

# DISCOVERY

Geography for Secondary Classes

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# Introduction

Geography is the study of the Earth, where human beings, animals, and plants live. Geography comes from two Greek words—*geo*, meaning the Earth and *graphein*, meaning to write or to map. Thus it is the study of the Earth, its physical features, its position in space and its movements in relation to the solar system. It is the study of the natural environment—climate, soils, vegetation, land, and water—and of human life and activity and their effect on the Earth. It is also the study of the Earth's physical features and its climate. We need to answer three questions about the Earth and its places: why, where, and how.

The study of geography teaches us why some locations are better for settlements, agriculture, and industries, and where and how changes have taken place in the Earth's landscapes and resources. As the world's population has grown by leaps and bounds, the Earth's natural resources have been exploited, causing environmental problems like pollution and climate change. We study the relationship between man and the natural environment, and the effects of natural hazards like cyclones, volcanic eruptions, earthquakes, and tsunamis.

The *Discovery* series for Classes 6 to 8 has been written with the aim of developing understanding and providing basic knowledge of geography. All topics have been covered in simple language and the content is supported by relevant maps, illustrations, diagrams, and tables. Additional and interesting information, related to the topics under study, is given in the margins. The chapters are divided into sections, each of which concludes with questions and activities to reinforce learning.

The *Discovery* series is designed to be supplemented with an atlas, as this reinforces the concepts taught and clearly illustrates the subject matter at hand. We recommend the *Oxford School Atlas for Pakistan*, which is a comprehensive atlas with an emphasis on the weather, relief and population data for Pakistan.

This Teaching Guide is an ideal accompaniment to the Student's Book 3. It contains detailed lesson plans, additional background information for the teachers, answers to the questions asked in the textbook, and supplemental worksheets which may be photocopied. It is a valuable resource which will enable the teacher to bring the subject matter to life and hopefully inculcate a lifelong understanding and appreciation of geography within the pupils.

# Chapter 1

## Maps and diagrams

### SECTION 1

#### MAPS

##### Teacher's focus:

Maps and diagrams are technical drawings which are rich in visual detail and aim to provide a maximum of information at a single glance. Maps and diagrams are generally prepared with a purpose, such as providing data for information, comparison, forecasts and projections, and analysis etc. This purpose also determines the technique and kind of drawing it will be.

A map is a visual representation of the Earth and its features. It can provide information about the weather and climate, landscapes, population, etc. Maps which illustrate the distribution of a feature, such as the vegetation distribution of a place, are known as distribution maps. A distribution map can be shown as a choropleth map that shows data in different shades or a dot map that shows data with the help of dots.

Other diagrams include a variety of graphs like the line graph, bar graph, and pie chart. Each of them can help in analyzing and comparing data in different ways.

#### Answer key

#### Questions and Activities

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1.
  - i. A map is a representation of the Earth's surface on a piece of paper.
  - ii. The components of a map are different symbols or conventional signs, given in the legend, a compass, and the scale of the map.
  - iii. A scale reduces the actual surface area according to the size of the map, used because actual area cannot fit on the map.
2.
  - i. Thematic maps represent a theme. For example, a city guide map provides information about roads, important places of city, etc. Relief maps represent relief features. Political maps show location of countries and their boundaries etc.
  - ii. Dot map is a useful method of representing numerical values of any area like population, number of livestock, crops, production, etc. on maps with the help of uniformly sized dots. In this method, the size and number of dots is used to represent quantities. For example, dot method can be used to show the sown area of sugarcane in the province of Sindh. For this

## DISCOVERY 3

### Teaching Guide

purpose a district-wise map and values of sown area of sugarcane of each district are used. A scale and size of dot are selected, for e.g. one dot represents sugarcane sown area of 1000 hectare. The number of dots for each district is obtained by dividing sown area of districts with selected scale i.e. 1:1000. Mark these dots in their respective districts but make sure that dots should not be marked on lakes, rivers, forests, or areas where sugarcane is not grown. Therefore to make an accurate dot map, knowledge about the physical features of the area is considered essential.

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 2–6, *Oxford School Atlas for Pakistan*

### Teaching objectives:

To explain to students:

- the purpose of maps
- different kinds of maps

### Learning outcomes:

Students should be able to:

- discuss distribution maps
- explain the techniques of drawing different maps

## Lesson 1

### Introduction (5 minutes):

Have a discussion about maps, drawing on previous lessons to emphasize and reinforce the concepts. Explain what spatial data means.

### Explanation (30 minutes):

Read and explain text. Explain maps with reference to geographical data: numerical, statistical and analytical. Use examples from the book to make the purpose of the topic clear. Refer to the *Oxford School Atlas for Pakistan* for more practice. Compare choropleth and dot maps with regard to their purpose and techniques.

### Conclusion (5 minutes):

Ask questions to check students' understanding of the topic.

## SECTION 2

# DIAGRAMS AND GRAPHS

### Teacher's focus:

In addition to maps, geographers also make use of different kinds of diagrams as tools for providing numerical data and statistics at a single glance. These figures are helpful in comparisons and problem solving. Proportion circles, bar and line graphs, and pie charts are the most commonly used diagrammatic representations for quantitative data.

### Answer key

#### Questions and Activities

- 1
  - i. Line graph is a method of representing numerical data by using lines. It is an important way of showing variation. On a graph paper two lines are drawn; one is horizontal, showing the X-axis while other is vertical showing the Y-axis.
  - ii. Pie chart or divided circle is also an important method to show quantities either in actual form or in percentage. A circle is divided in various sectors in which each sector represents quantity. For example shares of rural and urban population in Pakistan can be shown with pie chart.
- 2
  - i. Bar graph is the most common method of representing quantities. It is simple to draw and easy to compare quantities, and therefore it is widely used. For example, if we want to show the number of schools in all provinces of Pakistan, then on a graph paper provinces are marked on the X-axis while number of schools is shown on the Y-axis. The figures (number of schools) are shown by vertical bars of equal width. The length of bars is proportional to the quantity according to a suitable scale. Each bar represents the quantity of the corresponding province. Bars can be drawn vertically or horizontally.
  - ii. Bar graphs—Advantages: simple way for showing numerical data, shows constant values, shows data as whole numbers. Disadvantages: actual values cannot be obtained, cannot show data with wide variance, not easy to draw, requires graph paper.  
Pie chart—Advantages: shows distributional data, can be shown as percentages, can be shown as distributional data on maps, helps in comparing data collected from different places. Disadvantages: difficult to construct, does not show variation in data, actual values cannot be obtained, construction requires precision and skills.
  - iii. Bar graph. Represent the number of boys and girls using different coloured bars. The quantity of each will be plotted on the Y-axis and the breakup in different classrooms on the X-axis.
- 3
  - i. bar graph
  - ii. line graph
  - iii. key
  - iv. bar graph
  - v. scale
  - vi. They show the same variation data.

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 7–12, *Oxford School Atlas for Pakistan*

### Teaching objectives:

To explain to students:

- the purpose of graphs and diagrams
- different kinds of graphs and diagrams
- discuss the use of statistical data for diagrams
- construct line, bar and pie graphs using statistical data
- evaluate the merits and demerits of the diagrams

### Learning outcomes:

Students should be able to:

- discuss graphs and diagrams
- explain the techniques of drawing different graphs and diagrams

### Introduction (5 minutes):

Ask questions about the different graphs and diagrams, as taught in Mathematics. Reinforce the idea that the same graphs and diagrams could be used to express geographical data as well.

### Explanation (30 minutes):

Read and explain text. Focus on the purpose of each type of graph and diagram, and the similarities and differences between them. Explain with reference to geographical data: numerical, statistical and analytical. Use examples from the book to make the purpose of the topic clear. Refer to the *Oxford School Atlas for Pakistan* for more practice.

### Conclusion (5 minutes):

Summarise the main concepts. Ask questions to check level of understanding.

# WORKSHEET 1

Date: \_\_\_\_\_

Name: \_\_\_\_\_

## 1. Choose the correct word to complete each of the sentences below.

- i. Maps and diagrams are means of representing information or data in (oral, written, visual) forms.
- ii. The (title, direction, scale) of a map is used to measure distance of places on a map and actual distance on the ground.
- iii. Numerical data is also known as (quantitative data, qualitative data, spatial data).
- iv. A (dot, choropleth, distribution) map shows quantitative data by using different shades or colours.
- v. The numerical values or information of a particular area can be best shown by (dot maps, choropleth maps, line graphs).
- vi. In diagrams, quantitative data is shown with the help of (irregular, geometric, criss-cross) patterns.
- vii. A line graph is the best diagram to show (variation, population, distribution) in numerical data.
- viii. A pie graph is a (rectangular box, triangular figure, divided circle) that shows information in actual numbers or percentages.
- ix. The number of degrees in a pie circle are considered equal to (360, 100, 180).
- x. A (pie, bar, line) graph is the simplest and easiest way to compare different quantities.

## 2. Fill in the blanks.

- i. Maps can also show \_\_\_\_\_ data like distribution of population density, distribution of rainfall, etc.
- ii. The horizontal line in a line graph is called the \_\_\_\_\_ axis and the vertical line is called the \_\_\_\_\_ axis.
- iii. A \_\_\_\_\_ is set of symbols showing important features like roads, railways, rivers, mountains, etc. on a map.

## 3. Name the kind of map or diagram you will use to show the following:

- i. rice plantation in all the rice paddies in the Thatta district \_\_\_\_\_
- ii. increase in temperatures in your city over the last 10 years \_\_\_\_\_
- iii. languages spoken in Karachi \_\_\_\_\_
- iv. province-wise population of Pakistan \_\_\_\_\_
- v. land relief of Pakistan \_\_\_\_\_

## Chapter 2

# Agents of landform change I

## SECTION 1

### RIVERS

#### Teacher's focus:

No landform on the Earth can remain the same forever, as there is wear and tear in everything over time. This wear and tear is called weathering as it is brought about by elements of nature. Some changes are gradual, others drastic. Some of these changes add to the natural beauty of landforms; others break down landforms and create new ones in their place. The process that breaks down landforms is called erosion. In erosion, the elements of weathering namely water, wind, and ice pick up material, transport it, and deposit it in a different place. Though water, wind, and ice all cause erosion, all three agents perform different jobs in different ways.

Water is probably the mightiest agent of erosion. Water in oceans, rivers, and as rainfall brings about the greatest changes in mountains and rocks. The velocity or speed of the flow carves out different shapes over varying periods of time. Wind also is a powerful landscape shaper. Ice is the slowest of the agents but no less powerful than the other two.

Rivers are the most powerful and important landscaping agents. They create a variety of landforms as they flow downhill from mountains towards the sea. Waterfalls, plunge pools, ravines, gorges, valleys, meanders, oxbow lakes, canyons etc are some majestic landforms one can see along the stages of a river.

A river's journey can be divided into three stages: the mountain stage, the plains stage, and the delta stage. The landforms created at each stage are different. The slope and speed of a river affects the nature of erosion, causing breakdown, wear and tear or deposition.

#### Answer key

#### Questions and Activities

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1. i. surface runoff: river water that does not seep into the ground and flows downhill as running water  
meander: bend in a river  
flood plain: flat, fertile land created along river banks due to deposition of silt by the river in the plains stage  
mouth of the river: where the river meets the sea; an estuary

oxbow lake: a stagnant lake created when a meander gets cut off from the main river

braided channel: a depositional feature formed when sand and gravel act as obstacles and divert the river's flow towards other channels

distributaries: several smaller channels that a river splits into at its mouth

alluvial fan: fan like feature formed when seasonal streams deposit a mixture of coarse and fine sediments at the foot of mountains

delta: a depositional feature formed at the mouth of a river when a river splits into smaller channels before meeting the sea and deposits its load

- ii. mountain, plains, delta
  - iii. silt, clay, sand, gravel
  - iv. erosion, transportation, deposition
  - v. because of the slope or gradient of mountains, velocity of river water and amount of water
  - vi. Mountains are made of different layers of rocks. In some places soft and hard rocks are present as alternating layers. Soft rock gets eroded and hard rock is exposed, causing water to fall down from heights, creating a waterfall.
2.
    - i. All rivers start their journey from mountains; the point at which they begin is called the headwaters. Rivers travel on plains and most of them finally end into sea or lakes; the point they meet the sea or lake is called the mouth of the river or delta. This longitudinal profile of river has three main stages which are identified as the mountain stage, plain stage and delta stage. Mountain stage: In the mountain stage, the down-cutting work of rivers is dominant and rivers form deep, narrow valleys called gorges and canyons. In the mountain stage rivers flow over steep slopes and therefore are very noisy, turbulent and very erosive. Plain stage: When the river enters the plains its velocity (speed) decreases; rivers stop the action of deepening the valleys and start widening them instead. The V-shape of the valley disappears and forms a broad valley which has flood plains, meandering channels and oxbow lakes. Delta stage: In the delta stage water is nearly stagnant because of the lack of gradient (slope). Bars and braided structures are formed due to the deposition, and the main stream or river is diverted into several channels called distributaries. Rivers at this stage generally enter into the sea or large lakes. Tidal channels, creeks, mud flats and swamps are common features of the delta stage.
    - ii. They are formed as a result of downcutting or deepening of a river's channel. This deepening is due to removal of sediments from a river's bed.

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 13–20, *Oxford School Atlas for Pakistan*

## DISCOVERY 3

### Teaching Guide

#### Teaching objectives:

- to educate students about the agents of landscaping or landscape shapers, their actions and landforms created by them
- to explain river erosion and how landforms are created by river erosion

#### Learning outcomes:

Students should be able to:

- describe briefly the functions of different agencies responsible for developing relief features
- describe the stages of a river and landforms made by rivers
- describe the different processes of rivers and landforms made by rivers

## Lesson 1

#### Introduction (5 minutes):

Write the names of landforms like mountains, rivers, valleys, etc. on the board and show students their pictures, asking if they can guess how the landforms were formed. Write their answers on the board.

#### Explanation (30 minutes):

Introduce the names of agents of landscaping and their functions. Tell students that this concept is called landscape shaping and this is how different landforms are created. Read and explain text. Go over each landform created by rivers, stressing on the importance of rivers as landscape shapers.

#### Conclusion (5 minutes):

Summarise the lesson by relating landforms to the formation process, i.e. erosional or depositional. Ask questions for clarifying confusions. Give homework for revising key concepts as reinforcement.

## Lesson 2

#### Introduction (5 minutes):

Give instructions for the classwork and homework tasks.

#### Written work (35 minutes):

**Classwork:** Question 1–2 page 20

**Homework:** Worksheet 2

## WORKSHEET 2

Date: \_\_\_\_\_

Name: \_\_\_\_\_

### 1. Choose the correct word to complete each of the sentences below.

- i. Most rivers start their journeys from (mountains, plains, valleys).
- ii. The point at which a river meets the sea is called the (hand, mouth, foot) of the river or its (source, delta, erosion).
- iii. When the river enters the plains, its (velocity, pressure, flow) decreases.
- iv. Bars and braided structures are formed due to (erosion, transportation, deposition).
- v. The velocity of water provides (erosion, force, energy) for river erosion and deposition.
- vi. Most erosion takes place (in plains, near the delta, in the mountainous regions).
- vii. A river (peak, valley, glacier) is the most common feature of the Earth's surface.
- viii. Many rivers flow between long, deep and steep-sided cliffs called (beds, edges, gorges).
- ix. River gorges and canyons are the best sites for constructing (dams, barrages, farms).
- x. When an old (lake, meander, plain) is completely cut off from its channel it forms an oxbow lake.

### 2. State whether true or false.

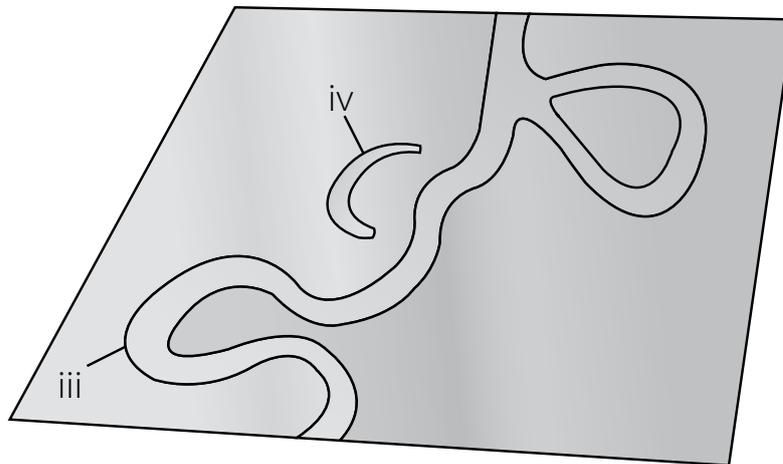
- i. All rainwater seeps into the ground.
- ii. The source or point where rivers begin is called the headwaters.
- iii. Most erosion takes place in the mountain stage.
- iv. A powerful stream cannot erode rocks and create landforms.
- v. Small valleys which hang over the main valley and form waterfalls are called hanging valleys.

3. Identify the following landforms.



i. \_\_\_\_\_

ii. \_\_\_\_\_



iii. \_\_\_\_\_

iv. \_\_\_\_\_

# WORKSHEET 3

Date: \_\_\_\_\_

Name: \_\_\_\_\_

## Research

1. What are waterfalls?

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2. How are they formed?

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3. What is a plunge pool?

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4. Illustrate the formation of a waterfall.



5. Name some famous waterfalls of the world, with the country they are located in.

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## SECTION 2

# LANDFORMS CREATED BY GLACIERS

### Teacher's focus:

Glaciers are also very powerful landscape shapers. They are slow moving rivers of ice that create erosional and depositional landforms like U shaped valleys, moraines, cirques, horns, and arêtes.

