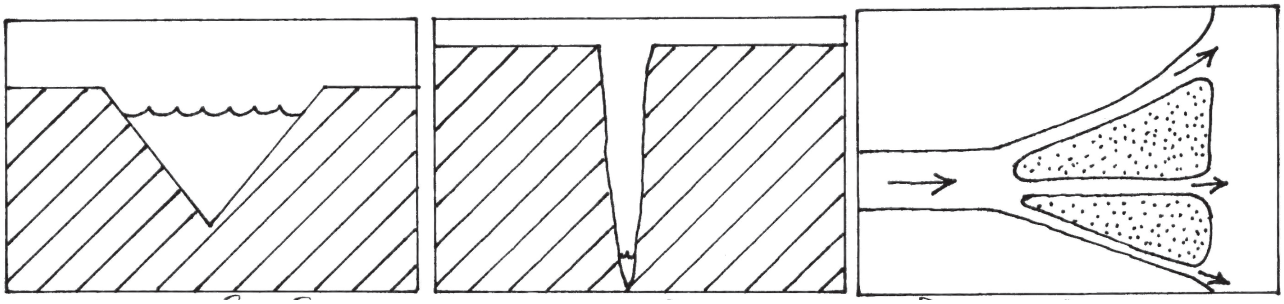
(3) List the landforms that are produced by the depositional work of the sea waves.

(4) Name the types of moraines.

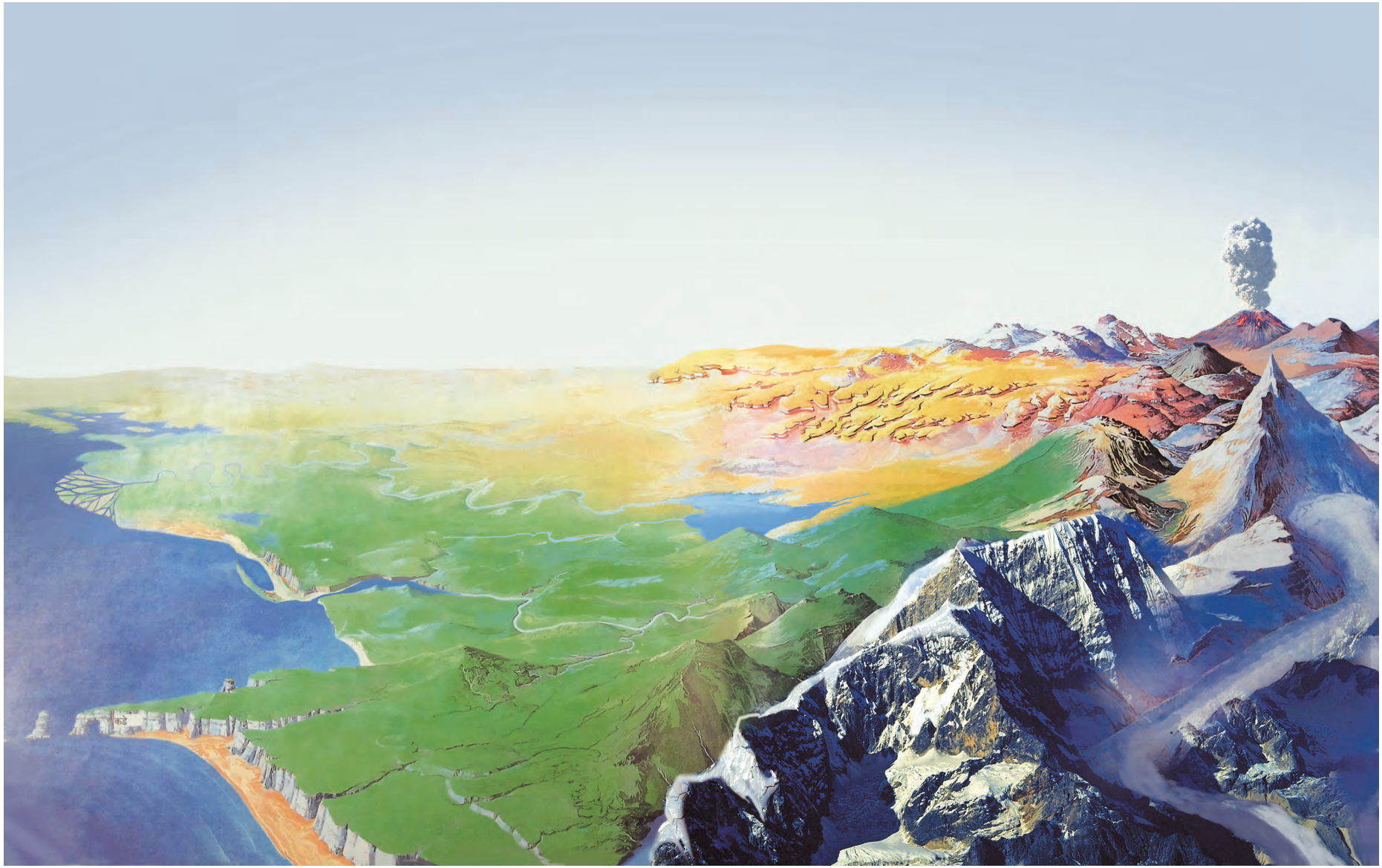
Activity :

(1) Go to a river bank or a sea coast and observe the erosional, depositional and transportational work done by them.

(2) Make a collage of pictures of land forms by collecting them from magazines and newspapers.



Q 7. Observe the following picture carefully. Identify the landforms formed by different agents of erosion. Number them with pencil here and write their names in the sequence in your notebook .



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