

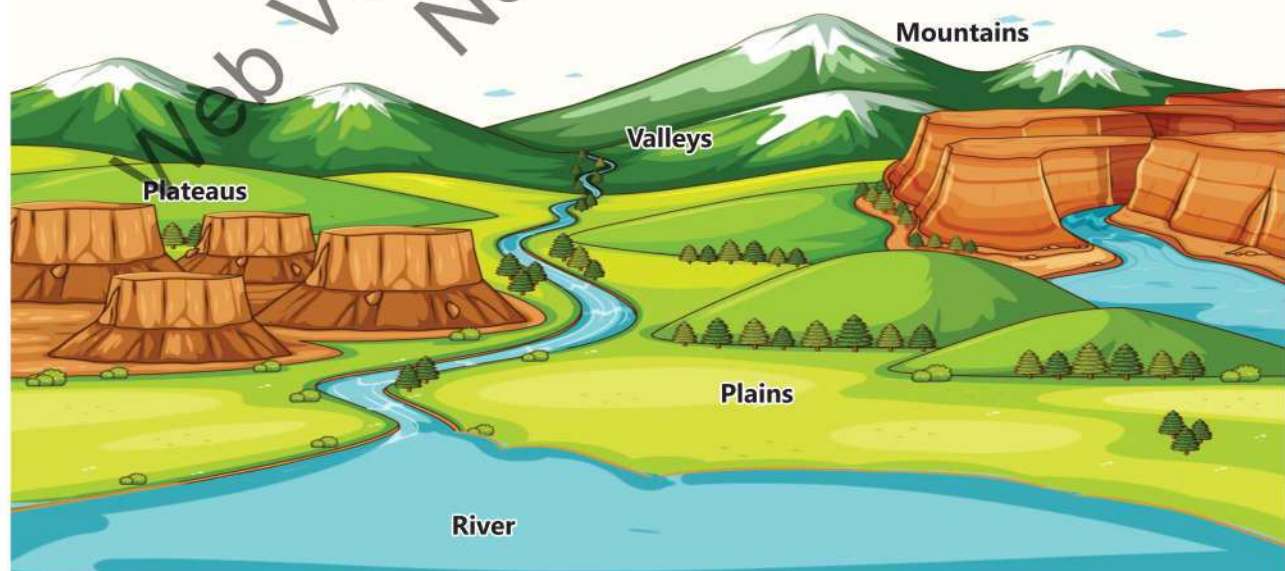
MOUNTAINS, PLATEAUS AND VALLEYS

Student's learning outcomes:

After completing this lesson, the students will be able to:

- ◆ Identify different types of mountains.
- ◆ Explain the formation of different types of mountains.
- ◆ Discover the major types of mountains in Pakistan.
- ◆ Describe the importance of the Himalayas, Karakoram and Hindukush Mountains.
- ◆ Explain the reasons for frequent earthquakes in Pakistan.
- ◆ Differentiate between a plateau and a mountain.
- ◆ Differentiate between V-shaped valleys and U-shaped valleys and their formation.
- ◆ Describe rift valley and explore where it is located.
- ◆ Identify some major valleys in Pakistan.
- ◆ Compare the lifestyles of people living in mountains, plateaus and valleys.
- ◆ Describe the importance of the Himalayas in the geography of Pakistan.

The surface of our Earth is not homogenous. A variety of landforms can be seen on it. There are elevated portions in the form of mountains, table land like features which are called plateaus



Types of Landforms

and vast stretches of flat land in the form of plains. Even the sea floor is comprised of uneven surface.

Landforms are formed by two forces:

- i. Internal forces of the Earth
- ii. External forces of the Earth

Let us look at both of them:

1. Internal Forces of the Earth

There are forces inside the Earth which push a part of Earth upwards or downwards. These forces create new landforms on the surface of Earth. The continents and mountain ranges are formed by these forces.

In the same way, when the molten matter inside the Earth moves upwards, it comes out on the surface of the Earth and solidifies. A variety of landforms are created in this way i.e., volcanoes and plateaus.

2. External Forces of the Earth

Have you seen a sculptor working? He works on stone with his tools and carves out different features. In the same way, when a part of Earth is uplifted by the internal forces, winds, rivers, glaciers and sea waves carve out different features on it. These are the external forces of the Earth. Dissected coast lines, valleys, mountains, various plateaus and plains etc. are formed by these forces.

