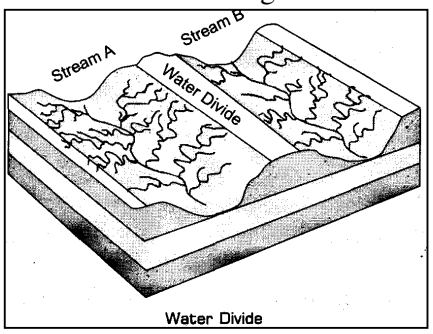
9th – Drainage I

The term drainage describes the river system of an area. However, small streams tend to flow from different directions and come together to form the main river. Ultimately the main river drains into large water body such as a lake, sea or ocean. The area drained by a single river system is called a drainage basin. Any elevated area, such as a mountain or an upland, separates two drainage basins, which is called as a water divide. The world's largest drainage basin is of the Amazon river in South America, whereas in India it is of the Ganga river.



The streams within drainage the slope of land underlying rock the area. Drainage patterns are of four kinds

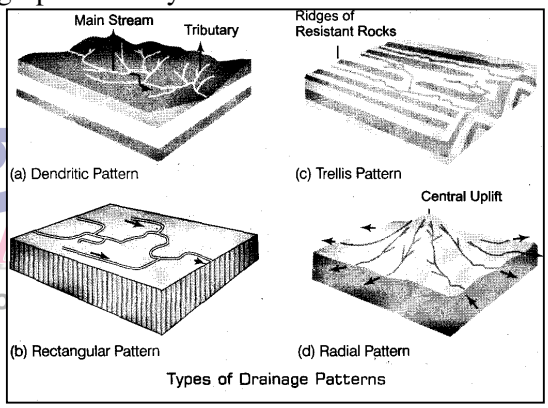
(i) Dendritic pattern: In this pattern the river and its tributaries follow the slope of the terrain just like the branches of a tree.

(ii)Rectangular pattern: This pattern occurs on a strongly jointed rocky terrain.

(iii) Trellis pattern: This pattern develops where hard and soft rocks exist parallel to each other, so that the tributaries join the river at almost right angles.

(iv) Radial pattern: This pattern develops when streams flow in different direction from a central peak or dome like structure.

A combination of more than one type of drainage pattern may be found in the same basin. basin.



DRAINAGE SYSTEMS IN INDIA

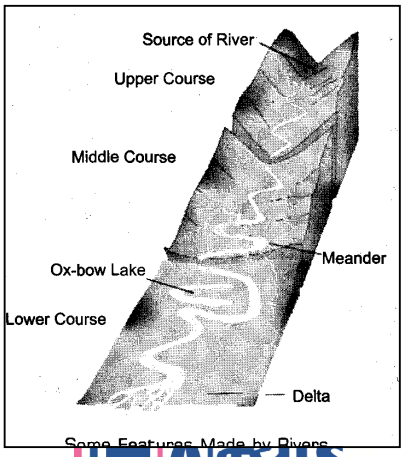
The drainage systems of India are mainly controlled by the broad relief features of the sub-continent. The rivers of India are broadly classified into two major groups

(i) The Himalayan rivers

(ii) The Peninsular rivers

Apart from originating from two major physiographic regions of India, the Himalayan and the Peninsular rivers are different from each other in many ways.

The Himalayan Rivers: Most of the Himalayan rivers are perennial, which means that they have water throughout the year. These rivers receive water from rain as well as from melted snow from the high mountains. The Indus and the Brahmaputra originate from North of the mountain ranges. They have cut through the mountains, making gorges. The Himalayan rivers have long courses from their source to the sea. These rivers perform intensive erosion activity in their upper course and carry huge loads of silt and sand. These rivers form meanders, Ox-bow Lakes and other depositional features during their middle and lower courses in the floodplains. These rivers have well developed deltas.



The Peninsular Rivers: These are seasonal rivers as their flow is depend rainfall. During the dry season, the large rivers even the flow of water in their channel. Himalayan. The Peninsular rivers have shorter and shallower courses compared to their Himalayan counterparts Peninsular rivers originate in the Western Ghats towards the Bay of Bengal.

LEARNING WITH INNOVATION….

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Some Features Made by Rivers

- Gorges: Deep narrow passages with steep rocky sides through which rivers may flow.
- Ox-bow Lake: A crescent-shaped lake formed when a meander of a river or stream is cut off from the main channel.
- Deltas: Triangular shaped alluvial deposits at the mouth of rivers where they enter the sea.