A U-shaped valley is a typical and most common feature created by glaciers. It is created as a result of erosion. Moraines, also an erosional landform, are a collection of loose stones, pebbles, sand and other debris brought down the slopes by glaciers. A cirque is a unique feature created by eroding glaciers. It looks like an arena or stadium. This is the starting point for glaciers and hence glacial erosion. When two cirques are created side by side and more erosion takes place, it creates a knife-like landform called an arête. A horn is a sharp peak, created when arêtes are further eroded by glaciers.

### Answer key

#### Questions and Activities

1.
  - i. Slow moving river of ice.
  - ii. The rate of melting is less than the rate of accumulation.
2.
  - i. Continental glaciers or ice sheets, found in the Polar Regions, covering huge areas. Greenland and Alaska.  
Alpine glaciers, found in mountains. Glaciers in mountain ranges like the Karakoram, Himalayas, Swiss Alps, etc.
  - ii. U-shaped valleys: formed when a glacier passes through v-shaped valleys and widens them  
hanging valley: a hanging, secondary valley over a main valley  
cirque: bowl like depression with steep walls, formed by avalanches  
horn: sharp edged peak  
arête: ridges with sharp edges  
moraines: mounds or piles of deposited material on the lower slopes of mountains

#### Research Task

Siachen, located in the Karakoram Range near Indo Pak border. One of the world's largest glaciers, extends for 70 km, has a number of streams running through it, has 12 moraines.

Biafo, in Karakoram range, 67 km long, meets the Hispar glacier to form the world's longest glacial system outside the Polar glaciers.

Baltoro, 63 km long, in the Karakoram mountain range, gives rise to the Shigar River, which is a tributary of the Indus River, many large tributary glaciers feed the main Baltoro glacier, including the Godwin Austen Glacier, flowing south from K2, the confluence of the main Baltoro Glacier with the Godwin Austen Glacier known as Concordia; this location and K2 base camp are popular trekking destinations.

Hispar, 49 km long, in the Karakoram Mountains meets the Biafo Glacier at Hispsar Pass, connects two ancient mountain kingdoms, Nagar in the west and Baltistan in the east.

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 21–23, *Oxford School Atlas for Pakistan*

### Teaching objectives:

To make students aware of:

- the importance of glaciers as landscape shapers
- erosional and depositional landforms created as a result of glacial activity

### Learning outcomes:

Students should be able to understand:

- the importance of glaciers as landscape shapers
- how glacial landforms are created

## Lesson 1

### Introduction (5 minutes):

Recap the importance of landscape shaping and the processes of erosion, transportation and deposition. Ask students what they know about glaciers. Briefly explain how glaciers also form unique features as they flow downhill.

### Explanation (30 minutes):

Read and explain text. Write the names of all landforms created by glaciers on the board. Make drawings on the board or on a chart to help in understanding.

### Conclusion (5 minutes):

Recap lesson by asking questions.

## Lesson 2

### Introduction (5 minutes):

Give instructions for classwork and homework tasks.

### Written work (35 minutes):

**Classwork:** Questions 1–2 on page 23

**Homework:** Research task on page 23

# WORKSHEET 4

Date: \_\_\_\_\_

Name: \_\_\_\_\_

**1. Choose the correct answer to complete each of the sentences below.**

- i. A glacier is a huge mass of slow moving (streams, water, ice).
- ii. The glaciers in Polar Regions are called (lunar, solar, continental) glaciers or ice sheets.
- iii. Glaciers in the Himalayas, Karakoram and Alps etc are examples of (polar, alpine, continental) glaciers.
- iv. A (cirque, torque, loess) is a bowl like depression.
- v. Horns and arêtes are formed as result of (water, wind, glacial) erosion.
- vi. Rock fragments and sediments carried by a glacier are called (silt, till, hill).
- vii. The word Siachen means the place of wild (horses, roses, animals).

**2. Give one-word answers for the following questions:**

- i. narrow scratches on the bedrock

\_\_\_\_\_

- ii. deep scratches on the bedrock

\_\_\_\_\_

- iii. sharp-edged peak

\_\_\_\_\_

- iv. sharp-edged ridge created by glacial erosion

\_\_\_\_\_

- v. famous glacier of Pakistan located in the Karakoram Range near the Indo-Pak border

\_\_\_\_\_

# Chapter 3

## Agents of landform change II

### SECTION 1

### LANDFORMS CREATED BY THE WIND

#### Teacher's focus:

Wind is another important landscape shaper, though not as powerful as water. It is particularly significant in the deserts where it is powerful enough to create landforms, as the sand particles are loose. Landforms such as loess are created when sand is picked up, transported, and deposited at a new place. In addition the wind also erodes rock features by sandblasting and abrasion. Sandblasting occurs because of the powerful, whipping action of wind on rocks over a period of time. It also depends on the hardness of rock. Landforms like loess are created when sand is picked up, transported and deposited at a new place.

#### Answer key

#### Questions and Activities

1.
  - i. Low rainfall, and arid climate, sparse vegetation, limited sources of water, special topography like sand dunes and loose sand, nomadic lifestyle.
  - ii. Wear and tear in rock and changes in topography due to wind.
  - iii. Removal of loose particles of soil/sand from the ground.
2.
  - i. loess: thick, blanket like deposition of fine sediments, deposited near riverbeds and dry parts of the sea, transported by wind  
dunes: mounds of loose sand that are deposited as wind blows against an obstacle  
yardangs: landforms created by the sandblasting action of wind on rock
  - ii.
    - a. sandblasting: abrasive action of the wind; loose particles of sand, silt and rock fragments are lifted and rubbed against rock surfaces, cutting and polishing them.
    - b. yardangs: landforms created as a result of sandblasting.
    - c. deflation: removal of loose, light sand particles from the ground by wind.
    - d. desert pavement: heavy rocks that remain on the surface after all loose material has been lifted and blown.

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 24–27, *Oxford School Atlas for Pakistan*

### Teaching objectives:

- to explain to students the work of wind as a landscape shaper

### Learning outcomes:

Students should be able to:

- understand the importance of wind as a landscape shaper
- identify the types of landforms created by wind, and the reasons and process behind the formation of each type

## Lesson 1

### Introduction (5 minutes)

Review the previous two agents i.e. rivers and glaciers. Ask students to think what would happen to sand and rock if both weak and strong winds act on them over a long period of time. Write down answers on the board. Ask them questions such as:

Will the pressure and speed of the wind have any effect? Why? What will happen to the landform? Will a new landform be created? How? Was material picked up and transported?

### Explanation (30 minutes):

Read and explain text. Go over the formation of each landform thoroughly.

### Conclusion (5 minutes):

Summarise the lesson by relating landforms to their landscaping agents. Compare with the two previous agents and discuss differences and similarities. Ask students for any confusion that needs to be cleared. Give homework for revising key concepts, as reinforcement.

## Lesson 2

### Introduction (5 minutes):

Give instructions for classwork and homework tasks.

### Written work (35 minutes):

**Classwork:** Questions 1–2 on page 27

**Homework:** Read and revise text pages 24–27, Worksheet 5

# WORKSHEET 5

Date: \_\_\_\_\_

Name: \_\_\_\_\_

**1. Choose the correct word to complete each of the sentences below.**

- i. Most landforms created by wind are found in (coastal areas, deserts, riverbeds).
- ii. Total annual rainfall of (5, 15, 25) inches is considered the limit for dry or arid climate.
- iii. Windblown sand erodes the surfaces of (pebbles and cobbles, dunes and yardangs, desert pavements).
- iv. Rains fill up deflation hollows and forms lakes called (runoff lakes, playa lakes, crater lakes).
- v. The most powerful abrasive action of wind erosion is called (sandbag, sandblasting, sandlock) action.

**2. Complete the following statements.**

- i. In desert areas, the powerful wind lifts \_\_\_\_\_.
- ii. Sand is blown about because \_\_\_\_\_.
- iii. Wind erosion creates blowout depressions or deflation hollows by \_\_\_\_\_.
- iv. Sand builds up on a dune's \_\_\_\_\_ face and slips down its \_\_\_\_\_ side.

**3. What is the disadvantage of leaving behind flags and other similar trails for desert travellers? Explain the reason for this.**

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## SECTION 2

# LANDFORMS CREATED BY SEA WAVES

### Teacher's focus:

Waves of oceans and seas create both erosional and depositional landforms. The wind's movement over these water surfaces causes waves to be formed. The landward and seaward movement of these waves causes the breakdown of rocks and the deposition of eroded material. Cliffs, sea stacks, headlands, arches etc., are landforms created this way. The formation of these landforms depends upon the strength of waves and tidal movements as well as the strength and composition of the rock. Softer rock erodes and breaks faster, as do rocks with chemicals that react with sea water and erode faster. Beaches are created because of the constant action of the waves on rock. The amount of rock eroded creates different kinds of shorelines and beaches such as sandy beach, rocky beach or shingle beach. Smooth round pebbles are formed by the filing and smoothing action of waves on sharp rocks.

### Answer key

#### Questions and Activities

1.
  - i.
    - a. sandbar: accumulation of sand in the form of a bar
    - b. sand spit: ridges formed by deposition of sand
    - c. baymouth: accumulation of sediment at the mouth of a bay
    - d. lagoon: pool of created behind a barrier in the sea
    - e. tombolo: a sandbar that joins an island to the mainland
  - ii. headlands: created when softer rock breaks down and harder rocks resist, forming an irregular coastline with inward and outward sections.  
sea cliffs: steep slopes formed as a result of eroded headlands, caused by undercutting and mass wasting.  
wave-cut platform: horizontal bed of rock formed by erosion.  
sea stacks: created when headlands are eroded forming arches that give way to stacks of rocks.
2.
  - i. The accumulation of sand and gravel absorbs the energy of the waves and acts as a break-wave, shaped by landward and seaward currents of water.
  - ii. Erosional landforms are created by the erosion or wear and tear of rock. Depositional landforms are created when sand, gravel, silt etc are carried by agents of landscaping and deposited in places creating new landforms.
3.
  - i. delta
  - ii. yardang
  - iii. waves
  - iv. waterfall
  - v. loess
  - vi. gradient

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 28–33, *Oxford School Atlas for Pakistan*

### Teaching objectives:

To explain:

- the role of waves in creating erosional and depositional landforms
- the type of landforms created
- how these landforms are created

### Learning outcomes:

Students should be able to:

- understand the role of waves in creating landforms
- identify landforms are created by waves and how they are created

## Lesson 1

### Introduction (5 minutes):

Recap all landscaping agents covered in previous lessons. Ask the names of different landforms. Link discussion to the current topic.

### Explanation (30 minutes):

Read and explain the text. Focus on the nature and type of landforms and their creation.

### Conclusion (5 minutes):

Recap key concepts. Ask questions to check understanding.

## Lesson 2

### Introduction (5 minutes):

Give instructions for classwork and homework tasks.

### Written work (35 minutes):

**Classwork:** Question 1–2 on page 33

**Homework:** Worksheet 6, Activity question on page 33

# WORKSHEET 6

Date: \_\_\_\_\_

Name: \_\_\_\_\_

**1. Choose the correct word to complete each of the sentences below.**

- i. Wind transfers its energy through (air, water, land).
- ii. The (height, power, speed) of waves is the key factor in determining wave energy.
- iii. Limestone and chalk are soluble in (seawater, rainwater, mineral water).
- iv. Shale and clay are (soft, hard) rocks.
- v. Inward sections of irregular coastlines are called (bays, bights, coves).
- vi. Sand bars, sand spits and bay-mouth form barriers and act as (support, channels, breakwaters).
- vii. The Spanish word for slope is (macarena, *bajada*, poncho).

**2. Complete the table below.**

Landform	Agent	Erosional/Depositional
	river	erosional
U-shaped valley		erosional
sea stacks	waves	
loess		
sand bar	waves	
sand spit		depositional
sand dunes		
moraines		depositional
horns and arêtes		
yardang	wind	
headlands		erosional

# Chapter 4

## The world of oceans

### SECTION 1

### OCEANS AND SEAS

#### Teacher's focus:

Oceans and seas cover  $\frac{3}{4}$  of the Earth's surface. They are the key source of evaporation and are important regulators of weather. They are home to a variety of plants and animals. Both oceans and seas are salt water bodies, but the main difference is that oceans are bigger than seas. Seas are parts of oceans that are bordered by land on one, two or three sides. There are five oceans, namely Indian Ocean, Pacific Ocean, Atlantic Ocean, Arctic Ocean, and Southern Ocean. Some seas of the world include Arabian Sea, Dead Sea, Mediterranean Sea, Black Sea, Red Sea, China Sea, Andaman Sea, Tasman Sea, etc. The Caspian Sea in Iran is a large lake but owing to its size it is awarded the status of a sea. All oceans of the world may seem to be the same but each of them is unique in its own way.

Oceans and seas create some unusual landforms and land features. These natural features add to scenic beauty and also have geographical importance as they create land and water features such as island, isthmus, peninsula, bay, gulf, bight, etc.

#### Answer key

#### Questions and Activities

1.
  - i. A strait is a narrow waterway which joins two larger water bodies like the Strait of Gibraltar which joins the waters of the Atlantic Ocean and Mediterranean Sea. The word channel is also used in this context like the English Channel between England and France. An isthmus is a narrow piece of land separating two bodies of water and connecting two larger bodies of land like the Isthmus of Panama which separates North America and South America.
  - ii. A broad inward portion of sea which is enclosed by land. Bay of Bengal, located along the coasts of India, Bangladesh and Myanmar is an example of a bay.
  - iii. The word peninsula refers to the portion of land which is surrounded on three sides by water while an island is land which is surrounded all sides by water. Arabian Peninsula and Indian Peninsula are examples of peninsula.

## DISCOVERY 3

### Teaching Guide

#### 2. Pacific Ocean

The Pacific Ocean is the largest ocean which starts in the north from the Arctic Ocean and goes to the Antarctic Ocean in the south. Its coastal limit touches the continents of Asia, Australia, North America and South America. Its total area is 155.55 million sq km, which is about 42 per cent of the total water surface of the Earth. The average depth of the Pacific Ocean is 4187 m. The Marianas Trench is the deepest part of the ocean. Its average depth is 10911 m while the deepest part is 11034 m deep.

#### Atlantic Ocean

The Atlantic Ocean is the second largest ocean. Its total area is 106.4 million sq km, which is about 29 per cent of the total water surface. The Atlantic Ocean starts in the north from the Arctic Ocean and goes to the Southern Ocean in the south. The continents of Europe and Africa are located in the east of the Atlantic Ocean and North America and South America are located in the west.

#### Indian Ocean

The Indian Ocean is the third largest ocean of the world. Its total area is 73.56 million sq km, which is about 20 per cent of the total water surface area of the world. Its average depth is 3890 m.

#### Southern Ocean

The Southern Ocean is located in the Southern hemisphere, which starts from the latitude of 60°S, to the coast of Antarctica. It is the fourth largest ocean of the world. Because of its location near the pole, the temperature of the water in winter drops below freezing point and it becomes frozen in many parts. Its total area is 20.32 million sq km while its average depth is about 4500 m.

#### Arctic Ocean

It is the smallest ocean of the world. Its total area is 14.05 million sq km while its average depth is about 1038 m. It is located in the extreme north of the Northern hemisphere. Greenland, Europe and North America are located along the Arctic Ocean. Because of its nearness to the North Pole, the temperature is often near or below freezing point. In winter many parts freeze to form ice sheets.

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 34–38, *Oxford School Atlas for Pakistan*

### Teaching objectives:

To explain to students:

- the difference between oceans and seas
- the characteristics of oceans and seas
- the names and characteristics of all the oceans of the world
- the different ocean and sea landforms

**Learning outcomes:**

Student should be able to:

- describe the main characteristics of oceans and seas
- define the following features: sea, gulf, bay, bight, channel/strait, peninsula, island, isthmus

## Lesson 1

**Introduction (5 minutes):**

Ask students to open the physical world map in the *Oxford School Atlas for Pakistan* and see if they can guess the difference between oceans and seas visually. Show them oceanic landforms on a physical map or an encyclopaedia. Ask them to observe the shapes and features. Draw shapes on board to give students an idea of the basic shape of the landform.

**Explanation (30 minutes):**

Read and explain text. Make students mark / highlight famous landforms and other important details in their textbook.

**Conclusion (5 minutes):**

Conclude lesson with a recap of key points. Ask short questions to test understanding. Revise and reinforce all the landforms with their similarities and differences. Recap the lesson by highlighting key concepts or by having a short quiz with one word answers.

## Lesson 2

**Introduction (5 minutes):**

Give instructions for classwork and homework tasks.

**Written work (35 minutes):**

**Classwork:** Question 1–2 on page 39

**Homework:** Activity question on page 39

# SECTION 2

## RELIEF OF THE OCEAN FLOOR

**Teacher's focus:**

Just like continental land masses, the ocean bed also has its share of landforms. In addition to flat land, the ocean bed also has highs and lows, similar to mountains and valleys. They all have special names and unique functions.

## Answer key

### Questions and Activities

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1.
  - i. Underwater volcano formed as a result of tectonic activity.
  - ii. Marianas Trench, Pacific Ocean near the Phillipines.
  - iii. Sea/ocean depth is measured in fathoms. 1 fathom = 1.83 m
  - iv. continental shelves
  - v. By the accumulation and hardening of coral, a living creature.
  - vi. guyots
2.
  - i. Insert diagram on page 39
  - ii. Several long underwater mountain ranges are called mountain ridges, formed as a result of tectonic activity.