MAJOR LANDFORMS

Mountains

Mountains are the most prominent landform as per their height, volume, size, shape and area. A landmass on the Earth surface with rocky, uneven, sloppy and elevated surface is known as mountain.



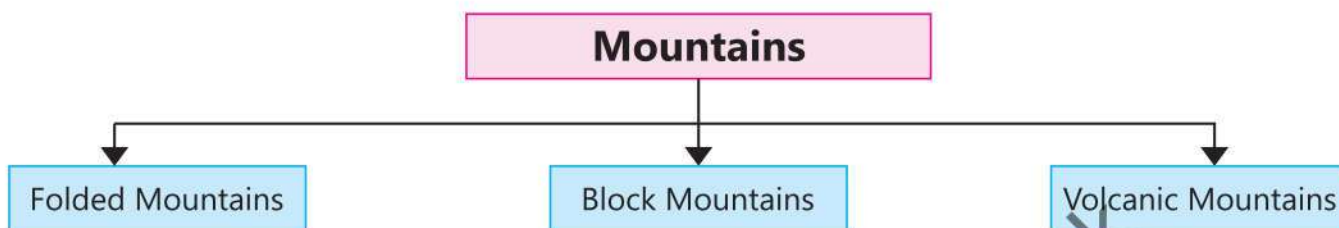
Do You Know?

Elevation of mountain is at least 900 m or above from sea level. Similar feature with less than standard elevation is referred as hill. The highest point of the mountain is known as peak.

Mountains have diverse structure. Some are dome like, while others are vertical like a wall. Some of the mountains are conical with conic peaks. Mountains are generally found in the form of ranges, for example, Rockies (North America) and Himalayas (Asia). Mountain ranges all over the world e.g. Himalayas (Asia), Rockies (North America), Andes (South America) and Alps (Europe) are made by sedimentary rocks. They all are rich in animal and plant fossils. These ranges are folded mountains. They have folds because of internal movements of the Earth.

TYPES OF MOUNTAINS

There are three broad types of mountains according to their formation.