Himalayan rivers	*Peninsular rive*
Perennial	Mostly seasonal
Longer courses with high erosional activity.	Shorter and shallower courses
They have well developed deltas.	Those originating in the Central Highlands and flowing westward estuaries, while those originating Western Ghats and flowing eastv form deltas.
In their middle and lower courses, they form meanders, ox-bow lakes and other depositional features in their floodplains.	Some of them become tributarie Himalayan rivers (examples are Betwa and Chambal, which are t of the Ganga river)
Examples are Indus, Ganga, Brahmaputra and their tributaries.	Examples are Narmada and Tap westwards), Mahanadi, Godava and Kaveri (flowing eastwards)

The Himalayan Rivers: Major Himalayan rivers are the Indus, the Ganga and Brahmaputra. These rivers are long and are joined by many large and important tributaries. A river along with its tributaries may called as river system. Indus, Ganga and Brahmaputra are major river system of India. These are discussed below.

The Indus River System: Indus river rises from China (Tibet) near Mansarowar lake. It flows westwards and enters India in the Ladakh district of Jammu and Kashmir. Several tributaries, like the Zanskar, Nubra, Shyok and Hunza join it in the Kashmir region. The Indus flows through Baltistan and Gilgit and emerges from the mountains at Attock. The Satluj, Beas, Ravi, Chenab and Jhelum join together to enter the Indus near Mithankot in Pakistan. The Indus flows Southwards till it reaches the Arabian sea East of Karachi port in Pakistan. .Indus has a total length of 2900 km; it is one of the longest rivers of the world. A Little over a third of the Indus basin is located in India in states of Jammu and Kashmir, Himachal Pradesh and Punjab. The rest is in Pakistan. As per the Indus Water Treaty signed between India and Pakistan in 1960, India can utilize only 20% of water carried by the Indus River System. Punjab, Haryana and southern and Western parts of Rajasthan use this water for irrigation.

The Ganga River System: This system starts as the Bhagirathi (Headwaters of Ganga) being fed by the Gangotri glacier in Uttarakhand. It is joined by the Alaknanda river at Devaprayag to form the Ganga. At Haridwar, the Ganga emerges from the mountains on to the plains. Many of the Ganga's tributaries like the Yamuna, Ghaghara, Gandak and Kosi are major rivers which flow down from the Himalayas. The river Yamuna rises from the Yamunotri glacier in the Himalayas. It flows parallel to the Ganga as a right bank tributary. It meets the Ganga at Allahabad. The Ghaghara, the Gandak and the Kosi rise in the Nepal Himalayas. Every year they flood parts of the Northern plains, causing destruction and damage to life and property, but also enriching the soil of agricultural lands. The Ganga's main tributaries which come from the Peninsular uplands are the Chambal, the Betwa and the Son. These rise from semi-arid areas, have shorter courses and do not carry much water in them. The Ganga flows eastwards till Farakka in West Bengal. Here it divides into two branches and, forms a distributary known as the Bhagirathi-Hooghly (also called Hughli), which flows Southward to Kolkata and the Bay of Bengal. The main stream of the Ganga flows into Bangladesh, where it is joined by the Brahmaputra coming from Assam to form the Meghna. This mighty river system, flows into the Bay of Bengal. This forms the Sunderban delta when it reaches the Bay of Bengal.

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Sundarban Delta: It derived its name from the Sundari tree which grows well in marshland. It is the world's largest and fastest growing delta. It is also the home of the Royal Bengal Tiger. The length of the Ganga is over 2500 km. Ambala is located on the water divide between the Indus and the Ganga river systems. The plains from Ambala to the Sunderban stretch over nearly 1800 km, but the fall in its slope is hardly 300m. The river develops large meanders as there is a fall of just one metre for every 6km.

The Brahmaputra River System: The Brahmaputra rises in Tibet, east of Mansarowar lake which is very close to the sources of the Indus and the Satluj. It flows Eastward parallel to the Himalayas till it reaches the Namcha Barwa mountain (7757m) where it takes a 'U' turn and enters India in Arunachal Pradesh through a gorge. Here, it is called the Dihang, It is slightly longer than the Indus and most of its course lies outside India. It is joined by many tributaries like Dibang, Lohit etc to form the Brahmaputra in Assam. It carries very little silt and water from Tibet as it is a cold and dry area. In Assam it carries a large amount of water and large amount of silt because Assam is a high rainfall area. It has a braided channel, in Assam, forming many riverine islands. In this river, we find Majuli island, the world's largest riverine island. Brahmaputra overflows lts banks during the monsoon every year, causing severe floods in Assam and Bangladesh. The Brahmaputra river shifts its channel frequently.

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