## Lesson plan

**No of lessons:** 1–2

**Duration:** 40 minutes

**Resources:** Textbook pages 39–41, *Oxford School Atlas for Pakistan*

### Teaching objective:

- to explain to students the relief of the ocean floor and some important underwater features

### Learning outcome:

Students should be able to describe the structure of the ocean floor and its important features

## Lesson 1

### Introduction (5 minutes):

Talk about mountains, valleys, plains etc. Tell students that the ocean bed also has rises and dips in addition to flat land. Underwater divers and swimmers have a lot to see when they are under water. It would be a good idea to get some pictures and videos to show students what the ocean bed looks like.

### Explanation (30 minutes):

Write the names of the components of the ocean floor on the board and describe it, using the text as support.

### Conclusion (5 minutes):

Ask short questions to review the topic. Clear any confusion.

## Lesson 2

### Introduction (5 minutes):

Give instructions for classwork and homework tasks.

### Written work (35 minutes):

**Classwork:** Question 1–2 on page 41

**Homework:** Read and revise topic.

## SECTION 3

### MOVEMENT OF OCEAN WATER

#### Teacher's focus:

The ocean is not a still body. It is full of energy which makes it constantly move in different ways. Currents, waves and tides are the different movements of the ocean and they are interesting geographical phenomena.

#### Answer key

#### Questions and Activities

1.
  - i. The force of wind transforms energy into waves.
  - ii. Horizontal movements of water are called surface currents, which are created by the pattern of wind systems. They are classified on the basis of sources of origin into warm currents and cold currents. Warm currents originate from the equatorial and tropical regions while cold currents originate from the Polar Regions.
  - iii.  $999.97 \text{ kg/m}^3$
  - iv. One is the daily cycle of tide which occurs within 24 hours and other is the monthly cycle of tides.
2.
  - i. Ocean currents are the regular movements of huge masses of water in particular directions. There are two types of movement. The horizontal movements of water are called surface currents while the vertical circulations of water are called subsurface oceanic currents. The factors that generate oceanic currents are wind, differences in temperature, differences in density, shape of the continents.
  - ii. A tide is the periodic rise and fall of water. Tides create small but broad bulges of sea water and are commonly observed in seas and oceans. Tides are formed as a result of the gravitational relationship of the Earth, the moon and the Sun and the gravitational pull of the moon and Sun on Earth.
  - iii. Diagram on page 46.

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 42–47, *Oxford School Atlas for Pakistan*

### Teaching objective:

- to make students aware of different oceanic movements and their cause and effect

### Learning outcomes:

Students should be able to

- describe the types, nature and causes of various oceanic movements
- differentiate between waves, currents and tides

## Lesson 1

### Introduction (5 minutes):

Ask students if they know what make the ocean move. What have they observed while standing in the sea? Have they noticed the pull of the sea as the waves go back? Have they noticed the ebbing of the tide and crashing of the waves? Have they noticed that sometimes the water comes right up to the land while at other times it is far away? Ask them if they can guess what causes each of these movements.

### Explanation (30 minutes):

Use diagrams in the text to explain the concept of currents, tides and waves. Read from text.

### Conclusion (5 minutes):

Ask students if they have any queries or confusion. Summarise key points. If possible, get newspaper clippings about the Seaview Tragedy in Karachi on 30 July 2014. Discuss its causes and how such tragedies can be avoided. Warn students against risking the currents in oceans and rivers.

## Lesson 2

### Introduction (5 minutes):

Give instructions for classwork and homework tasks.

### Written work (35 minutes):

**Classwork:** Question 1–2 on page 47

**Homework:** Read and revise topic.

# WORKSHEET 7

Date: \_\_\_\_\_

Name: \_\_\_\_\_

**1. Choose the correct word to complete each of the sentences below.**

- i. Pacific Ocean is the (largest, smallest, coldest) ocean.
- ii. The (Arctic, Pacific, Antarctic) Ocean is the coldest ocean.
- iii. A bight is a large scale (indentation, movement, tide) in the coastline.
- iv. The portion of land which is surrounded by water on three sides is called a (bay, isthmus, peninsula).
- v. Spring tides are generated at the time of the new (month, moon, tide).
- vi. Neap tides are generated the first and third (week, quarter, month) when the Sun and the moon are at a right angle with the Earth.
- vii. Tides create small but broad (pockets, bulges, openings) of sea water.

**2. State whether true or false.**

- i. Horizontal movements of water are called surface currents while the vertical circulation of water is called subsurface ocean currents.
- ii. There are eight cycles of tides that occur within 12 hours.
- iii. At 6 am and 6 pm the Earth and Sun are in such a position that the Earth's gravitational pull is low.
- iv. In low tides, the level of sea rises above normal and the shoreline is covered by water.

**3. Illustrate the following landforms. Use additional space if necessary.**

bay                  bight                  isthmus                  peninsula                  strait                  gulf                  channel

# Chapter 5

## Natural disasters

### SECTION 1

### VOLCANISM AND LANDSLIDES

#### Teacher's focus:

Natural disasters are a result of the force of nature, and their occurrence and prevention is beyond human control. Humans can only plan safety measures for such events in order to minimize damage to life and property.

Natural disasters occur because of tectonic activities and changes in any of the Earth's spheres. Some disasters like floods and landslides can also occur because of human activity.

Earthquakes, tsunamis, floods, cyclones and tornadoes, landslides and avalanches, volcanic eruptions, and droughts are natural disasters. Each of them brings widespread destruction to places they attack.

Volcanism refers to the process in which molten lava erupts from volcanic mountains. It causes great damage to surrounding areas and areas can become uninhabitable for long periods of time, even permanently.

#### Answer key

#### Questions and Activities

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1.
  - i. Japan, the Phillipines, Indonesia, Hawaii
  - ii. 1100°C
  - iii. Magma erupts from below the Earth's surface, flows down as lava destroying everything in its way. Gases like sulphur dioxide and carbon dioxide, ash and rock fragments accompany lava emissions.
  - iv. Downward movement of rock and debris under the influence of gravity.
2.
  - i. Magma erupts from below the Earth's surface, flows down as lava destroying everything in its way. Gases like sulphur dioxide and carbon dioxide, ash and rock fragments accompany lava emissions. Volcanic eruptions cause death and destruction of property including crops and farms.

- ii. Landslide causes are generally related to instability in the slope; a specific cause will vary on a case-by-case basis. Landslides can be prevented stopping the felling of forests on mountain slopes as the roots of trees hold the soil in place; stopping the grazing of animals on mountain slopes because grasses protect soil from run-off. Erosion; avoiding the construction of roads, houses, etc. on mountain slopes; constructing retaining walls and stone pitching across mountain slopes.
- iii. Kaghan, Naran, Chitral, Kohistan, Malakand, and Dir

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 48–51, *Oxford School Atlas for Pakistan*

**Teaching objective:**

- to make students aware of the different kinds of natural disasters, and the damages that can be caused

**Learning outcomes:**

Students should be able to:

- understand what natural disasters are
- identify the natural disasters and the reasons for their occurrence
- understand in detail the causes and effects of volcanism and landslides

### Lesson 1

**Introduction (5 minutes):**

Write the names of natural disasters on the board and ask students what they know about them i.e. why they occur, how they occur, personal experiences etc. Briefly summarise what they will be studying in this chapter.

**Explanation (30 minutes):**

Read and explain text. Emphasise the causes and effects of volcanism and landslides.

**Conclusion (5 minutes):**

Review lesson. Get suggestions from students on what can be done to minimize damages due to these disasters.

### Lesson 2

**Introduction (5 minutes):**

Give instructions for classwork and homework tasks.

**Written work (35 minutes):**

**Classwork:** Questions 1–2 on page 51

**Homework:** Activity Questions 1–2 on page 51

## SECTION 2

# DESERTIFICATION AND FLOODS

### Teacher's focus:

Desertification is the process in which a usually fertile piece of land becomes useless for agriculture and plantation, just like a desert. Desertification occurs due to natural phenomena and human activities. Drought is a natural phenomenon. War is a human activity. Both cause desertification. Other reasons include excessive grazing by animals and increasing commercialization of land for construction.

Floods are the most common natural disaster all over the world. A flood basically means a spillover and collection of water on land in large volumes. Such a spillover covers dry land completely and causes widespread destruction.

Excess water comes from heavy rains, a tsunami, and/or flooding of river banks because of excess water in the channel. Water from these sources collects at alarmingly high rates because:

- the soil is unable to absorb so much water.
- the flooded area is low-lying areas surrounded by high lands and the water runs-off and collects here
- too much construction and paved areas prevent water from being absorbed by the soil.

All these conditions can also cause a flash flood—a sudden and fast moving flood.

Floods can completely wipe out regions. People and animals drown, crops, and forests are destroyed, electricity and telephone lines are cutoff and property is damaged. In addition, when the standing water starts to stagnate, it carries many diseases and epidemics.

Flooding is a disaster that holds some chances of prevention. However the measures need to be taken on individual, local, communal and national levels in order to make them effective. Some steps are:

- identify flood-prone areas
- monitor weather and local news regularly
- educate the locals of all such areas about what to do in times of floods
- make sure that houses and other buildings are constructed away from flood prone areas.
- make sure temporary shelters and shanty towns (*katchi abadis*) don't crop up near high-risk areas
- cleaning of river beds and channels should be done at regular intervals. This prevents the pile-up of material which often leads to the flooding of riverbanks.
- if the city or region is a low-lying area, make channels for draining out run-off water.
- have a trained evacuation and rescue team as well as volunteers

## Answer key

### Questions and Activities

1.
  - i. Long period of dryness, absence of water over a long period of time, affecting a large area and great number of people.
  - ii. Avoid excessive grazing by animals, stop excessive felling of trees, stop excessive pumping of ground water.
  - iii. Death of humans and animals, destruction of property, crops destroyed, disruption of electricity, gas and water supplies, contamination of potable water, spreading of diseases, and epidemics.
  - iv. Construction of concrete dikes and other embankments along rivers, avoiding felling of trees on slopes and areas around river banks, flood awareness, rescue and evacuation training programs.
2.
  - i. Riverine: overflow of river water, cause when there is more water in the channel than it can hold. Excessive water due to heavy rains, melting glaciers and other streams gushing in.  
Coastal: caused due to huge inland waves, floods in the delta/estuary region due to flooding rivers or tsunamis.  
Flash flood: sudden flood caused due to water running off from slopes at torrential speeds.
  - ii. The depletion of water resources, famine, death of livestock and other animals. In desert countries and less developed countries like Pakistan and India, and African countries like Somalia, Sudan, Niger, the situation worsens as drought creates famine, causing dehydration and malnutrition.

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 52–55, *Oxford School Atlas for Pakistan*

**Teaching objective:**

- to make students aware of the causes and effects of droughts and floods

**Learning outcome:**

Students should be able to understand why droughts and floods occur and the nature of damage caused

## Lesson 1

**Introduction (5 minutes):**

Discuss experience of thirst and hunger while fasting or having run out of water supplies, and excessive rainfall. Compare the nature of both, as one is the opposite of the other. Ask them to think why droughts

## DISCOVERY 3

### Teaching Guide

and floods are classified as natural disasters.

#### Explanation (30 minutes):

Read and explain text. Focus on causes and effects.

#### Conclusion (5 minutes):

Summarise key concepts. Ask students to provide suggestions for minimizing damages by both disasters; preventive and relief measures.

**Classwork:** Questions 1–2 on page 55

**Homework:** Read and revise topic.

## SECTION 3

# CYCLONES, FOREST FIRES, AND EARTHQUAKES

### Teacher's focus:

Cyclones are storms caused by fast moving winds. They usually occur as a result of low atmospheric pressure and winds of different densities over seas and oceans, usually around the tropics. These fast moving winds spiral in an anticlockwise movement in the northern hemisphere. In the southern hemisphere, they go clockwise. Cyclonic winds accumulate moisture as they spiral around over water, resulting in cloud formation and rain, along with windstorms. The calm center of a cyclone is called its eye. Cyclonic winds can change direction any time, which makes them unpredictable and difficult to monitor. Cyclonic winds occurring in high pressure areas are called anticyclones.

Forest fires occur when dry bushes, shrubs and wild grasses in usually arid regions catch fire and this fire spreads rapidly over a large area.

An earthquake is the shaking of the Earth because of tectonic activity. The Earth's plates are constantly moving, and as a result they either push into each other, pull away from each other or grind past each other. In each case, a jolt is felt, and it is this jolt that causes everything on the Earth's surface to shake.

### Answer key

#### Questions and Activities

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1.
  - i. Natural phenomena that cause extensive damage to life and property
  - ii. landslides, drought, floods, cyclones, and earthquakes
  - iii. Hot dry weather, friction and lightning, and human negligence. Areas like parks where there are many trees, shrubs, wild grasses and bushes.

- iv. cyclone: storms occurring in the Indian Ocean, Arabian Sea and the Bay of Bengal.  
typhoon: storms occurring in the South China Sea  
hurricane: storms occurring in the Atlantic Ocean and Caribbean Sea
- 2. i. Tectonic plates move in different directions and at different speeds. This causes waves of energy to be released when pressure is felt at the edges or faults of plates causing the plates to quake or shake. Damage to life, buildings can sway and topple over, roads can crack open, gas and water pipes can burst, bridges can collapse, land can sink, new landforms like islands and rift valleys can be created, tsunamis can occur
- ii. Wind damage, storm surge, inland freshwater flooding. Have an up to date meteorological department for creating awareness among people, using media to keep people informed about forecasts and what to do in case of disaster.
- iii. A huge wave that hits a large portion of coastal land that occurs due to an earthquake in the ocean bed.
- iv. Short severe storms caused by violently rotating column of air in contact with the ground and cumulonimbus cloud. Completely destroys land over which it travels, just like a bomb explosion.

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 56–61, *Oxford School Atlas for Pakistan*

### Teaching objective:

- to make students aware of the causes, nature, and effects of cyclones and tornadoes, forest fires, and earthquakes

### Learning outcome:

Students should be able to understand and identify the causes, nature, and effects of cyclones and tornadoes, forest fires, and earthquakes.

## Lesson 1

### Introduction (5 minutes):

Begin the lesson with video clips of natural disasters. Get student responses for any personal experiences.

### Explanation (30 minutes):

Read and explain text.

## DISCOVERY 3

### Teaching Guide

#### Conclusion (5 minutes):

Recap key points.

## Lesson 2

#### Introduction (5 minutes):

Give instructions for classwork and homework tasks.

#### Written work (35 minutes):

**Classwork:** Questions 1–2 on page 61

**Homework:** Activity Question on page 61

## WORKSHEET 8

Date: \_\_\_\_\_

Name: \_\_\_\_\_

### 1. Choose the correct word to complete each of the sentences below.

- i. Mount (Mayon, Egmont, Fuji) in the Philippines has erupted (40, 15, 0) times since 1616.
- ii. Volcanoes are dangerous because they erupt (suddenly, annually, collectively).
- iii. People living on the (mountain slopes, green fields, built up area) of Japan, Indonesia, Philippines, Hawaii, etc are in the volcanic zone.
- iv. The clouds of smoke and (toxic, atomic, atmospheric) gases cover an extensive area and people and animals die because of the hot smoke and toxic gases.
- v. Hot lava with temperature more than (1100, 900, 80)°C flows on the mountain slopes.
- vi. Tornadoes are (short, long, medium) but severe storms caused by a violently rotating column of air that is in contact both with the ground and with a cumulonimbus cloud.
- vii. In the United States tornadoes are popularly called (twisters, tsunamis, typhoons).
- viii. The wind speed reaches up to (1500, 500, 2500) km per hour or more and the width of the tornado can be (5 km, 6.5 km, 3 km) or more on the ground.
- ix. Tornadoes occur all over the world except in (Southern Oceans, Antarctica, Arctic Circle).
- x. The highest number of tornadoes is recorded in the (USA, Russia, Phillipines).
- xi. The north to south corridor stretching from Canada to Georgia is known as Tornado City, Tornado Alley, Tornado Stretch).
- xii. The most common and severe natural hazard in the mountainous regions of the world is (land sliding, earthquakes, forest fires).
- xiii. Desertification refers to the (expansion, removal, contraction) of deserts.
- xiv. Drought is defined as a period of (humidity, dryness, desertification) whether it is short or long.
- xv. Forest fire or wildfire is a term used for (man-made, uncontrolled, deliberate) fires.

## Chapter 6

# Major environmental problems

## SECTION 1

### POLLUTION

#### Teacher's focus:

Environmental issues are a matter of concern for all countries in today's world, including both developed and underdeveloped. Scientific and technological advancement has brought about widespread devastating effects on the environment. Resources are being depleted at alarmingly high rates causing a serious disbalance in the environment. As a result, life on Earth has come under many threats. If these threats remain unchecked, the Earth will cease to remain a life-sustaining planet.

Pollution is the largest threat to the Earth's environment. Wind, water and soil (or land) are the major components of the environment. Any changes in these key components can trigger negative changes in the environment. Such changes are called pollution and they can be physical or chemical. Agents of pollution are called pollutants.

Pollution has been categorized into

- air pollution
- water pollution
- land or soil pollution
- noise pollution

Air pollution refers to the presence of pollutants in the air which decrease its purity. Air pollution is a major crisis that affects all life forms on Earth and their environment, rapidly leading to a poor quality of life.

#### Answer key

#### Questions and Activities

1.
  - i. Pollution can be defined as any change in the physical, chemical, or biological characteristics of air, water, or soil that directly or indirectly affects the health, survival or activities of human beings, other living creatures and plants.
  - ii. Various types of air pollutants found in the air over cities are classified as industrial smog.