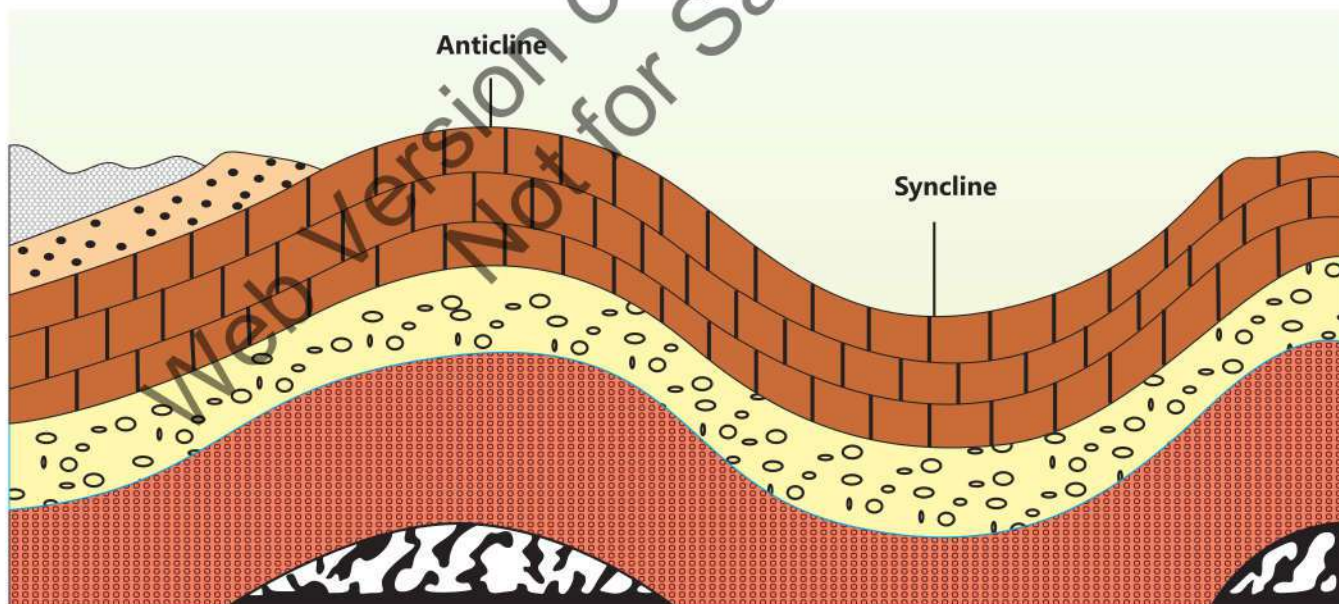


1. Folded Mountains

The convergence of the tectonic plates produce folds. The mountains formed in this way are called folded mountains. Upper part of the fold is called anticline while the lower one is syncline. Folded mountains all over the world are stretched in the form of parallel and huge ranges. Himalayas, Rockies, Andes and Alps are main examples of such mountains.

Skill

What is the difference between mountain range and mountain peak?

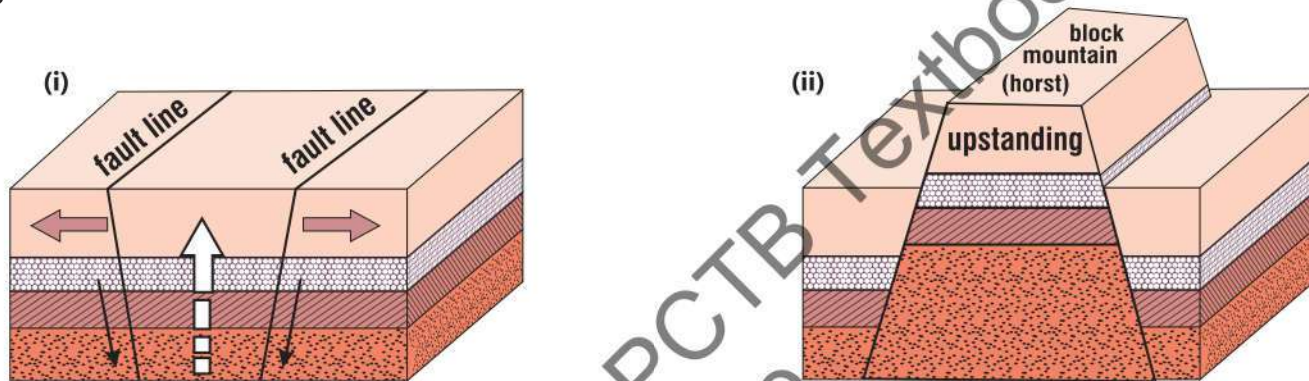


Do You Know?

Himalaya is among the highest mountain range where world's highest peak i.e. Mt. Everest (8848 m high) is located.

2. Block Mountains

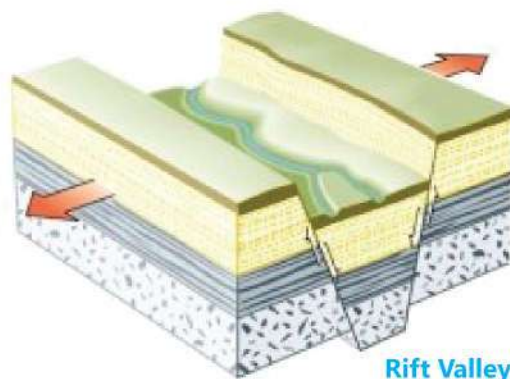
Earth's crust is cracked due to divergence that divides the surface into various blocks. Unequal stresses and earthquakes create faults on the surface of the Earth. Sometimes the internal forces uplift a part of the Earth between these faults which become higher from the surrounding surface. It is called Block mountain. If any of the block is uplifted during this process, that is known as block mountain, for example, Harz Mountains (Germany). In between block of the Earth crust is uplifted in some cases that is called horst. If that block is upended, it makes rift valley also named as graben.



(a) Block Mountain (Horst) formed by vertical movements of the Earth

Rift Valley

A feature associated to block mountains is rift valley. This type of valley is formed when the Earth's crust on both sides of two parallel faults is uplifted or sinks. Well known rift valleys in the world are African Rift Valley and Great Basin of USA.



Rift Valley

3. Volcanic Mountains

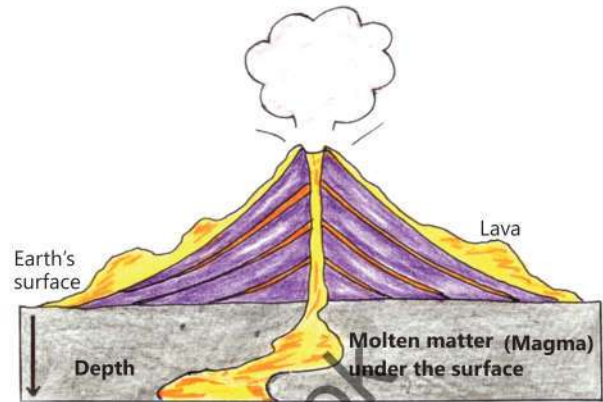
Lava accumulates and then solidifies vertically and horizontally at the Earth's surface. This process continues and keeps increasing its size unless it takes conical shape known as volcanic mountain. Volcanic mountains are formed by successive layers of lava. Vesuvius (Italy) and Fujiyama (Japan) are some famous volcanic mountains in the world. There are three types of volcanic mountains:

- Cinder Cone Volcanoes
- Composite Volcanoes
- Shield Volcanoes



Do You Know?

Pakistan's deadly earthquakes owe their birth to the juncture of three colliding tectonic plates: Indian, Eurasian and Arabian. The Indian and Eurasian plates grind with each other along the Chaman Fault, triggering destructive earthquakes. Earthquakes along the Chaman Fault are more frequent in the north than in the south.



Volcanic Mountains

MOUNTAINS IN PAKISTAN

Pakistan is surrounded by mountain ranges from North-Eastern, North-Western and Western sides. The most famous mountains of Pakistan include the mountains of Himalayas, Karakoram and Hindukush. These are folded mountains. The mountain ranges of Pakistan are divided into two segments.

- i. Northern Mountains
- ii. North- Western and Western Mountains

These two mountain ranges meet together at "Pamir Knot" in the north-east of Pakistan.

Lets have a look on these mountain ranges.

1. Northern Mountains

There are two ranges in the northern mountains.

- i. Himalayas
- ii. Karakoram

i. Himalayas

The Himalayas are divided into three segments which are situated parallel to each other from south-east to north-west.

Siwalik Hills

Siwalik hills are foothills. The average height of these hills is about 800 metres. Islamabad, Attock, Rawalpindi etc are located in these hills.

Lesser Himalayas

In the north of Siwalik hills, are the mountains of Azad Kashmir and Pir Panjal. Average height of these mountains is about 4000 metres. These are called Lesser Himalayas. Murree, Kashmir, Guliyat and lower Hazara are situated in this range.



Do You Know?