- iii. To prevent air pollution, trees should not be cut down unnecessarily. If this has to be done then new saplings should be planted in their place. Lead-free petrol should be used in all vehicles. The smoke emitted from factory chimneys should be filtered. Rubbish collected in heaps should not be burned. It should be disposed of properly. As much as possible people should travel by bus. There should be fewer cars on the road.
2.
  - i. Natural sources of air pollutants include forest fires caused by lightning, pollen dispersal, wind erosion of soil, volcanic eruptions, etc. Emissions from natural sources are dispersed throughout the world and rarely reach concentrations high enough to cause serious damage. However, exceptions occur in form of massive volcanic eruption and emission of sulfur dioxide and suspended particles like ash from volcanoes.
  - ii. Air pollutants have fatal effects on living things. Numerous harmful effects have been identified on human health. The human respiratory system is seriously damaged by air pollution. Air pollution is one of the factors of many dangerous diseases like lung cancer, tuberculosis, chronic bronchitis, pneumonia, etc. besides persistent asthma and breathing problems. Air pollutants like sulfur dioxide and carbon dioxide react with rain water and form acids. This type of rain is called acid rain. Acid rain has been reported for the last 150 years, but its damaging effect has been felt more in the last twenty-five years. Acid rain mainly affects water sources such as lakes and rivers and their surrounding soil. It also releases aluminum from the soil into the water. Aluminum is highly toxic for aquatic life. Acid rain also damages plants and buildings.

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 62–65, *Oxford School Atlas for Pakistan*

### Teaching objectives

To educate students about:

- the concept and definition of environmental issues
- the types and causes of environmental issues
- the impact of environmental issues on life and the Earth in general

### Learning outcomes:

Students should be able to:

- define environmental problems
- identify the main types of environmental problems
- describe the impacts of environmental pollutants on life
- understand the concept, causes and effects of air pollution

## Lesson 1

### Introduction (5 minutes):

Talk to students about the increasing traffic and traffic jams, litter, scarcity of potable water. Ask them what they think are the reasons for all these issues. Have students have noticed an increasing amount of allergies and related medical issues in people? How do they feel when they are stuck in a traffic jam and the vehicles are emitting smoke? Introduce topic.

### Explanation (30 minutes):

Read and explain the text. Emphasise that the issues are a serious concern and not just a topic in the book. Explain the composition of air in the environment and the fact that all gases present are in the right proportion. Emphasise that the quality of life depends on clean air. Talk about how and why the air gets polluted and what the major air pollutants are.

### Conclusion (5 minutes):

Summarise the main idea. Ask students to come up with possible environmental issues and make a list on the board. Ask them to think about the effects (long term and short term) of air pollution on the environment. Can they think of measures to counter them? Make a list of suggestions on the board.

## Lesson 2

### Introduction (5 minutes):

Give instructions for classwork and homework tasks.

### Written work (35 minutes):

**Classwork:** Questions 1–2 on page 65

**Homework:** Activity on page 65 (can also be done as a project)

# SECTION 2

## WATER POLLUTION

### Teacher's focus:

After air, water is the most crucial element of nature for life. Without water, nothing would survive. Water pollution occurs when the physical or chemical state of water is altered due to the presence of a single or multiple pollutants, making it unfit for any kind of consumption. The presence of excessive salt, toxic wastes, solid wastes, non-biodegradable material, metals and chemicals etc can contaminate water. These can cause death and illnesses in all forms of life, directly and indirectly. This is why it is important that we look after our water resources like rivers, lakes and reservoirs. A large number of rivers around the globe are becoming polluted at alarmingly high rates. Factories and industries are largely responsible for the toxicity of rivers because they dump industrial wastes. Other individuals and communities also contribute to pollution because

of their carelessness.

## Answer key

### Questions and Activities

1.
  - i. Water pollution can be defined as any change in the physical characteristics like colour, taste, smell, and chemical properties such as composition of salts, minerals and other chemicals in surface water and underground water which adversely affect living organisms.
  - ii. Water pollutants related to disease-causing agents: bacteria, viruses, protozoa and parasites are the most common disease causing agents found in contaminated water. Water-soluble and insoluble organic and inorganic chemicals like acid, salts, toxic metals, nitrate and phosphate salts, oil, gasoline, plastics, pesticides, cleaning solvents, etc. are types of water pollutants. Suspended materials in water like insoluble particles of soil, silt, etc. pollute the water. Radioactive substances like atomic reactor wastes and industrial waste like tannic acid from tanneries are serious threats. Reduction of oxygen in water as a result of decomposition of water and contamination of water due to mixing of sewerage, industrial waste, etc. are also dangerous.
  - iii. Typhoid, infectious hepatitis, cholera, and dysentery are the most common and fatal diseases that occur as a result of the drinking of contaminated water.
2.
  - i. Rivers and lakes provide fresh water for drinking as well as being the habitat of aquatic life and plants. Therefore rivers and lakes should be protected from contamination. Discharge of sewerage water into rivers and lakes must be stopped. Discharge of industrial polluted water must be stopped into lakes and rivers. Industrial and sewerage water must be treated before discharging into rivers and seas. Stop the excessive use of pesticides and fertilizers which contaminate underground water. Underground and overhead water tanks of homes must be kept clean. People should be informed about dangerous of water pollution. Oil spills in oceans and large rivers, as a result of the sinking of oil tankers are very dangerous for marine life. The black crude oil makes beaches dirty, polluted, and unpleasant for visitors who come to beaches for recreation. Therefore such incidents must be stopped.
  - ii. The effect of water pollutants in form of water-borne diseases is fatal. Typhoid, infectious hepatitis, cholera, and dysentery are the most common and fatal diseases that occur as a result of the drinking of contaminated water. Use of contaminated water also causes eye and skin diseases. Reduction of oxygen in water due to decomposition of water creates danger for the aquatic life like fish and other living organisms. The presence of toxic metals like lead and mercury are very harmful to human life. The presence of radioactive substances like uranium in water leads to diseases like cancer.

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 66–67, *Oxford School Atlas for Pakistan*

## DISCOVERY 3

### Teaching Guide

#### Teaching objective:

- to educate students about the causes and effects of water pollution

#### Learning outcomes:

Students should be able to understand:

- what water pollution is
- causes and types of water pollution
- the effects of water pollution on life
- how to minimize water pollution

## Lesson 1

#### Introduction (5 minutes):

Link the lesson to air pollution. Discuss the importance of water for life in general. What would a world without water be like?

#### Explanation (30 minutes):

Read and explain text. Talk about major water pollutants and the effects of polluted water. Explain how polluted water affects all kinds of life.

#### Conclusion (5 minutes):

End the lesson by summing up key points and asking students for feedback on how to minimize water pollution.

## Lesson 2

#### Introduction (5 minutes):

Give instructions for classwork and homework tasks.

#### Written work (35 minutes):

**Classwork:** Questions 1–2 on page 67

**Homework:** Activity question on page 67

# SECTION 3

## LAND POLLUTION

#### Teacher's focus:

All settlements are on land. Agriculture is done on land. It is vital for human survival. However pollutants like pesticides and chemicals, and processes like water logging and salinity affect the quality of land by polluting

it. This results in land becoming entirely or partially polluted, for various purposes, the most important of which is agriculture.

## Answer key

### Questions and Activities

1.
  - i. Water logging, salinity and harmful effects of fertilizers and pesticides.
  - ii. Reduction in use and recycling should be practiced. Paper-based waste and other non-toxic solid wastes can be used as fuel for generating electricity. Disposal of some plastics and other solid chemical products which cannot be disposed of safely is taken care of by burning or burying them in the ground. Incinerators should be used for disposal wastes from hospitals etc. Solid waste should be burnt. Chemicals should be avoided. Biodegradable material should be encouraged. Material like peels and flesh from fruits and vegetables can be used for making compost/kitchen fertilizer.
  - iii. The amount of solid waste is increasing day by day and its safe disposal is a serious problem. Collection and safe disposal of solid wastes are big challenges. This is why landfill sites are developed far away from cities.
2.
  - i. Water logging, salinity and harmful effects of fertilizers and pesticides are main factors.
  - ii. Chemicals and fertilizers affect agricultural produce, unhealthy for us. Untreated toxic waste causes health issues and scarcity of potable water, especially when dumped into resources like rivers and reservoirs. Heaps of rubbish spoil the environment and attract pests and diseases. Animal and plant life is threatened.

## Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 68–70, *Oxford School Atlas for Pakistan*

### Teaching objectives:

To explain to students:

- the idea of land pollution and its types
- the causes and effects of land pollution
- impact of land pollution on life

### Learning outcome:

Students should be able to understand what land pollution is, how it is caused and what are its effects

## Lesson 1

### Introduction (5 minutes):

Ask students if they can drink sea water or salt water in small or large quantities. What would happen? Introduce the words water logging and salinity and explain them.

### Explanation (30 minutes):

Read and discuss text. Explain the causes and effects of water logging and salinity. Emphasise why they are important for soil or land. Discuss the issues related to these two.

### Conclusion (5 minutes):

Ask questions to gauge the level of understanding. Explain confusion if any.

## Lesson 2

### Introduction (5 minutes):

Give instructions for classwork and homework tasks.

### Written work (35 minutes):

**Classwork:** Questions 1–2 on page 70

**Homework:** Activity question on page 70 (can also be done as a project)

# SECTION 4

## NOISE POLLUTION

### Teacher's focus:

Noise pollution refers to the collective noises of industrial machinery and other appliances, various kinds of transport (including aircraft and trains) / vehicles and traffic, sounds emitted from televisions, radios, recorders and such and humans too. The concentration of has a deep impact on people and their environment. It disturbs the peace of people and their surroundings, adding to stress, agitation, lack of concentration, irritability etc.

### Answer key

#### Questions and Activities

---

1.
  - i. Industrial machinery, traffic, generators, air craft and music.
  - ii. Impaired hearing, stress and agitation, disturbed sleep, inability to think and focus.

- iii. Soundproofing in rooms/houses/buildings, creating awareness, avoiding loud music, avoiding car horns and pressure horns, minimizing the use of loudspeakers, using silencers in cars, bikes and rickshaws, houses should be constructed away from industrial areas and airports.
2. Open question

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 71–72, *Oxford School Atlas for Pakistan*

**Teaching objective:**

- to create awareness in students about noise pollution and its effects

**Learning outcome:**

Students should be made aware of the effects of noise pollution and how they can contribute to minimizing it

## Lesson 1

**Introduction (5 minutes):**

Ask students how they feel when a generator or any other loud machine like a water pump is on for a long time and then is switched off.

**Explanation (30 minutes):**

Explain noise pollution and how it affects the people in the environment. Talk about noises like car horns, people shouting, sounds of machines etc and their effects on human minds.

**Conclusion (5 minutes):**

Ask questions to gauge the level of understanding. Explain confusion if any.

**Classwork:** Questions 1–2 on page 72

**Homework:** Activity question on page 72

## SECTION 5

# GLOBAL WARMING AND THE GREENHOUSE EFFECT

### Teacher's focus:

The structure and composition of the atmosphere are in the perfect ratios for the sustenance of life. The gases that exist in the atmosphere help in regulating and maintaining an ideal temperature on Earth. Thus we see snow, glaciers and ice sheets in the Polar Regions throughout the year without melting. Alpine glaciers exist in cold regions of the Earth and many remain partially frozen for much of the year. Similarly all kinds of precipitation and variations in temperature also are part of cyclic changes on Earth. In recent times, the increasing release of carbon dioxide and other inert gases into the atmosphere is causing global warming or increasing global temperatures. This is leading to the melting of ice sheets and glaciers at a high rate, leading to more heat on Earth.

### Answer key

#### Questions and Activities

1.
  - i. 50% infra-red, 40% visible light, and 10% ultra-violet light
  - ii. A layer formed in the stratosphere that absorbs and reflects 99% of the ultraviolet rays.
  - iii. The atmosphere contains water vapour, carbon dioxide, and small amounts of gases like methane, nitrous oxide and carbon chlorofluorocarbons. These collectively are called greenhouse gases and they play an important role in regulating the Earth's temperature.
  - iv. Chlorofluorocarbons are gases used in aerosol sprays.
  - v. Air pollutants like sulfur dioxide and carbon dioxide react with rain water and form acids. This type of rain is called acid rain.
2.
  - i. The rapid increase of chlorofluorocarbons (CFCs), gas pollutants, due to the excessive use of aerosol sprays, coolants in refrigerators and air conditioners, cleaning solvents and plastic foams for insulating houses.
  - ii. Insert diagram on page 74
  - iii. Global warming refers to the increase in the average global temperature. As a result the melting of polar ice-caps takes place, causing a rise in sea level. It is estimated that raising the average atmospheric temperature by 4°C would raise the average global sea level by about 0.6 m (2 ft). Many of the islands and low-lying coastal areas would be sunk. Rivers fed by melting glaciers like the River Indus in Pakistan will have severe floods. Because of the increasing rate of evaporation, heavy rainfall will be forecast.
  - iv. Burning of fossil fuels must be minimized, car pools and walking to places must be encouraged, use of aerosols should be minimized, emission of greenhouse gases should be reduced, use of industrial machinery and other appliances should be curtailed, alternative energy should be used so that less electricity is consumed to run power plants.

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook page 73–77, *Oxford School Atlas for Pakistan*

### Teaching objectives:

To educate students about:

- the greenhouse effect and the ozone layer
- finding a solution to minimize the dangers of these issues

### Learning outcomes

Students should be able to:

- describe the nature and causes of global warming and its impact on life on Earth
- describe the greenhouse effect

## Lesson 1

### Introduction (5 minutes):

Begin by asking students the composition of different gases in the atmosphere. Highlight the percentage of carbon dioxide. Ask them to think why it must exist in that proportion. Talk about carbon emissions and the dangers they cause to the atmosphere. Have they felt the heat while passing by a generator or a fridge or an air conditioner? Can they imagine what must be happening to the Earth when so many people use so many appliances, generating excessive heat?

### Explanation (30 minutes):

Read and explain text. Explain why and how acid rain occurs.

### Conclusion (5 minutes):

Ask students what they can do as individuals and communities to minimize global warming etc. Make a list on the board.

**Classwork:** Questions 1–2 on page 77

**Homework:** Activity question on page 77

## WORKSHEET 9

Date: \_\_\_\_\_

Name: \_\_\_\_\_

### 1. Choose the correct word to complete each of the sentences below.

- i. Noise and heat are (invisible, liquid, gaseous) pollutants.
- ii. The concentration of pollutants is given as (pmp, ppm, mpp) and represents the number of parts of a chemical or pollutant.
- iii. The envelope of air surrounding the Earth is called (lithosphere, hydrosphere, atmosphere).
- iv. Air pollutants found in the air over cities are classified as industrial (density, smog, waste).
- v. The amount of pollutant in a given volume of air, water or other medium is called (convection, concentration, pollution).
- vi. The use of toxic metals like (lead, iron, copper) and mercury are very harmful for life.
- vii. Use of (contaminated, mixed, acidic) water can cause eye and skin diseases.
- viii. Soil pollution is a big challenge in (rural, urban, metropolitan) areas.
- ix. Water (seepages, logging, salinity) from canals accumulate in the farmland which becomes saturated and infertile.
- x. The average global temperatures of the Earth can rise by (1.5–4.5, 3–6, 7–9)°C by 2030.

# Chapter 7

## Natural regions of the world

### SECTION 1

### NATURAL REGIONS

#### Teacher's focus:

As studied in earlier lessons, latitudes divide the world into different climatic zones, based on the Equator, the two tropics and the two polar zones. The regions on or near the Equator are the hottest; the regions between the Equator and the tropics have a cooler climate. Finally, the poles are the coldest, with freezing temperatures.

The temperatures of a place determine the natural surroundings, vegetation and lifestyle of people and their activities. For example, people living in the desert dress differently from those living in the Polar Regions.

Geographers group countries with the same climatic conditions, together. Places on the same latitudes will generally have a similar kind of climate. It is very interesting to note the differences and similarities between places belonging to the same climatic regions in different continents. Even though they are the same physically, there may be many cultural differences.

#### Answer key

#### Questions and Activities

1.
  - i. Regions classified on their natural features like mountains, rivers, plateaus, plains or climate.
  - ii. torrid zone, temperate zone, frigid zone
2.
  - i. The temperate region lies beyond the tropical region, between the latitudes  $23.5^{\circ}$  and  $66.5^{\circ}$  north and south. The average temperature is between  $4^{\circ}$  and  $10^{\circ}\text{C}$ . Summers are mild and winters are cool. Heavy snowfall occurs in winter in most of the region. Coniferous and deciduous forests, and temperate grasslands are the main types of vegetation.
  - ii. The tropical region lies between the Tropic of Cancer ( $23.5^{\circ}\text{N}$ ) and the Tropic of Capricorn ( $23.5^{\circ}\text{S}$ ), where the temperature is generally high throughout the year. The average monthly temperature is about  $27^{\circ}\text{C}$ . Some areas, like Indonesia, Bangladesh, and Brazil, receive heavy rainfall, i.e. about 2000 mm or more annually; but dry places and deserts are also located in this region, such as those in Saudi Arabia and Sudan. Tropical cyclones frequently occur in this region. Some parts of the tropical region have dense forests,

## DISCOVERY 3

### Teaching Guide

called rainforests, for example, Brazil and Indonesia. In tropical Africa there are vast grasslands called savannas. Rice, cotton, tea, and sugarcane are the main tropical crops. This is the most densely populated region of the world and most of the world's developing countries are located in this region.