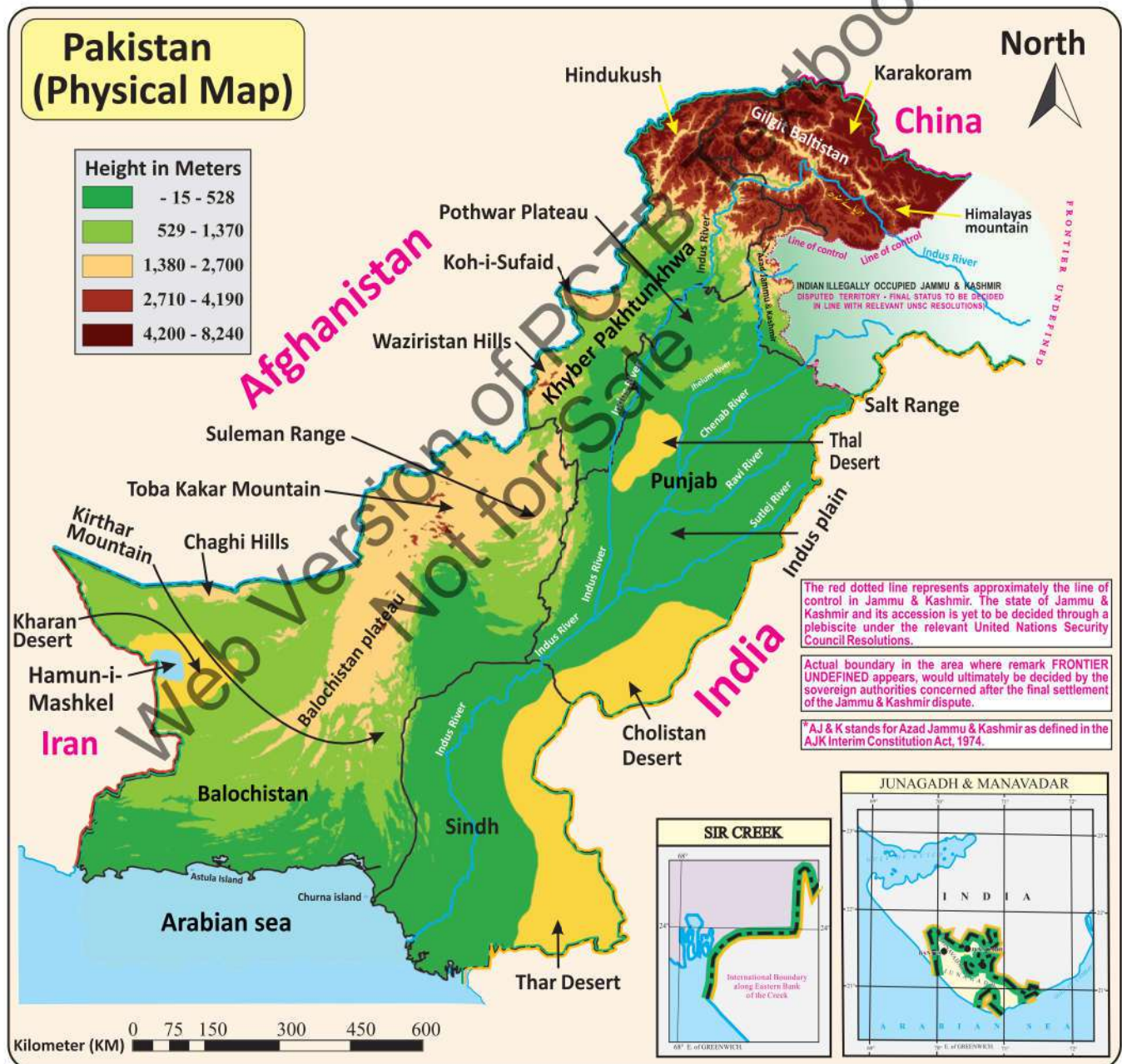
Islamabad is the capital of Pakistan that is located in the piedmont of Siwaliks.

Greater Himalayas

Greater Himalayas are situated in the north of Lesser Himalayas. Gilgit, Swat, Kohistan are situated in this region. Average height of these mountains is about 6000 metres. The highest peak of this range is Nanga Parbat which is 8126 metres high.

ii. Karakoram

In the north of Greater Himalayas, there is another range of snow peaked mountains, situated in Gilgit up to Skardu. This is called Karakoram range. The highest peak of this range is K-2



which is 8611 metres high. K-2 is also called Godwin Austin. It is the second highest peak of the world. Huge glaciers are found in this range in which Siachin, Hispar, Baltoro, Biafo and Batura are important.

2. North-Western and Western Mountains

There are three mountain ranges in the west of Pamir Knot. Their height decreases towards south. These mountain ranges are:

i. Hindukush Mountains

Hindukush mountains are situated in the north-west of Pakistan along the border of Afghanistan. This mountain range stretches from Chitral, Swat and Malakand up to river Kabul in the south. The highest peak of this range is Tirich Mir which is 7690 metres high.

ii. Sufaid Koh and Waziristan Hills

In the south of Hindukush Mountains, from river Kabul to river Kurram, along the border of Afghanistan the mountain range called Sufaid Koh. These mountains are situated in Mohmund and Khyber agency. The valleys of Peshawar, Kohat and Bannu are also situated in these mountains. The highest peak of this range is Sikaram which is 4761 metres high.



Waziristan Hills

In the south of Sufaid Koh from river Kurram to river Gomal are situated the less high, Waziristan hills.

iii. Suleman and Kirthar Mountains

In the south of river Gomal up to river Bolan is situated the mountain range, known as Suleman mountains. These mountains are situated along the river Indus between Punjab and Balochistan. The highest peak in this range is Takht-e-Suleman which is 3487 metres high.