- iii. The areas beyond the Arctic Circle (66.5° to 90°N) and the Antarctic Circle (66.5° to 90°S) form the cold region, where the winters are long and severe. The temperature falls several degrees below freezing point. Forest lands called taiga and scrub lands called tundra are located in this region. Norway, Canada, Greenland, Siberia in Russia, and Antarctica are located in this region, as are the major continental glaciers of the world. The population density of this region is the lowest in the world.
3. Open question
4.
  - i. temperature
  - ii. 30° latitude north and south
  - iii. 27°C
5.
  - i. tundra
  - ii. Argentina and Chile
  - iii. rice

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook 78–81, *Oxford School Atlas Pakistan*

### Teaching objectives:

To explain to students:

- the division of the Earth into different climatic regions
- the basis for these divisions
- characteristics of climatic regions

### Learning outcome:

Students should be able to understand the characteristics of different climatic regions

## Lesson 1

### Introduction (5 minutes):

Introduce the definition of the region. Write the names of the three broad classifications on the board.

### Explanation (30 minutes):

Read and explain text. Explain each division with reference to its proximity from the Equator and the Poles, with reference to the angular distance.

**Conclusion (5 minutes):**

Summarise the lesson.

**Classwork:** Questions 1–5 on page 81

**Homework:** Read and revise lesson.

## SECTION 2

# IMPORTANT NATURAL REGIONS OF THE WORLD RAINFOREST

### Teacher's focus:

The rainforest region is comprised of areas in the tropics and the equatorial belt. It is characterized by high temperatures, high rainfall and dense rainforests.

### Answer key

#### Questions and Activities

- rainforest, monsoon, Mediterranean, steppe, desert, tundra
  - A type of forest where trees are large and grow close to each other
- This is a region of dense forest where old tribes and traditional tribal culture still exists. The Negritos of Malaysia, Pygmies of the Zaire Basin, and Indians of the Amazon Basin are important primitive groups. Shifting cultivation, in which forest land is cleared by cutting and burning, is still practised, and crops are grown there for a certain period, after which the land is left fallow. Now modern agricultural techniques are used in farming. Bananas, pineapples, and rice or paddy are widely grown in the region. Subsistence farming, in which farmers grow crops for their own requirements, is practised. Fast growing trees form a dense canopy that prevents much sunlight from reaching the forest floor. Many animals, birds and insects live under the canopy. In areas such as Indonesia, Malaysia, and Brunei, where minerals like petroleum and gas have been discovered, people are engaged in mining and other industrial activities. Malaysia has now become an important industrial country in the region. Singapore is a modern and important trade city. People there are now employed in industries, services, and business activities.
- evergreen
  - 3°C
  - tropical cyclones
- dense, heavy
  - mangrove
  - timber

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 82–84, *Oxford School Atlas for Pakistan*

**Teaching objective:**

- to explain to students the importance, characteristics and impact of rainforests

**Learning outcome:**

Students should be able to understand the significance and important features of rainforests

### Lesson 1

**Introduction (5 minutes)**

Introduce the region by defining rainforest, and providing climatic details for it. Give a brief introduction by showing students some pictures or video clips related to the rainforest region. Tell the students that each of these regions has its own characteristics that include climate, natural vegetation and human activity. Explain how all three are connected and that they will be comparing all the six regions on the basis of these characteristics.

**Explanation (30 minutes)**

Read and explain text. Stress on the locations (latitude), countries, temperature and climate, natural vegetation, people and lifestyles. Question students about what else they think would be different about each region because of their temperature and climate.

**Conclusion (5 mins)**

Summarise the lesson with reference to locations (latitude), countries belonging to that region, temperature and climate, natural vegetation, people and lifestyles.

**Classwork:** Questions 1–4 on page 84

**Homework:** Read and revise topic

## SECTION 3

### MONSOON REGION

**Teacher's focus:**

The monsoon region is of special importance to us as we live in this region. We live in the Indian monsoon region which is the most significant out of all other monsoon regions. It is characterized by hot, humid

weather and heavy rainfall during summers. Another important characteristic of the monsoon region is the seasonal change in winds. There are many other regions which have a monsoon climate as well.

In Asia, summer months are monsoon months, beginning from May till August. They are characterized by low pressure, changing winds, high levels of humidity in the atmosphere and heavy rainfall.

## Answer key

### Questions and Activities

1. Pakistan, India, Bangladesh, Sri Lanka, Myanmar, Thailand, Cambodia, Laos, Vietnam, South China
2.
  - i. Generally the monsoon region has warm, wet summers and the winters are mild and dry. In summer the countries in this region receive heavy rainfall due to the movement of the south-west trade winds, popularly called monsoon winds, which come from the oceans and carry copious amounts of moisture. The region receives rainfall mainly in the summer season. Cherrapunji in the Indian state of Assam is the wettest place in the world. Monsoon is crucial to life in many parts of the region. A year without the rains can result in famine, bringing death to humans and animals alike. The mean summer temperature in monsoon regions is about 30°C, and the mean winter temperature is about 18°C. In winter, the north-east trade winds also bring a small amount of rainfall to the region.
  - ii. Because of the heavy summer rainfall the region has an appreciable area of forest. The tropical monsoon forests contain many types of hardwood trees which are valuable in the timber industry. Teak, ironwood, and bamboo are the most important trees commercially. Areas where rainfall is relatively low have grassland
3.
  - i. rice
  - ii. summer
  - iii. 30°C
4.
  - i. summer, south-west trade winds
  - ii. Cherrapunji
  - iii. densely

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 85–87, *Oxford School Atlas for Pakistan*

**Teaching objective:**

- to explain to students the importance and characteristics of the monsoon region

**Learning outcome:**

Students should be able to understand the significance and important features of the monsoon region

## Lesson 1

### Introduction (5 minutes):

Introduce the definition of the monsoon region and its climatic characteristics. Give a brief introduction to the region by either showing students some pictures or video clips related to it.

### Explanation (30 minutes):

Read and explain text.

### Conclusion (5 minutes):

Summarise the lesson with reference to locations (latitude), countries belonging to the monsoon region, temperature and climate, natural vegetation, people and lifestyles.

**Classwork:** Questions 1–4 on page 87

**Homework:** Read and revise topic

## SECTION 4

### MEDITERRANEAN REGION

#### Teacher's focus:

The area along the Mediterranean Sea and on the same latitude in other parts of the world is known as the Mediterranean region and is one of the most fascinating regions of the world. It is characterized by mild winters and warm summers and a variety of crops like olives and citrus fruits.

Though the Mediterranean region is spread over different continents, all countries falling in this category have the following common characteristics:

- they are located between 32°N and 41°S of the Equator
- all regions are situated along oceans or the Mediterranean Sea
- they have cool sea breezes and moderate winter temperature
- low rainfall
- strong sun, warm to hot summers
- winters may be cool and mild
- they have rugged mountains running along the coast which regulates the climate along with the sea breeze.

## Answer key

### Questions and Activities

1.
  - i. Because of the influence of the sea, the Mediterranean region has mild winters and warm summers. The region receives rainfall in winter, while summers are dry. The westerly winds blowing over the region bring moisture from the ocean's surface causing winter rainfall. Summer temperatures average between 15 to 20°C, while winter temperatures are between 0° and 15°C. The region receives 300 to 1000 mm of rainfall annually. In summer there is little or no rain. The natural vegetation of the region comprises forest and shrubs. Forests are not dense and trees are not as tall as in the tropical rainforests. The leaves of many trees are small and glossy. Olive trees, vines, and fruit trees are of economic importance. Cedar and eucalyptus trees are important as they provide hardwood timber.
  - ii. Agriculture is the main activity of most people in this region. Besides olives and vines, the Mediterranean lands are famous for growing citrus fruits like oranges and lemons, and also melons, peaches, apricots, and nuts such as walnuts. Canning and jam-making are important industries based on fruit production. The wine industry is also important in the European countries of the region and in California, Australia, and South Africa. Wheat and barley are important crops. The Mediterranean region is also significant in minerals like marble, petroleum, copper, iron ore, etc. Some of the countries, such as Italy, Portugal, southern France, and California in the USA, are industrialized and highly developed.
2.
  - i. Spain and Portugal
  - ii. Between 15–20°C
  - iii. winter

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook page 88–89, *Oxford School Atlas for Pakistan*

**Teaching objective:**

- to explain to students the importance and characteristics of the Mediterranean region

**Learning outcome:**

Students should be able to understand the significance and important features of the Mediterranean region

## Lesson 1

**Introduction (5 minutes)**

Introduce the region by highlighting its characteristics. Give a brief introduction by either showing students some pictures or video clips related to that particular region.

## DISCOVERY 3

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#### Explanation (30 minutes)

Read and explain text. Compare with previous regions.

#### Conclusion (5 minutes)

Summarise the lesson with reference to locations (latitude), countries temperature and climate, natural vegetation, people and lifestyles.

**Classwork:** Questions 1–2 on page 89

**Homework:** Read and revise topic

# SECTION 5

## STEPPE REGION

### Teacher's focus:

Steppes are characterized by their arid climate and grassy vegetation. They are habitat to the world's most unique wildlife and grasses. They are actually grassy plains with few or no trees, are greener than deserts but browner than forests, i.e. in between the two. Temperature differences during the day and night, and winter and summer can vary drastically. Summers are usually hot and winters cold.

They are usually found in regions with temperate climate, between the tropics and Polar Regions. Steppes are categorized as cold and sub tropical steppes. Cold steppes are found in regions like USA, Turkey, Eastern Europe and Central Asian Republics. Sub tropical steppes are found in Australia, some desert areas and the region around the Mediterranean Sea.

### Answer key

#### Questions and Activities

1. They are all places where there is too little rain for trees to grow in great numbers. Instead, these lands are covered in grasses. These grasses can support high densities of grazing animals, such as zebra, antelope, and bison, which in turn support predators, such as lions.
2. The temperate grasslands were once the home of nomads who came with their animals in search of pastures. Nomadic settlements still exist in Central Asia and China. However, the region is identified as the major wheat-growing area of the world. Extensive commercial farming is practiced in the USA, Canada, Kazakhstan, Ukraine, Australia, and Argentina. The countries of this region are the leading producers and exporters of wheat and other grains. Because of the presence of grassland, animal rearing is another important economic activity, and the region is an important producer of livestock. A crop called alfalfa is grown as food for the large herds of cattle. The region has enormous mineral resources including coal, petroleum, and gas. A significant number of people are also employed in industries.

- |    |    |          |     |                |      |        |
|----|----|----------|-----|----------------|------|--------|
| 3. | i. | wheat    | ii. | low rainfall   | iii. | July   |
| 4. | i. | 350, 600 | ii. | animal rearing | iii. | pampas |

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook 90–92, *Oxford School Atlas for Pakistan*

**Teaching objective:**

- to explain to students the importance and characteristics of the steppe region

**Learning outcome:**

Students should be able to understand the significance and important features of the steppe region

## Lesson 1

**Introduction (5 minutes):**

Introduce the idea of steppes. Give a brief introduction to the region by either showing students some pictures or video clips related to that particular region.

**Explanation (30 minutes):**

Read and explain text. Compare with other regions.

**Conclusion (5 minutes):**

Summarise the lesson with reference to locations (latitude), countries belonging to that region, temperature and climate, natural vegetation, people and lifestyles. Revise the different names for steppes in various countries.

**Classwork:** Questions 1–4 on page 92

**Homework:** Read and revise topic

# SECTION 6

## DESERT REGION

**Teacher's focus:**

Deserts are the hottest regions of the world with drastic temperature differences during day and night. The

## DISCOVERY 3

### Teaching Guide

amount of rainfall is less than 250 mm and humans, animals and vegetation have adapted themselves to the climatic demands. Desert plants have flat broad leaves which are succulent and fleshy because they store water. They have long roots which allow them to draw water from deep down. A wide variety of cactus is found in deserts. People usually live in brick houses or tent shelters to keep them safe from the extreme temperatures of the day and night. Camels are the hardiest of all desert animals and are used for many purposes including transport, meat and skin.

## Answer key

### Questions and Activities

1.
  - i. The desert region receives very little rainfall, generally less than 250 mm per year. Summers are very hot in the hot desert region. The hottest places of the world, such as Azizia in Libya, Sibi and Jacobabad in Pakistan, and the Arabian Peninsula are located in this region: daily summer temperatures above 50°C have been recorded. The mean monthly temperature for July in the hot desert region is between 32° and 38°C. The tropical and subtropical locations of the region, and the absence of clouds for most of the year, can be said to be the main factors of this hot, dry climate. The winters are mild. The mean January temperature is about 15°C. The temperature pattern of temperate cool deserts is different from that of tropical hot deserts. Winter is severely cold and the temperature drops to below freezing. Summers are warm or hot; the average summer temperature varies between 18° and 32°C. The total annual rainfall is less than 250 mm. The natural vegetation of the temperate deserts comprises thorny bushes, cactus plants, and patches of short grass, dry herbs, and shrubs. Trees such as poplar, willow, and elm grow along the beds of rivers or around springs or lakes. The natural vegetation of tropical and subtropical deserts depends upon the amount of water. Thorny bushes and trees which have long roots survive in the dry environment of deserts. Trees like acacia, and arabica, locally called *babool*, are the most common and valuable trees in the deserts of Arabia, Africa, and Asia.
  - ii. Most of the areas of temperate and tropical deserts are barren, covered by sand dunes and a rocky, sandy surface. Nomadic tribes and nomadic lifestyle still prevail in the Sahara, Kalahari, Gobi, Arabian, and Asian deserts. Nomads are groups of animal herders who move from one place to another with their herds in search of grass and water. Nomads live in tents in the deserts. They rear sheep, goats, camels, horses, cows, etc. and sell them and their products, like milk, butter, ghee, and wool and skins in the cities and buy the items they need for daily use. In the deserts there are places where fresh water from springs or rivers is available. In some places where underground fresh water exists, it is used for irrigation.
2.
  - i. Between 32-38°C
  - ii. oil
  - iii. Mongolia
3.
  - i. thorny bushes, cacti and trees with long roots
  - ii. 15°C
  - iii. less than 250 mm

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 93–95, *Oxford School Atlas for Pakistan*

**Teaching objective:**

- to explain to students the importance and characteristics of the desert region

**Learning outcome:**

Students should be able to understand the significance and important features of the desert region

### Lesson 1

**Introduction (5 minutes):**

Students will have studied deserts in the previous lessons. Begin the lesson with a recap of the characteristics of deserts. Ask students what they remember. Remind them about landforms created by the wind—which landforms would they see in a desert?

**Explanation (30 minutes):**

Read and explain text. Stress on the locations (latitude), countries, temperature and climate, natural vegetation, people and lifestyles. Question students about what else they think would be different about deserts as compared to other regions because of their temperature and climate.

**Conclusion (5 minutes):**

Summarise the lesson with reference to locations (latitude), countries, temperature and climate, natural vegetation, people and lifestyles.

**Classwork:** Questions 1–3 on page 95–96

**Homework:** Read and revise topic.

## SECTION 7

### TUNDRA REGION

**Teacher's focus:**

The word tundra means treeless plain, and as the name suggests, the region is nothing more than a vast plain with no trees or vegetation on account of there being ice. Tundras are also characterized by freezing temperatures and low biodiversity on account of freezing temperatures.

## DISCOVERY 3

### Teaching Guide

Tundras are of two types: Arctic tundra and alpine tundras. Arctic tundras are found around the Arctic zone and are permanently covered with ice. Alpine tundras are found on or near the peaks of mountains covered with ice.

The fauna and flora of this region have adapted themselves to the climatic conditions of this region. Plants have short roots and the variety includes grasses and shrubs.

## Answer key

### Questions and Activities

1. i. The temperatures are too low to support tree growth.
2. i. Due to the long, harsh winter, no crops are grown so the people here live a nomadic life. Hunting and fishing are their main activities; they keep herds of reindeer for milk and meat, and use their skin and fur to keep warm. The Inuit were famous for their ice-block houses called igloos. The tundra region has enormous resources of minerals. Alaska is an important area for petroleum production in the USA. With the help of modern technology people in the tundra regions of Alaska, Canada, and Scandinavian countries of Iceland, Denmark, Sweden, Norway, etc. now live in permanent settlements of modern houses with all the basic facilities. They have electricity, heating systems, and modern communication.  
ii. Steppes, as the climate is suitable for cereals like wheat and other grasses.
3. i. Africa            ii. temperature
4. i. tundra            ii. treeless            iii. rainforest

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 97–99, *Oxford School Atlas for Pakistan*

**Teaching objective:**

- to explain to students the importance and characteristics of the tundra region

**Learning outcome:**

Students should be able to understand the significance and important features of the tundra region

## Lesson 1

**Introduction (5 minutes):**

Introduce the definition of the tundra region and its climatic features. Give a brief introduction to the region by either showing students some pictures or video clips related to it. Tell the students how unique this region is in terms of its climate, natural vegetation and human activity.

**Explanation (30 minutes):**

Read and explain text. Stress on the locations (latitude), countries, temperature and climate, natural vegetation, people and lifestyles. Question students about what else they think would be different about tundras because of their temperature and climate. Compare with previous regions.

**Conclusion (5 minutes):**

Summarise the lesson with reference to locations (latitude), countries, temperature and climate, natural vegetation, people and lifestyles.

**Classwork:** Questions 1–4 on page 99–100

**Homework:** Research task on page 100

**Activity:** This activity can be used as an introductory activity to support explanation of the text or as a reinforcement activity after the lesson.

1. Group work

Divide the class into pairs or groups of 3–5 depending on the number of students. Assign a region to each group and ask them to prepare write-ups on their group. They should be given a week to bring information for write-ups. Put up the charts on display boards. Have a class presentation for the information they bring.

2. Project display

Students can also make models of the regions for a project display. Encourage them to use recyclable material like cartons, washed tetrapak cartons, brown paper bags, play doh or plasticine.