In the further south of river Bolan between Balochistan and Sindh is the mountain range known as Kirthar mountains.



Activity Corner!

Use available source such as maps, google maps or GIS to identify mountains, plateaus and valleys of the world.

MOUNTAIN VALLEYS

Large number of valleys are located in these mountains ranges. Some famous valleys in Hindukush range are Swat, Chitral and Dir. The Gilgit, Shigar, Skardu and Hunza are famous valleys of Karakoram whereas Murree, Galiyat, Kaghan and Abbottabad are significant valleys in Himalayas.

Types of Valleys

Northern mountains have diversified climate and topography. Maximum snowfall in Pakistan is observed on the peaks of these mountains that become glaciers with the passage of time. Melting of these glaciers in summer provides fresh water to rivers. Glacial work and rivers cause emergence of different valleys that are described as below:

1. U-Shape Valley

Glacier on the mountains continues its creeping movement along the slopes. Due to erosional work of glaciers U-Shaped Valley is formed.

2. V-Shape Valley

Glaciers melt and form streams and rivers. Fast flow of water erodes the rocks and starts to form narrow valley that is known as V-Shape valley.



Kaghan Valley



V-Shape Valley



U-Shape Valley



Skill

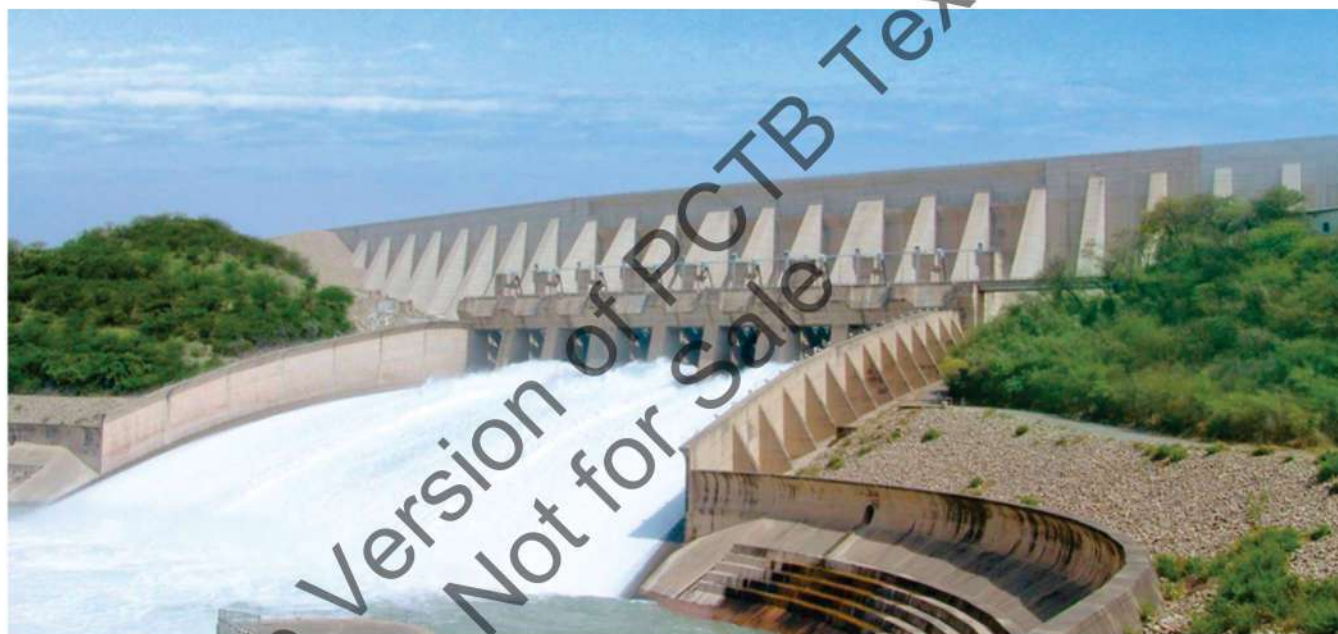
Draw a images of V-shape and U-shape valley in your notebook.

IMPORTANCE OF NORTHERN MOUNTAINS

Northern mountains of Pakistan (Karakoram, Himalayas and Hindukush) have immense influence on the people and economy.

Tourism: Pleasant climate in summers, snowfall in winters, beautiful valleys and huge mountain peaks in northern areas are great attraction for tourists. Tourism in the area boosts the economy and provide employment to the local people.

Power Potential (Hydro Electricity): Fast flowing rivers and steep slopes in northern mountainous areas are best suitable conditions for hydro electricity production. All major dams of Pakistan are constructed in these mountains or their foothills. Moreover, many dams are under construction.



Mangla Dam

Natural Barrier: The northern mountains of Pakistan form natural barrier from the movement from Central Asia to the plains of Pakistan because most of the area is hilly and proper infrastructure is not there.

Fresh Water: These mountains remain snow covered all the year and are the source of perennial water supply to the rivers of the Indo-Gangetic plains. Many mountain glaciers are located in these mountains that are actually huge reserves of fresh water.

Climate: These mountains also protect the plains of the sub-continent from the cold winds of Central Asia in winter. The southern slopes of these mountains are covered by evergreen forests because these mountains cause heavy rainfall on the southern slopes.



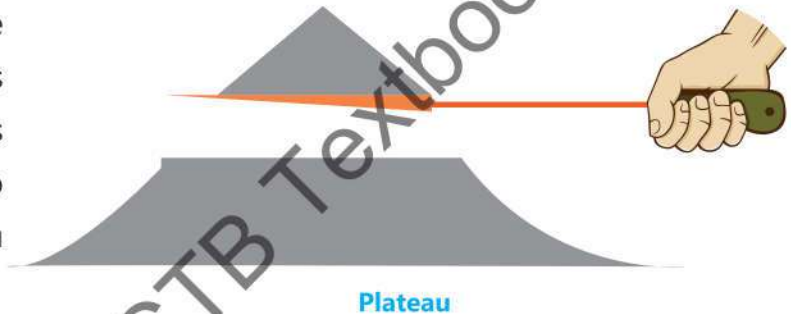
Do You Know?

Why mountains are important for Pakistan?

The mountain areas are rich in natural resources such as water, forests, pasture, and minerals, and can play a vital role in the country's development. The northern mountains are the main sources of surface water in the country and provide the basis for irrigation and hydropower.

PLATEAUS

An elevated landmass with almost flat top and vertical slope minimum at one side is known as plateau. Its surface is cut by various narrow and wide valleys. Colorado Plateau (U.S.A.) and Potwar Plateau (Pakistan) are best examples.



Activity Corner!

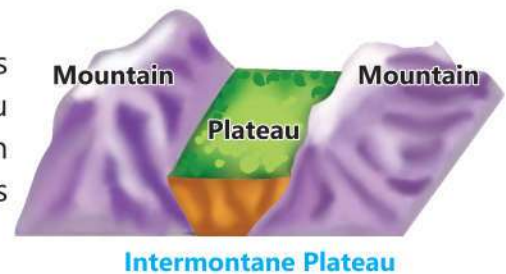
Draw image of plateau and mountain in your notebook. Write two differences between mountain and plateau.

TYPES OF PLATEAUS

Plateaus may be classified into the following types according to their location.

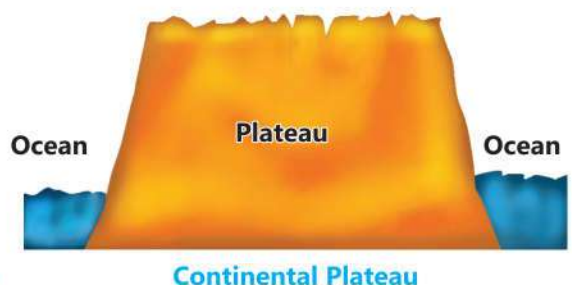
1. Intermontane Plateau

This type of plateau is formed by internal movements of the Earth along with mountains. For example, Tibet Plateau is located in between the mountains of Himalayas. Bolivian Plateau is another example located in between Andes Mountains (South America).



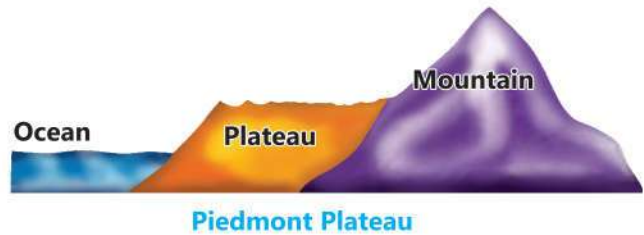
2. Continental Plateau

These are the plateaus uplifted from land or ocean due to internal movements of the Earth. There are no mountains in their surroundings. Antarctica, Greenland, Arabian Plateau and Plateau of Spain are its examples.