# WORKSHEET 10

Date: \_\_\_\_\_

Name: \_\_\_\_\_

**1. Choose the correct word to complete each of the sentences below.**

- i. Areas with more than one common natural features are grouped together as (zones, areas, regions).
- ii. Ancient (Greek, Arab, Roman) geographers were the first to divide the Earth into three main regions.
- iii. The temperate region lies beyond the (polar, tropical, Mediterranean) region.
- iv. The areas beyond the Arctic and Antarctic circles form the (cold, warm, mid-winter) region.
- v. The monsoon region is the (most populated, hardly populated) region of the world.
- vi. Temperate grasslands are known as the (food basket, fruit basket, grass basket) of the world.
- vii. Desert regions receive less than (500, 400, 250) mm of rainfall annually.
- viii. The word tundra means treeless (valley, desert, plain).
- ix. The annual precipitation of tundras is 250 mm or (more, less).
- x. The Nevada desert is located in (China, Pakistan, USA).

**2. Answer the following questions:**

- i. Why does the Mediterranean region have mild winters and warm summers?

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- ii. Write all the different names for grasslands of the temperate regions with the name of the country.

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# Chapter 8

## The climate of Pakistan

### SECTION 1

### CLIMATE AND WEATHER

#### Teacher's focus:

Pakistan has a diverse climate ranging from mild to severe winters and summers; however it borders on being generally mild as compared to extreme weather and climatic conditions in other parts of the world. Pakistan lies in the monsoon region of the world, slightly north of the Equator in the northern hemisphere. There is a variety of land features and relief, including a coastline of roughly 1046 km, providing conditions for temperature variation, climatic conditions and precipitation. All these factors are conducive for agriculture. In addition, they affect the health, culture and lifestyle of the people of Pakistan.

#### Answer key

#### Questions and Activities

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1.
  - i. subtropical areas of Pakistan between 23.5° to 37° N
  - ii. arid with warm summer and mild winter
  - iii. western winds
  - iv. monsoon rains
  - v. eastern parts of Pakistan
2. Weather is the daily atmospheric conditions in a place, including the air temperature, air pressure, precipitation, humidity, wind speed, etc. Climate, on the other hand, refers to the average weather conditions of any place.

#### Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook 101–107, *Oxford School Atlas for Pakistan*

## DISCOVERY 3

### Teaching Guide

#### Teaching objectives:

To highlight:

- the difference between weather and climate
- the weather and climate of Pakistan
- the factors that regulate or determine Pakistan's weather and climate

#### Learning outcome:

Students should be able to understand:

- the difference between weather and climate
- the weather and climate of Pakistan
- the factors that regulate or determine Pakistan's weather and climate

## Lesson 1

### Introduction (5 minutes):

Begin the lesson by discussing the weather and climate of your city. Ask students the weather of the day; at that time, early in the morning, later on in the day. Ask what kind of weather the city had the previous day. Compare. Talk about the weather around the same time the previous year. Was it more or less the same?

### Explanation (30 minutes):

Read and explain text. Explain the difference between weather and climate. Revise seasons and solstices, done in previous lessons.

### Conclusion (5 minutes):

Sum up key points.

## Lesson 2

### Introduction (5 minutes):

Ask students to recall the factors that control the climate of any given place. Write them down on the board.

### Explanation (30 minutes):

Read and explain the text.

### Conclusion (5 minutes):

Sum up main points.

**Classwork:** Questions 1–2 on page 107

**Homework:** Read and revise text

## SECTION 2

# CLIMATIC REGIONS OF PAKISTAN

### Teacher's focus:

The location of a place on the Earth and its physical features often combine to create unusual environmental conditions. Based on these combinations, geographers have divided Pakistan into different local climatic zones. Cities in these zones or regions are grouped on common characteristics like rainfall, temperature, humidity etc. Each region has its own peculiar characteristics in addition to similarities with other cities. All of this affects human life—food, homes, dressing, trades and professions, economic activities, health etc.

### Answer key

#### Questions and Activities

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1.
  - i. Open question
  - ii. Sialkot: humid with hot summer and mild winter  
Karachi: arid with warm summer and mild winter  
Sibi: arid with hot summer and mild winter  
Murree: humid with warm summer and cool winter  
Peshawar: semi-arid with hot summer and mild winter  
Ormara: arid with warm summer and mild winter  
Quetta: arid with warm summer and cool winter  
Multan: arid with hot summer and mild winter
2.
  - i. The major part of Pakistan is arid. These areas receive less than 250 mm of rain annually. All of Sindh, the southern part of Punjab, and southern Balochistan lie in the arid zone.
  - ii. North eastern Punjab, including places like Sialkot and Jhelum.
  - iii. Climate affects human activities in many ways. People feel uncomfortable in extreme heat and cold. People's lives are seriously affected by hot and cold days. Despite technological developments and the use of artificial means of generating comfortable levels of temperature and humidity, such as air conditioners and heaters, the climate still affects human activities.
  - iv.
    - a. agriculture
    - b. agriculture

### Lesson plan

**No of lessons:** 2

**Duration:** 40 minutes

**Resources:** Textbook pages 108–113, *Oxford School Atlas for Pakistan*

## DISCOVERY 3

### Teaching Guide

#### Teaching objectives:

To familiarize students with:

- the climate of Pakistan and its local climatic regions
- the controlling factors of climate in Pakistan
- the different kinds of weather and climate experienced in Pakistan
- the effect of these conditions on the lives of people

#### Learning outcomes:

Students should be able to:

- describe the seasons and their salient features
- identify the climatic regions of Pakistan and their characteristics
- describe impacts of climatic conditions on human health and activities

## Lesson 1

#### Introduction (5 minutes):

Students should be asked to read the relevant pages from the text as class research for homework a day earlier. Ask short questions to check.

#### Explanation (30 minutes):

Read and explain from text.

#### Conclusion (5 minutes):

Sum up key points. Ask students how weather affects their daily activities and chores. Is it the same for summer and winter. Why?

## Lesson 2

#### Introduction (5 minutes):

Give instructions for classwork and homework tasks.

#### Written work (35 minutes):

**Classwork:** Questions 1–2 on page 113

**Homework:** Activities

# WORKSHEET 11

Date: \_\_\_\_\_

Name: \_\_\_\_\_

## 1. Choose the correct word to complete each of the sentences below.

- i. Weather is (daily, yearly, annual) atmospheric conditions of a place.
- ii. The (location, temperature, physical features) of any place in the world does not remain same throughout the year.
- iii. Most of Pakistan generally has a (dry, humid) climate.
- iv. Temperature in the tropical and subtropical location is generally high in summer because of the nearly (oval, horizontal, vertical) angle of the Sun's rays.
- v. Oceans and seas affect the coastal areas due to the development of (sea breeze, dryness, land locks).
- vi. Air temperature declines with increasing (pressure, height, humidity).
- vii. All of Sindh, the southern part of Punjab and southern Balochistan fall in the (humid, arid, wet) zone.
- viii. Thunderstorms form as a result of the (air, water, land) heating up.
- ix. Snow, rain and ice are known as (precipitation, climate, weather)
- x. Murree is the (driest, hottest, wettest) station of Pakistan.
- xi. At the height of (1000, 1500, 2000) m the winter temperature ranges between 0 to 5°C.

## 2. Answer the following questions:

- i. How are seasons different on or near the Equator, Tropical, and Subtropical regions and the Poles?

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- ii. Explain what happens in a solstice. Why are solstices important for seasons?

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- iii. Name and describe the factors that control the climate of Pakistan.

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## Chapter 9

# Neighbouring regions of Pakistan

## SECTION 1

### LOCATION OF PAKISTAN

#### Teacher's focus:

Pakistan lies in the northern hemisphere, slightly above the Equator. In addition to having a largely moderate climate and other geographical advantages, it has also been blessed with neighbours with similar cultures and values. Its other immediate neighbours are Afghanistan, Iran and China. More distant neighbours include Bangladesh, Nepal, the Middle East and Central Asia. Pakistan also shares historical perspectives with these countries. The progress of a nation, among other things, is also dependent on its ties with its neighbours and nations within the region.

#### Answer key

#### Questions and Activities

1.
  - i. Pakistan is located just above the Tropic of Cancer, in the eastern hemisphere. Its latitudinal extent is  $23.55^{\circ}\text{N}$  to  $37.05^{\circ}\text{N}$  and its longitudinal extent is  $60.5^{\circ}\text{E}$  to  $77.5^{\circ}\text{E}$ . Pakistan is surrounded by land on three sides. The Arabian Sea lies to the south and Pakistan has full access to sea routes throughout the year.
  - ii. India, Afghanistan, Iran, China

### Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 114–115, *Oxford School Atlas for Pakistan*

#### Teaching objectives:

To educate students about:

- the location and position of Pakistan in relation to its neighbouring countries and other countries in the region

- characteristics like landscape, economy, culture of countries in Pakistan's close contact and their comparison
- Pakistan's relationship with its different regions and countries of Asia

**Learning outcomes:**

Students should be able to:

- name the countries of each region, locate them on a map, and draw a sketch of each region
- describe the economic characteristics of each region
- examine the relationship between Pakistan and its neighbouring regions
- discuss the geographic setting and strategic importance of Pakistan and its adjoining regions

## Lesson 1

**Introduction (5 minutes):**

Ask students to locate Pakistan on the world map. Locate and mark its neighbouring countries. Highlight the region Pakistan falls in and name various countries.

**Explanation (30 minutes):**

Read and discuss text.

**Conclusion (5 minutes):**

Revise key points.

**Classwork:** Question 1 on page 115

**Homework:** Revise topic.

# SECTION 2

## SOUTH ASIA

**Teacher's focus:**

Pakistan is located in South Asia which is why all countries in this region are of special importance. Countries that share boundaries with Pakistan are Afghanistan, China, India, and Iran. These countries also have historic ties with Pakistan. Other regional neighbours include Bangladesh, Sri Lanka, Nepal and Bhutan. Pakistan relies on regional cooperation with all its neighbours and maintains good relations with them. Despite ideological differences based on religion, all these countries share a common culture and values, similar lifestyles, cuisines, and geographical factors. Floods are a natural disaster common to nearly all these countries. These countries are part of the Asian monsoon region.

## Answer key

### Questions and Activities

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1.
  - i. Pakistan, India, Bangladesh, Sri Lanka, Bhutan, Nepal, the Maldives
  - ii. South Asia is located in the tropical and subtropical regions. Except in the highlands, summer is hot and winter is pleasant across the region. In the highlands a long, frozen winter and a short, mild summer is generally observed. South Asia lies in the monsoon climate region and most of it receives heavy summer rainfall. Some of the wettest places in the world, like Assam and the Western Ghats, are located in India. The rainy season starts from June and ends in September, particularly in Bangladesh and India.
2.
  - i. Poverty is the major problem of the people of this region. The gross national per capita income is low compared to that in developed countries. For example, the GNI per capita of India is US\$3840, while the GNI per capita of Japan is US\$33,730. One of the main reasons for the low GNI per capita in India, Pakistan, and Bangladesh is their large populations.
  - ii. Agriculture is the backbone of the economy. Rice, wheat, cotton, tea, jute, and sugarcane are the major crops. Wheat and rice are staple foods of the people of this region. Tea is grown in Bangladesh, Sri Lanka, and India. Bangladesh is the leading country in the world in jute production. Pakistan and India are the main cotton growing countries in this region and the world. is rich in mineral resources and is a leading producer and exporter of iron ore, coal, mica, and other minerals. Pakistan, Bangladesh, and India also produce oil and gas but they are not self sufficient in energy resources. The industries of the region are mostly agro-based, cotton textile industries being the major ones. India and Pakistan produce good quality cotton. Cotton yarn and cotton cloth are major products. India has a strong industrial base as it has the raw materials required. Kolkata, Mumbai, and Chennai are major industrial bases in India, producing iron and steel products, machinery, vehicles, chemicals, and cotton, silk and synthetic textiles. India also has a strong information technology-based industry in Delhi, Bengaluru (Bangalore), and Hyderabad. Pakistan's economy depends on the cotton and textile industries. About 60 per cent of its exports are textile products. In addition, and on a smaller scale, there are steel- and iron-based industries. In Bangladesh, jute, paper, garments, and hosiery are the major industries. Tourism is the main source of income in Nepal. Each year hundreds of foreign tourists and mountaineers visit Nepal, which is home to Mt Everest and other Himalayan peaks.
  - iii. Pakistan is keen to develop good political and economic relationship with its neighbours. Unfortunately, because of historic conflicts, relationships with India, Bangladesh, and Afghanistan need to be improved. Pakistan and India fought three wars (1948, 1965, and 1971), the first two over the territorial claim on Kashmir. Indian intervention in the separation of East Pakistan and the creation of Bangladesh is a sore memory for Pakistan. Pakistan and India have to resolve the Kashmir dispute, and conflicts over water, Siachen, and Sir Creek, and work together for good economies, peace, culture, and the eradication of poverty from the region. Pakistan has accepted Bangladesh as a brother Muslim country and wants to develop a good economic and diplomatic relationship. Pakistan has been facing serious economic losses with the thirty-four-year-long conflict in Afghanistan. Pakistan supports a stable and democratic Afghanistan.

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 116–122, *Oxford School Atlas for Pakistan*

### Teaching objectives:

To educate students about:

- the location and position of Pakistan in relation to South Asia and its neighbouring countries in the region
- characteristics like landscape, economy, culture of countries in Pakistan's close contact, and their comparison
- Pakistan's relationship with the different regions and countries of South Asia

### Learning outcomes:

Students should be able to:

- name the countries of South Asia, locate them on a map, and draw a sketch of each region
- describe the economic characteristics of each country in the region
- examine the relationship between Pakistan and all its neighbours in the region
- discuss the geographic setting and strategic importance of Pakistan and its adjoining regions

## Lesson 1

### Introduction (5 minutes):

Ask students to locate the region on the world map in the *Oxford School Atlas for Pakistan*. Identify the countries in that region. Compare their location with Pakistan's location.

### Explanation (30 minutes):

Read and discuss text. Take each of the points of location, geographical features, economy, and culture and compare with that of Pakistan. Ask students to write down any similarities and differences that they can notice.

### Conclusion (5 minutes):

Revise key points.

**Classwork:** Activity on page 122

**Homework:** Questions 1–2 on page 122

## SECTION 3

### MIDDLE EAST

#### Teacher's focus:

The countries of the Middle East do not share borders with Pakistan but the entire region is of special importance to Pakistan because it is a Muslim dominated region. In addition, the Holy Kaaba is in Makkah, a city in the Kingdom of Saudi Arabia. The Middle East is a petroleum region and greatly influences Pakistan because of its interests in the country. Pakistan tries to establish and maintain healthy trade and diplomatic ties with all the countries. Countries of the Middle East (also known as the Gulf Countries or GCC countries) have financed many welfare projects in Pakistan which include mosques and hospitals. The government of Pakistan extends full support and hospitality to its Arab neighbours.

#### Answer key

#### Questions and Activities

1.
  - i. The Elburz and Zagros mountains in Iran, and the Pontus and Taurus mountains in Turkey are the main ranges in this region. The Anatolia plateau and Kurdish highlands are located in Turkey and northern Iraq.
  - ii. Saudi Arabia, Kuwait, Qatar, UAE, Oman
2.
  - i. The enormous wealth from petroleum and natural gas resources make the region very important in the world. Petroleum is the sole item produced and exported by several Middle Eastern countries where about 67 per cent of the world's reserves of petroleum are found. Saudi Arabia is the largest producer and exporter of petroleum in the region. Iran is the second largest oil producer and exporter. Kuwait, Qatar, the UAE, and Oman are other oil producers and exporters in the region. In the 1980s Iraq was one of the region's leading oil producers and exporters, but due to a long period of war in Iraq, its oil production has declined. The economy of Turkey does not depend on oil. Agriculture and industry are the two main components of its economy. Within the Middle East Turkey is ranked top in the production of many crops. Turkey is a member of the European Defence Alliance and NATO. Turkey and Iran are two countries which have forest and fishing industries. Turkey is rich in minerals like chromite, iron ore, and copper. The economy of Egypt depends on agriculture. Egypt is an important producer of cotton that is known for its fine quality. Raw cotton and cotton yarn and cloth are exported.
  - ii. The region is dominated by Muslims.
  - iii. The Middle East has long been a region of conflicts. Arabs and Israelis have fought three wars and have on-going territorial disputes: the issue of Palestine is still unresolved. Iran and Iraq fought a long war from 1980 to 1988 over the territorial dispute of Shatt-al-Arab. The most dangerous conflict emerged when Iraq invaded Kuwait in 1990 and as Iraqi pilots before mission in Iran a result the USA and its allies invaded Iraq and liberated Kuwait. In 2003, following the events of 9/11, the United States again invaded Iraq over the issue of

weapons of mass destruction. The civil and military conflict still continues in Iraq which has been almost destroyed by wars. Iran and the United States are in conflict over Iran's nuclear programme. A civil war is raging in Syria between the government forces and the armed rebel militias. Though there are many other conflicts in the Middle East, there is a general consensus that the major root cause of conflicts in the region is the Palestinian problem and the Arab-Israel conflict.

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 122–127, *Oxford School Atlas for Pakistan*

### Teaching objectives:

To educate students about:

- the location and position of Pakistan in relation to Middle East and other countries in the region
- characteristics like landscape, economy, culture of countries in Pakistan's close contact and their comparison
- Pakistan's relationship with its different regions and countries of the Middle East

### Learning outcomes:

Students should be able to:

- name the countries of the Middle East, locate them on a map and draw a sketch of each region
- describe the economic characteristics of the Middle East
- examine the relationship between Pakistan and the Middle East
- discuss the geographic setting and strategic importance of Pakistan and the Middle East

## Lesson 1

### Introduction (5 minutes):

Ask students to locate the region on the world map in the *Oxford School Atlas for Pakistan*. Identify the countries in the region. Compare their location with Pakistan's location.