3. Piedmont Plateau

These plateaus are located at the foothills, and are surrounded by mountains from one side with ocean or plain on the other side. Patagonia Plateau (South America) in piedmonts of Andes and Potwar Plateau (Pakistan) in piedmonts of Himalayas are some other examples of piedmont plateau.



Potwar Plateau is a piedmont plateau situated in south of Siwalik hills. To its east is river Jhelum, towards west river Indus and to its south is the Salt range. Agriculture is dependent on natural rainfall mainly. Other than this, several oil and gas exploration sites lie in the Potwar Plateau indicating that along with fertile soil, this area is rich in natural resources.

Physical Regions and lifestyle of the people

Land features of our country and human ways of living are described as under. In our country, the Northern and North Western areas are mountainous. There is a large difference in temperature between plain areas and mountainous areas. Some areas remain covered with snow the whole year. The profession of people of these areas are handicrafts and farming. Tourism and hoteling industry is common in these areas. The beautiful Valleys of Northern and North Western areas attract the people to visit these places.



Naran Valley



Potwar Plateau

Plain areas of Pakistan have extreme climate, i.e., winters are cold and summers are warm. This kind of climate is favourable for agriculture and for the production of many other crops because plain areas are made up with the soil brought by the rivers. The profession of the people living in

plain areas directly or indirectly depends upon agriculture. The land in Pothwar plateaus is both rocky and soft. Along with small hills the water erosion has broken the land and caused depressions. Therefore, its land is not good for cultivation. The second largest salt mine of the world is located in this mountain range. Besides salt, coal and gypsum are important minerals found in this area.

Key Points

- A landmass on the Earth's surface with rocky, uneven, sloppy and elevated surface is known as mountain.
- Andes Mountains (South America) are the longest folded mountains in the world.
- Pakistan is surrounded by mighty mountain ranges from northern and western side.
- Murree, Galiyat, Kaghan and Abbottabad are significant valleys in Himalayas.
- Glacier on the mountains continues its creeping movement along the slopes.

Exercise

1 Circle the correct option:

- Rockies are located in:
☐ a. Asia ☐ b. Europe ☒ c. South America ☐ d. North America
- The highest mountain range in the world is:
☐ a. Himalayas ☐ b. Alps ☐ c. Andes ☐ d. Rockies
- The highest mountain peak in the world is:
☐ a. Nanga Parbat ☐ b. Mount Blanc ☐ c. Mount Everest ☐ d. K-2
- K-2 is also known as:
☐ a. Godwin Austen ☐ b. Mount Blanc ☐ c. Kohsar ☐ d. Nanga Parbat
- Rift Valley is formed in which type of mountains:
☐ a. Residual ☐ b. Folded ☐ c. Volcanic ☐ d. Block
- River forms which type of valley:
☐ a. U-shape ☐ b. W-shape ☐ c. V-shape ☐ d. Y-shape

2 Answer the following short questions:

- i. Define mountain.
- ii. What are different types of mountains in the world?
- iii. Enlist the names of famous mountain ranges in Pakistan.
- iv. What is rift valley? Write its example.
- v. Define continental plateau.
- vi. What is meant by V-shape Valley?
- vii. What is the difference between fold and fault?

3 Answer the following questions in detail:

- i. There are different types of mountains in the world. Discuss each of them.
- ii. What are different types of plateaus? Elaborate.
- iii. What are the impacts of mountains on human life?
- iv. Write a descriptive note on the mountains of Pakistan.

Critical Thinking Questions:

- How physical regions of Pakistan effects the life of the people?
- Explore the impacts of earthquake on ecosystem.
- How Himalayas are important for Pakistan?
- Explore importance of valleys for Pakistan.

Learning Activities:

The Teacher will:

- i. Use presentations, diagrams, and videos to explain the earthquake prone areas of Pakistan.
- ii. Where do you live? Make a list of landforms around you. How did that landforms come into existence? Discuss with your teacher.