### Explanation (30 minutes):

Read and discuss text. Take each of the points location, geographical features, economy, and culture and compare with that of Pakistan. Ask students to write down any similarities and differences that they can notice.

### Conclusion (5 minutes):

Revise key points.

**Classwork:** Question 1 on page 127

**Homework:** Question 2 on page 127

## SECTION 4

# CENTRAL ASIA

### Teacher's focus

Central Asia has great importance for Pakistan not only geographically but also because of shared history from ancient times. Central Asian countries include Kyrgyzstan, Turkmenistan, Uzbekistan and Tajikistan.

#### Answer key

#### Questions and Activities

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1.
  - i. Kazakhstan, Tajikistan, Turkmenistan, Kyrgyzstan, and Uzbekistan
  - ii. Islam is the religion of the majority of the population. Christianity and Judaism are also practised. The long rule of communist Russia has changed the society of the Central Asian Republics. Russians make up about 22 per cent of the population of Kazakhstan. Turkish, Persian, Chinese, and Russian languages are spoken in the region
2.
  - i. Central Asia is rich in mineral resources. Tajikistan, Turkmenistan, and Kazakhstan are rich in oil and gas reserves. However, their energy resources are not fully utilized because of Russia's influence in the region and the war in Afghanistan.
  - ii. Much of the Central Asian region has a dry climate. The region receives less than 250 mm of rain. Extreme desert conditions prevail in most of the area. Summer is hot, while around the Caspian Sea it is pleasant. Winter is severe in the region.

### Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 127–131, *Oxford School Atlas for Pakistan*

#### Teaching objectives

To educate students about:

- the location and position of Pakistan in relation to Central Asia and other regions
- characteristics like landscape, economy, culture of countries in Central Asia with that of Pakistan
- Pakistan's relationship with Central Asia

## Learning outcomes

Students should be able to:

- name the countries of Central Asia, locate them on a map, and draw a sketch of each region
- describe the economic characteristics of Central Asia
- examine the relationship between Pakistan and Central Asia
- discuss the geographic setting and strategic importance of Pakistan and Central Asia

## Lesson 1

### Introduction (5 minutes):

Ask students to locate Central Asia on the world map in the *Oxford School Atlas for Pakistan*. Identify the countries in that region. Compare their location with Pakistan's location.

### Explanation (30 minutes):

Read and discuss text. Compare each of the points location, geographical features, economy, and culture with that of Pakistan. Ask students to write down any similarities and differences that they can notice.

### Conclusion (5 minutes):

Revise key points.

**Classwork:** Activities on page 131

**Homework:** Questions 1–2 on page 131

# SECTION 5

## CHINA

### Teacher's focus

China is Pakistan's long time friend and ally in all matters. The Karakoram Highway or Silk Route is a highway built by Pak-China collaboration. It connects Pakistan to China through the Karakoram Mountains. Pakistan looks towards China in matters of regional cooperation, financing of development and other high-level projects and the exchange and transfer of technology. There is a general feeling of goodwill between the people of both countries. Chinese food is an important part of Pakistani culture, especially in urban settlements and cities. Many Chinese immigrants live in Pakistan as permanent settlers.

## Answer key

### Questions and Activities

1.
  - i. The rapid decrease of population growth has been because of the strict birth control policy of the government, known as the single child per couple policy, which was promulgated in 1979.
  - ii. Yangtze and the Yellow River
  - iii. It is a powerful member of the UN and a permanent member of the Security Council. It holds the United Nations' veto power.
2.
  - i. The Chinese economy is multidimensional and the peasant economy is mixed with the modern urban economy. A programme for fundamental reform of the urban economy was introduced in 1985. State control was reduced, private entrepreneurs were encouraged, and a market economy was introduced. The new power policy provides energy to industry at low rates which make industrial products highly competitive in the world market. As a result, the economy has grown at the rate of 9 per cent during the last two decades.
  - ii. China and Pakistan have important strategic, military, and economic relationships. Pakistan was one of the countries that developed a relationship with China in 1950 when China was declared an independent communist republic, separate from Taiwan. China is the most reliable strategic partner of Pakistan and has played a very important role in the economy of Pakistan. China is helping Pakistan in the fields of energy, agriculture, and technology. Pakistan has a very strong military relationship with China. Both China and Pakistan believe in world peace. The peoples of Pakistan and China share many common cultural values.

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 132–136, *Oxford School Atlas for Pakistan*

### Teaching objectives:

To educate students about:

- the location and position of Pakistan in relation to China
- characteristics like landscape, economy, culture of China and comparison with Pakistan
- Pakistan's relationship with its different regions and countries of Asia

### Learning outcomes:

Students should be able to:

- locate China on a map
- describe the economic characteristics of China

- examine the relationship between Pakistan and China
- discuss the geographic setting and strategic importance of Pakistan and China

## Lesson 1

### Introduction (5 minutes):

Ask students to locate China on the world map in the *Oxford School Atlas for Pakistan*. Compare China's location with Pakistan's location.

### Explanation (30 minutes):

Read and discuss text. Take each of the points location, geographical features, economy, and culture and compare with that of Pakistan. Ask students to write down any similarities and differences that they can notice.

### Conclusion (5 minutes):

Revise key points.

**Classwork:** Questions 1–2 on page 136

**Homework:** Activities on page 136

# WORKSHEET 12

Date: \_\_\_\_\_

Name: \_\_\_\_\_

**1. Choose the correct word to complete each of the sentences below.**

- i. Pakistan is located just above the (Tropic of Cancer, Tropic of Capricorn, Equator) in the (eastern, western) hemisphere.
- ii. The (Karakoram, National, Super) Highway links Pakistan to China.
- iii. Pakistan is located in (North, South, East) Asia.
- iv. The Ganges river also originates from the (Himalayas, Hindukush, Karakoram) and joins River (Jamuna, Saraswati, Brahmaputra) in Bangladesh.
- v. The second most populated country in the South East region is (Bangladesh, China, India).
- vi. The backbone of economy in South Asia is (agriculture, industries, mining).
- vii. South Asia is divided into (two, three, five) major cultural groups.
- viii. The cradle of ancient civilizations is (Far East, Middle East, China).
- ix. Pontus and Tauros mountains are located in (Iran, Turkey, Iraq).
- x. Population distribution in the Middle East is very (high, low, uneven).

**2. Answer the following questions:**

- i. Comment on the relief of South Asia.

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- ii. What is the chief characteristic common to the Karakoram, Himalayas and Hindu Kush ranges?

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- iii. Name some important major rivers in the Indian Peninsula.

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- iv. Comment on the population of South Asia.

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# Chapter 10

## Problems of underdevelopment

### SECTION 1

### DEVELOPED AND UNDERDEVELOPED NATIONS

#### Teacher's focus:

Underdevelopment is a term used to compare regions and countries on the basis of economic, human and political progress. The economic factors that decide the categorization of a nation as developed or underdeveloped are bank reserves, economic growth, Gross National Income per person, inflation, unemployment, trade balance, exports and other sources of earnings. Human development and advancement is measured in terms of the availability of basic services like health and sanitation, land and housing, water, law and order, legal system and justice etc. Political wellbeing depends on the system of governance, good ruling, stability, defence at borders against external threats, safety against internal threats etc. Technological advancement is also another factor that determines a country's position. All these factors, when combined, bring about the peace and prosperity that is needed for development.

#### Answer key

#### Questions and Activities

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1.
  - i. USA, UK, Japan, Germany, France
  - ii. Pakistan, India, Sudan, Somalia, Bangladesh
2.
  - i. When countries do not earn enough money to provide basic services to the entire population, and the average citizen has little money to spend on health, education, food, and other necessities, there is hardly any development.
  - ii. Lack of education, regional conflicts, a poor economy, and unstable governments are the main causes of underdevelopment.
  - iii. The explosive population growth in most of the underdeveloped countries is the root cause of many economic and social problems. There are more mouths to feed than there are resources: the population becomes a burden on the economy. The majority of the people have no access to good education, good health facilities, clean drinking water, sanitation, etc. The enrolment of children in schools at primary level is still below 20 per cent in countries like Afghanistan, Somalia, and Niger. The school drop-out rate is quite high. The numbers of qualified professionals are too low to meet the countries' demands.

## DISCOVERY 3

### Teaching Guide

- iv. Growing poverty in the underdeveloped region has been a serious concern for the world's economists and planners. The average income in rich countries is thirty-seven times more than the average income in poor countries. The per capita income in underdeveloped countries is far below that in developed countries. In Mali, India, Pakistan, Bangladesh, and Ethiopia, about two-thirds of the population lives below the poverty line. The daily income per person is US \$2 or less. Crop failures, energy crises, lack of trained people, a weak industrial infrastructure, high inflation, foreign debt, unemployment, and political instability are the main causes of economic problems.

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 137–143, *Oxford School Atlas for Pakistan*

### Teaching objectives:

- to create awareness about the concept of development and underdevelopment
- to highlight the differences between developed and underdeveloped nations and their characteristics, problems and solutions

### Learning outcomes:

Students should be able to:

- differentiate between development and underdevelopment
- identify the geographic features that promote development
- discuss the economic, social and political problems of underdeveloped countries

## Lesson 1

### Introduction (5 minutes):

If possible, show the students pictures or video clips of rich and poor countries. Ask them how underdeveloped and developed countries are categorized. Write relevant answers on the board.

### Explanation (30 minutes):

Read and explain text. Explain the difference between developed and underdeveloped countries. Highlight countries from both regions. Talk about the factors that bring about development.

### Conclusion (5 minutes):

Wrap up lesson by summarizing key points.

**Classwork:** Question 1–2 on page 143

**Homework:** Activities on page 143

## SECTION 2

### POLITICAL PROBLEMS

#### Teacher's focus:

Many countries endowed with diverse physical and human resources often remain underdeveloped if their political situation is weak. Wars, internal conflicts, border and territorial disputes and civil wars are some factors that weaken the position of any nation and become its barrier to its progress and development. The system of governance is another determinant of political stability in a country. It is a general view that democracy or a system of elected civilian government is a better form of rule as compared to an autocratic or dictatorial form of government in which a person or a group of people come to power, usually by force. Nepotism or choosing people from the same family or circle to positions of power without merit is another kind of political problem that leads to the weakening of a country.

#### Answer key

#### Questions and Activities

1.
  - i. Democracy, in which people exercise their right to vote, is generally considered to be the best form of government.
  - ii. Military and civilian dictatorships
  - iii. Afghanistan, Iraq, Syria, Palestine
  - iv. Liberia, Sierra Leone, South Sudan

#### Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 144–145, *Oxford School Atlas for Pakistan*

#### Teaching objectives:

To explain

- what politics, wars, territorial conflicts and civil wars are
- the impact of the political situation on a place, its people, and their lives

#### Learning outcomes

Students should be able to understand:

- what politics, wars, territorial conflicts and civil wars are
- the impact of the political situation on a place, its people, and their lives

## Lesson 1

### Introduction (5 minutes):

Discuss the political and law and order situation of Pakistan—political rallies and protest marches, strikes and shut downs, terrorism, street crime etc. Make a list on the board. Ask students how they and people around them are affected by it.

### Explanation (30 minutes):

Read and explain text. Refer to the example of Pakistan and other countries whose underdevelopment is largely due to the political situation.

### Conclusion (5 minutes):

Review points. Ask students to come up with solutions.

**Classwork:** Question 1 on page 145

**Homework:** Activity page 145

## SECTION 3

# PROBLEMS AND CAUSES OF UNDERDEVELOPMENT IN PAKISTAN

### Teacher's focus:

Pakistan is a potentially rich country, with a variety of human and natural resources. Its geographic location and physical features (especially its mountain and river systems) give it a unique place in the world. However, its political problems and lack of stability affect its growth and development. There are many reasons for this underdevelopment, most of which are a result of poverty and bad governance.

### Answer key

#### Questions and Activities

1. i. Due to conflict with India over Kashmir, Pakistan has had to fight two wars. A third war was fought over India-aided secessionist war in East Pakistan. Similarly, due to the conflict in Afghanistan, and as a partner of American's war against terrorism, Pakistan has suffered many deaths of both its citizens and soldiers. This situation has exerted immense pressure on the weak economy of Pakistan. Pakistan is the sixth most-populous country in the world. The high growth rate of the population is one of the main reasons for poverty in the country. The level of education in Pakistan is very poor. Only 40 per cent of school-age children go to school. The energy shortage is a serious problem facing the country. It has adversely

affected industrial growth and foreign investment. Pakistan has a huge burden of foreign and internal debt. An overwhelming portion of the budget goes into debt servicing which leaves very little for the development sector. The vast majority of the population lives in villages which lack good health centres, good schools, clean drinking water, etc. Due to increased taxes and inflation, ordinary people find it difficult to make ends meet. Pakistan often suffers natural calamities such as the 2005 earthquake, and the floods of 2010 and 2011, which affected its people and the economy.

- ii. Pakistan has a huge amount of foreign and internal debt. An overwhelming portion of the budget goes into debt servicing, which leaves very little for the development sector.
- iii. Lack of good health centres, good schools, clean drinking water, sanitation. etc.
- iv. floods and earthquakes

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook pages 145–148, *Oxford School Atlas for Pakistan*

**Teaching objective:**

- to make students aware of the factors responsible for Pakistan’s underdevelopment

**Learning outcome:**

Students should be able to identify, understand and analyse the causes behind Pakistan’s underdeveloped state and look at solutions for this problem

## Lesson 1

**Introduction (5 minutes):**

Recap points from previous class. Talk about the current situation in Pakistan. Write down the points/problems on the board.

**Explanation (30 minutes):**

Read and explain text.

**Conclusion (5 minutes):**

Ask students for suggestions for improvement. Discuss how we, as individuals, can contribute towards a stable and developed Pakistan.

**Classwork:** Question 1 on page 148

**Homework:** Activity on page 148

# WORKSHEET 13

Date: \_\_\_\_\_

Name: \_\_\_\_\_

## Research

1. Discuss the responsibility of each of the following members of a Pakistani society to bring about development in Pakistan.

teacher

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common man

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head of state

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policeman

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soldier

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businessman

---

---

doctor

---

---

government servant

---

---

shopkeeper

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engineer

---

---

town planner

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---

volunteer worker

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---

religious leader

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**2. Choose the correct word to complete each of the sentences below.**

- i. The rich countries are generally known as (developed, progressive, high-tech) regions.
- ii. The majority of the countries of the world lie in the (developing, developed, underdeveloped) region.
- iii. Growing (illiteracy, poverty, technological development) have been a most serious issue for the worlds economists and planners.
- iv. In countries like Pakistan, India, Bangladesh, Mali etc, about (one fourth, half, two-thirds) of the population lives below the poverty line.
- v. About (840, 1000, 1250) million people in underdeveloped countries are undernourished.

- vi. HIV is a serious threat in African countries like (Zaire, Nigeria, Botswana).
- vii. In addition to other problems, Pakistan's worst problem at the moment is (poverty, terrorism, lack of water).
- viii. Human rights are the (social, economic, basic) rights that all human beings should enjoy without discrimination.
- ix. Growing poverty and the (gap, friendship, negotiations) between the rich and the poor are the major challenges in the underdeveloped region.
- x. The enrolment of children in schools at primary level is still below (10, 15, 20) per cent in countries like Afghanistan, Somalia, and Niger.

**3. Fill in the blanks.**

- i. Child labour is the result of \_\_\_\_\_ and \_\_\_\_\_.
- ii. Malnutrition and \_\_\_\_\_ are big challenges for African countries.
- iii. Social and gender \_\_\_\_\_ are most serious social problems in underdeveloped countries.
- iv. About \_\_\_\_\_ per cent of the world's population lives in the underdeveloped region.

**4. Compare the following:**

- i. developed and underdeveloped countries on the basis of factors of development

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- ii. infant death rates in England and Afghanistan

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# Chapter 11

## Introduction to modern techniques in geography

### SECTION 1

#### THE WORK OF GEOGRAPHERS

##### Teacher's focus:

Technological advancements in geography are considered to be one of the most important tools for a developed nation. They are vital in the study of the Earth, its features and phenomena, and provide solutions to many problems. Such studies and information are crucial for the survival and advancement of a nation.

Modern techniques and tools include GPS, GIS and computer modelling. Their use is being perfected and implemented over time. More and more geographers are being made aware of such helpful tools for help with predicting and planning as well as forecasting. In addition, these can also help in trouble shooting and solution of problems related to geography. Governments of developed countries have organizations that are working day and night to come up with more technological advancements in this field.

##### Answer key

##### Questions and Activities

1.
  - i. remote sensing, Global Positioning System (GPS), Geographic Information System, (GIS), and computer modelling
  - ii. Geographers use imaginary coordinates of latitude and longitude to express location. The imaginary coordinates are linked to satellites through an electronic instrument called the Global Positioning System (GPS).
  - iii. data related to the Earth's surface
  - iv. computer hardware, computer software, spatial data, people
  - v. The French satellites
2.
  - i. Data collected by geographers has many practical applications. For instance, meteorologists use the data to predict the weather, which is useful for the aviation and shipping industries.

## DISCOVERY 3

### Teaching Guide

- ii. Geographers draw maps for different factors such as crop production, soil, irrigation, water logging and salinity, drainage, etc. These maps are layered on top of each other to study and identify the areas of low yield crop production and find out the possible causes, whether this was a problem of soil type, salinity, or something else. Now this analysis can be done on a large scale using GIS software. By using the stored spatial data of soil characteristics, water logging, salinity, drainage, topography, etc., different thematic maps are prepared and examined in the form of layers.
- iii. Cars, buses, aeroplanes, trains, etc. rapidly change their positions. GPS is very useful in determining the location of these mobile objects and monitoring their movements. GPS is used in wildlife management, to locate wild animals. Geographers use GPS not only to find out the latitude and longitude of places, but also in surveying and making maps.
- iv. Remote sensing is a technology through which spatial data and images of the Earth are obtained through satellites. Remote sensors on satellites and aircraft sense a broader range of wavelengths than can be seen by the human eye. Our eyes are one of the important sensors which observe things and record spatial data, but they see only visible light and cannot see infrared and ultraviolet light. Infrared light enables night vision. To see objects at night or in the dark, different cameras are used to take photographs and to see objects which cannot be seen by the naked human eye. These cameras are fixed on aircraft and artificial satellites.
- v. A beam of light is emitted from the satellite to the Earth's surface, and is then reflected back to the satellite with recorded information about the Earth's surface. The United States Space Research Organization, NASA, sent several imaging radar systems into orbit on Space Shuttles. They are useful in the study of oceans, landforms, geology, terrain, cloud darkness, ozone, weather, earthquakes, volcanic eruptions, etc.

## Lesson plan

**No of lessons:** 1

**Duration:** 40 minutes

**Resources:** Textbook 149–156, *Oxford School Atlas for Pakistan*

### Teaching objective:

- to update students about the latest developments in technology and their application for geographical purposes

### Learning outcomes:

Students should be able to:

- describe the main types and features of modern technology in geography
- learn about satellites, satellite imagery and aerial photographs
- discuss the use of computers in geography
- explain the utility and scope of modern study tools in geography

## Lesson 1

### Introduction (5 minutes):

A good way to introduce the lesson would be by bringing in a cell phone with a weather application that shows the weather forecast for the day. Ask students how having such a forecast handy at all times can help people in their daily lives. Tell them about times when this technology and such gadgets were not available and people had no idea when heavy showers, storms, earthquakes, etc would occur.

### Explanation (30 minutes):

Read and explain the text. Focus on each kind of technology and explain its merits and demerits.

### Conclusion (5 minutes):

Ask for student feedback and ideas on the use of modern technology. Revise key concepts.

**Classwork:** Question 1 on page 158

**Homework:** Activity page 156

**Activity:** Report

- a) Find out who a geoscientist is and what they do.
- b) If you were a geoscientist, what inventions would you like to be able to invent for helping out mankind in times of natural disasters? Make a report. Mention the name of the disaster, what kind of technology would you like to develop, and how you can minimize damage and maximize resources?

# WORKSHEET 14

Date: \_\_\_\_\_

Name: \_\_\_\_\_

**1. Choose the correct word to complete each of the sentences below.**

- i. Geographers collect spatial data from field and ground (features, studies, surveys).
- ii. Remote sensing is a technology through which spatial data and images of Earth are obtained through (satellites, photographs, infra red rays).
- iii. Remote sensors can sense a broader range of (perspectives, data, wavelengths).
- iv. Our (computers, eyes, radars) are one of the most important sensors which observes and records spatial data.
- v. Infrared light provides night (protection, vision, sensors).
- vi. Digital cameras fitted in satellite take pictures of the Earth in the form of (photographs, sketches, images).
- vii. Active remote sensing works on the principal of (radar, geography, computers).
- viii. The United States Space Research Organization is called (USSRO, NASA, Aerospace).
- ix. Cars and other vehicles can be tracked down with (GIS, GPS, GRS).
- x. GPS is also used to locate (places, satellites, maps).

**2. Answer the following questions:**

- i. a. Why do geographers study the features of the Earth's surface and different phenomena?

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- b. What do they do to analyse the cause and effect of problems?

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ii. Explain the use of infrared rays.

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iii. a. How does Passive Remote Sensing work?

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b. What are its purposes/uses?

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iv. Why are countries like Pakistan not able to enjoy the benefits of GIS? Explain your answer with reference to the principles of GIS.

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# Answer key for worksheets

## Worksheet 1

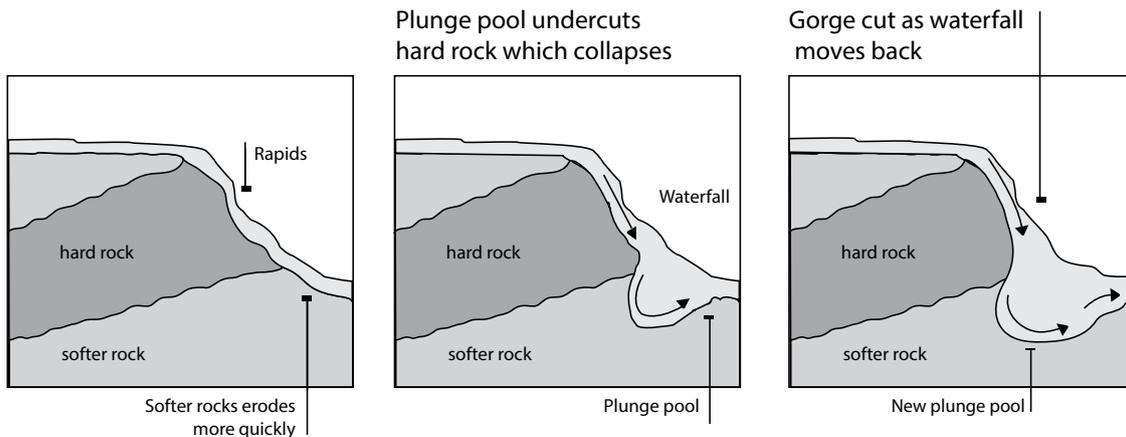
1. i. visual                      ii. scale                      iii. quantitative              iv. distribution  
v. dot maps                    vi. geometric                vii. variation                viii. divided circle  
ix. 360                        x. bar
2. i. numerical                ii. x, y                      iii. key or legend
3. i. dot map                    ii. bar graph                iii. pie chart                iv. population circles map  
v. thematic map

## Worksheet 2

1. i. mountains                ii. mouth, source            iii. velocity                iv. deposition  
v. energy                      vi. in the mountainous regions            vii. valley  
viii. gorges                    ix. dams                      x. lake
2. i. false                      ii. true                      iii. true                      iv. false  
v. true
3. i. delta                      ii. alluvial fan                iii. meander                iv. oxbow lake

## Worksheet 3

1. Water that falls or drops vertically from a height. An erosional feature found in the mountain stage of a river.
2. Formed in areas where hard and soft rock in mountains occur as alternating layers. Water flows with great velocity (rapids). If it comes into contact with a layer of soft rock, it gets eroded and the hard resistant rock is exposed. It forms a ledge over which the river or stream falls vertically. Undercutting also helps the process.
3. A cavity or depression created at the base of a waterfall as a result of the pressure of water falling on rock and erosion due to pebbles and gravel swirling around in circular motion.
- 4.



5. Angels Falls in Venezuela, highest uninterrupted waterfall  
 Huangguoshu Waterfall in Anshun, Guizhou, China. It is the largest waterfall in East Asia.  
 Iguazu Falls on the Argentina-Brazil border.  
 James Bruce Falls in British Columbia, Canada.  
 Jiao Lung Waterfall in Alishan, Chiayi, Taiwan. It is the tallest waterfall in East Asia  
 Niagara Falls are the widest and most powerful falls in North America on the border of Canada and USA.  
 Tugela Falls is the world's second tallest at 947 m in KwaZulu-Natal province, Republic of South Africa.  
 Venta Rapid in Latvia  
 Victoria Falls, on the Zambezi river along the border between Zimbabwe and Zambia, one of the largest waterfalls in the world.  
 Yosemite Falls, tallest waterfall in North America and sixth tallest in the world, located in Yosemite National Park, California, United States.  
 Yumbilla Falls, world's fifth tallest, located in Peru.

### Worksheet 4

1. i. ice                      ii. continental              iii. alpine                      iv. cirque  
     v. glacial                  vi. till                          vii. roses
2. i. striations              ii. grooves                      iii. horn                          iv. arête  
     v. Siachen

### Worksheet 5

1. i. deserts                  ii. 25                              iii. pebbles and cobbles  
     iv. playa lakes          v. sandblasting
2. i. the loose particles of sand into the air or rolls then along the ground.  
     ii. there are few plants to hold the soil in place.  
     iii. by removing and transporting loose soil.  
     iv. on a dune's windward face and slips down its leeward side.
3. There is no point in leaving such trails because they will be blown away. When winds blow in a desert, they lift and carry away any loose material on the ground.

### Worksheet 6

1. i. water                      ii. height                      iii. seawater                      iv. soft  
     v. bays                          vi. breakwaters                  vii. *bajada*
2. i. gorge                          ii. glacier                          iii. erosional                      iv. wind, depositional  
     v. depositional              vi. glacier                          vii. erosional, glacier              viii. erosional  
     ix. waves

### Worksheet 7

1. i. largest                      ii. Antarctic                      iii. indentation                      iv. peninsula  
     v. moon                          vi. quarter                          vii. bulges
2. i. true                              ii. false                              iii. true                              iv. false
3. Diagrams from book

## Worksheet 8

1. i. Mayon, 40                      ii. suddenly                      iii. mountain slopes  
iv. toxic                      v. 1100                      vi. short                      vii. twisters  
viii. 500, 3                      ix. Antarctica                      x. USA                      xi. Tornado Alley  
xii. land sliding                      xiii. expansion                      xiv. dryness                      xv. uncontrolled

## Worksheet 9

1. i. invisible                      ii. pmp                      iii. atmosphere                      iv. smog  
v. concentration                      vi. lead                      vii. contaminated                      viii. rural  
ix. logging                      x. 1.5-4.5

## Worksheet 10

1. i. regions                      ii. Greek                      iii. tropical                      iv. cold  
v. most populated                      vi. food basket                      vii. 250                      viii. plain  
ix. less                      x. USA
2. i. Because of the influence of the sea.  
ii. Central Asia, China, Russia and Ukraine: steppes, Argentina and Uruguay: pampas, South Africa: veldt, Australia: downs.

## Worksheet 11

1. i. daily                      ii. temperature                      iii. dry                      iv. horizontal  
v. sea breeze                      vi. height                      vii. arid                      viii. land  
ix. precipitation                      x. wettest                      xi. 1500
2. i. The temperature in any place in the world does not remain the same throughout the year. Summer and winter are the two main seasons, summer being a period of heat and high temperatures, and winter a time of coolness and low temperatures. The Equator has a prolonged summer but no winter. Similarly, the Polar Regions have long, severe winters and summer is either very short or does not exist. Spring and autumn are the two other seasons; spring comes after winter, and autumn arrives after summer; temperatures are mild in both seasons. The subtropical and temperate regions enjoy the four seasons of winter, spring, summer, and autumn. In general, November to February are winter months, March to April are the months of spring, May to early September are summer months, and late September to November are the months of autumn.  
ii. Changes of season and the occurrence of summer and winter depend upon two natural factors. The Earth revolves around the Sun and it completes one revolution in about 365 days and the axis of the Earth is not vertical; it is tilted at about 22.5°. During the movement of Earth around the Sun, on 22 June, the Sun's rays are vertical over the Tropic of Cancer, and the northern hemisphere is tilted towards the Sun while the southern hemisphere is tilted away from the Sun. This means that temperatures are high in the northern hemisphere and it is summer. Temperatures in the southern hemisphere are low and it is winter there. The situation is reversed on 22 December when the Sun's rays are vertical at the Tropic of Capricorn, the southern hemisphere is tilted towards the Sun and the northern hemisphere is tilted away from the Sun. On 21 March and 23 September the Sun's rays are vertical at the Equator: therefore mild temperatures prevail in both hemispheres.  
iii. Temperature and rainfall are two factors that determine climate. In Pakistan the characteristics of these two factors or elements differ from one area to another. The temperature in the tropical and

subtropical locations is generally high in summer because they receive nearly-vertical sunrays. Thus, the subtropical location of Pakistan, which is approximately 23.5° to 37°N tends to result in hot summers. The highest temperature ever recorded in Pakistan is 53.7°C which was recorded in Mohenjo-daro, Sindh on 26 May 2010. Oceans and seas affect the temperature of the coastal areas due to the development of sea breezes. The oceanic influence of the Arabian Sea keeps the temperature of coastal areas of Pakistan low. Air temperature declines with increasing height. Therefore in the high mountains in the west and north the temperature stays as low as freezing point. Rainfall in Pakistan varies. Most areas of Pakistan are dry. Monsoon winds bring rainfall in summer, from July to September, to the eastern part of Pakistan. In winter, the western winds bring rainfall to the western part of Pakistan. From May to June, and October to November, thunderstorms cause rainfall in the north and centre of the country. On the basis of the amount of rainfall, areas of Pakistan are classified as arid, semi-arid, and humid regions. The major part of Pakistan is arid. These areas receive less than 250 mm of rain annually. All of Sindh, the southern part of Punjab, and southern Balochistan lie in the arid zone. The semi-arid areas cover northern Balochistan, a large part of northern Punjab, and the major part of Khyber Pakhtunkhwa. The annual rainfall in these areas ranges from 250 mm to 750 mm. Gilgit and Skardu in Gilgit-Baltistan in the north receive less than 250 mm of rainfall, but due to low temperatures, the soil is not as dry as in the high-temperature areas of Sindh and Punjab. Therefore they are classified as semi-arid areas. A humid climate prevails in a small part of Pakistan which is a strip of north-eastern Punjab comprising Murree, and adjoining parts of Khyber Pakhtunkhwa, Kaghan, Naran, and Nathiagali. A small area around Parachinar in the tribal area also has a humid climate. The region receives more than 750 mm rainfall, roughly between 751 mm and 1200 mm.

## Worksheet 12

1. i. Equator, eastern    ii. Karakoram    iii. South    iv. Himalayas, Brahmaputra  
v. India    vi. agriculture    vii. two    viii. Middle East  
ix. Turkey    x. uneven
2. i. The relief of South Asia is dominated by mountains, plateaus, deserts, and fertile river plains. The mountains of the Himalayan system, formed around 30 to 35 million years ago, are located in the north, east, and west of India-Pakistan. The three main ranges are the Himalayas, Karakoram, and Hindu Kush. The height of these mountains ranges from 4000 to over 8000 m. The highest peak in the world, Mount Everest (8848 m), is located in the Himalayas. The countries of Nepal and Bhutan are located in the Himalayan mountain region. The mountainous north is ice-capped all year long. There are many large glaciers in this region, and several major rivers originate here. The Rivers Indus and Ganges are two of the main rivers of the region that originate in this area.  
ii. The height of these mountains ranges from 4000 to over 8000 m.  
iii. Ganges, Brahmaputra, Krishna, Kauveri, Godavari, and Tapti.  
iv. South Asia is among the most densely-populated regions of the world. After China, India is the second most-populated country in the world. Its population in 2013 was 1675 million, and it is expected to overtake China by 2050. Pakistan, with its population of 186 million, is sixth in the table, and Bangladesh, with 154 million, is the seventh most-populated country in the world.

## Worksheet 13

1. Open question; mark students on sensibility and correctness
2. i. developed    ii. underdeveloped    iii. poverty  
iv. two-thirds    v. 840    vi. Botswana    vii. terrorism

## DISCOVERY 3

### Teaching Guide

- viii. basic                      ix. gap                      x. 20
3. i. ignorance, poverty                      ii. famine                      iii. discrimination
- iv. 85
4. i. Developed countries have political stability, democracy, freedom of expression, and better employment opportunities that the less developed countries lack. Countries that are more economically developed are richer. They make more money, and the people in these countries have more money to spend on health, education, food, and luxuries. These countries have political stability, democracy, freedom of expression, and better employment opportunities. Countries that are less economically developed are poorer. This means that these countries make less money, and the people in these countries have little money to spend on health, education, food, and luxuries. The economies of these countries are agro-based rather than industrialized. A majority of the people in these countries grow their own food to feed themselves and their families.
- ii. The infant death rate in Afghanistan is 71 per 1000 infants population per year, which is very high compared to that of the United Kingdom which is only 4 per 1000 infants population per year.

## Worksheet 14

1. i. surveys                      ii. satellites                      iii. wavelengths                      iv. eyes
- v. vision                      vi. photographs                      vii. radar                      viii. NASA
- ix. GPS                      x. places
2. i. a. They investigate the causes and effects of problems and search for solutions. For example, geographers study environmental hazards like earthquakes, tropical cyclones, tsunamis, floods, landslides, volcanic eruptions, etc. and provide methods to prevent damage.
- b. To determine the causes and effects of these problems, geographers collect spatial data from field and ground surveys.
- ii. Infrared light enables night vision. To see objects at night or in the dark, different cameras are used to take photographs and to see objects which cannot be seen by the naked human eye.
- iii. a. Passive remote sensing works on the energy that is radiated by the Earth's surface mostly as visible light and infrared rays. Our own eyes are passive sensors.
- b. It is used by geographers in various studies and applications such as in the study of landforms, disaster management, the study of environmental problems, and weather studies and weather forecasting.
- iv. In under-developed countries like Pakistan, spatial data is not fully collected or completely stored in computers. Therefore such countries cannot utilize this technology in planning and resolving spatial problems.

### Activity - Report

- a) A geoscientist is someone who studies the sciences related to the Earth in order to come up with a better understanding of its systems. A geoscientist uses tools from subjects like Physics and Mathematics for his studies. Such research provides crucial information needed for a better understanding of the Earth and its complex relationships, and for finding solutions to the problems experienced.
- b) Open question – mark students for sensibility and correctness of thoughts, ideas and facts