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Teacher's Guide

Secondary Geography for Pakistan

for Grade 6

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Introduction

The lesson plans here are based on suggestions of how to cover the curriculum over 18 weeks of Geography teaching during school year 6, with three or four lessons per week of 40 or 45 minutes each.

Each plan consists of the following headings and information

Chapter

Textbook chapter number and section

Lesson

Number in sequence

Textbook Section

The part of the textbook to be used for this lesson

Aim

The overall objective or enquiry question for the session

Learning outcomes

The specific areas of skills and content to be covered

Lesson plans

Ideas for the stages of the lesson- usually consisting of a preview or starter activity to catch pupil's interest; an explanation of new knowledge and suggested activities.

Plenary

Advice for drawing together the end of the lesson and reviewing what has been learnt to consolidate understanding.

Responses to questions at the end of the chapter

A guide of potential responses to exercises at the end of each chapter in the book

Opportunities for Longer Prose Responses, Debating and Extended Writing

Ideas for extended learning activities to engage students in critical thinking and enhance deeper understanding, communication skills, self-awareness and meta cognition

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Chapter 01

The Structure of the Earth and Types of Rocks

In this introductory chapter, we will embark on a captivating journey to explore the wonders of our planet's geography. Learners will delve into the depths of Earth's structure, uncover the mysteries of rock formations, and uncover the profound impact of geology on Pakistan's economy. Throughout this chapter, learners will develop essential skills, including locating places on maps, globes, and atlases, that will equip them with the tools to navigate and understand the dynamic world around them.

Textbook Section: pages 1-16

- **Aim:** To understand the structure of the earth and types of rocks and its impacts and uses.

Learning outcomes of the chapter:
Learners will—

- define Geography
- describe the structure and movement of the earth
- describe the types of rocks and their uses
- explain the influence of Geology on Pakistan's economy
- be able to find location on maps, globes and atlases

Lesson1 An introduction to Geography: What is unique about this discipline?

Begin by asking the pupils if they know what the subject of Geography is about, making a list of their suggestions and also discussing why this discipline might be useful in the modern world. Together look at the suggestions and decide if any of them are really at the heart of the subject. Then explain that Geography is a wide-ranging subject and has some overlap with both the sciences and the social sciences, for example elements of geography are very scientific in their approach and link to geology and earth sciences, physics, and chemistry. Other aspects of geography explore how humans interact with place and space and natural processes.

Use the textbook to look at the definitions in section 1.1, (page 1) and explanation of what Geography 'offers' on pages 1 and 2. Perhaps show some images of all the diversity that geography covers, show how natural landscapes the oceans and land use differ; include some images of varied climates and habitats to generally give a broad awareness of the variety of things that geography covers.

You could either set the task of completing a title page for pupil notebooks with the word Geography in a large size of lettering and drawn or stuck in images to create an eye-catching first page. If time is restricted you might ask learners to set aside a page for a title page- to be completed as home learning, on which pupils will later design their own title page for 'Geography' in their notebooks.

To help learners understand the nature of the subject and design their title page, discuss what the subject of geography is 'about:' the opening section of the book does this and is intended to introduce the discipline.

After the title page, pupils should be asked to write down the title 'What is Geography?' and write down a definition of the subject, either drawing on the discussion from earlier or using the definitions in section 1.1 of the textbook.

Plenary

in the final few minutes of the lesson ask the group what they have learned about today and summarised the key learning points of the lesson as a way of drawing together and reiterating the key information. If you have set home learning remind them and ask them what sorts of things they might include on their title page.

Lesson 2 How do Geographers Represent the Earth in 2-dimensions?

Textbook Section: Section 1.1 pages 2-3

Aim: to help learners understand how maps represent the globe and understand how grid lines help 'read' a map and find locations.

Learning Outcomes: Learners will –
- Understand how geographers represent the earth in two dimensions as maps to represent when the three-dimensional sphere (or geoid) that is the Earth;
- Understand and be able to use the terms Eastings and Northings in relation to map making and reading map coordinates;
- Know that maps can represent different types of key geographic information such as scale, borders, key features and factual details.

Begin with a short verbal review of what was learned in the last lesson, asking the class to tell you what geography is about. Preview today's lesson by explaining that you are going to look together at how geographers represent the earth as maps and that we will start to look at how to read maps and find locations.

Then look at the explanation of the earth as a sphere in the textbook, page 2. Discuss the importance of maps as a tool, asking the question 'Why do you think we need maps?' Learners are likely to explain that people need to find their way around, that navigation across long distances is aided by maps, and that land ownership and planning all rely on maps. They might talk about learning about their own area and region, or other places abroad. If you wish, ask them to write down the questions 'what is a map?' and 'Why do we need maps?' and to answer both.

Ask them 'Was the map maker Gerardus Mercator an important contributor to geography?' they should explain that his map was important, but that it presents some challenges. Decide if you have time to ask them to write something about Mercator.

Look at the section on page 2, 'How do I find a specific place on a map?' Read this together and explain what an X axis is, and what a Y axis is, as well as saying that if a grid pattern is used, and the boxes are numbered then it is possible to identify points at which the lines intersect.

Decide how you want to get learners to record and retain this important information about 'the along then up' coordinates of a map. You might find it very useful to give pupils a photocopied image showing Y and X axises like on page 2, and getting them to write down an explanation of what an easting and a northing is, and the rule around the order in which they all read when map reading. The little figure walking along and then up the stairs is also useful to help them remember that we read the easting then the northing.

Next link to the map of Pakistan on page 3. Explain that this is a map showing the geology of the country and ask if they know what that means. The definition box at the bottom of the page explains the term and could be used to ensure they understand that different types of map represent different sorts of information. Ask them to look closely at the map: can they see the grid lines? Here the boxes are very large so it would be impossible to tie down very precise locations. This should give you the opportunity to talk about scale and how some maps are of very large spaces for example of continents or countries, and other maps might show a relatively small area in great detail. Here there are also two indented maps showing Sir Creek and Junagadh and Manavadar. Explain that this is to help give fine detail, and represent key pieces of information. The focus in looking at this particular map should be on basics: the grid lines, the notion of a legend or key, scale, the showing of northern orientation and how labelling is used. You can return to the map to look in more detail at the geological information when discussing how geology impacts on a national economy if you wish, but be ready to explain that:

- the Geology panel (top left) shows rock types, which we will explore in a lesson soon;
- the pre-Cambrian and Faults box (top right) shows where the oldest beds of rock are situated (Pre-Cambrian rocks, with the more recent- but still ancient, Mesozoic and Paleozoic rocks also shown), and where the fault lines in the surface of the Earth run.

Using the Oxford School Atlas, or other maps available, you could then ask pupils to carry out some activities looking at 4 figure grid references and grid lines. This would provide the opportunity to practise and help you diagnose if any pupils had misunderstood.

Lessons 3 and 4 What is the Structure of the Earth?

Lesson 3 How is the Earth Structured?

Textbook Section: Section 1.2, The Formation of the Earth, pages 4-5

Aim: Learners will study details of how the Earth was formed and the technical terms used to classify the layers of the Earth and the key vocabulary.

Learning outcomes: Learners will -
- Know how and when the Earth was created;
- Use a variety of key terms to describe the layers of the Earth;
- Understand that this is informed by data and computer modelling to help us understanding the nature of rock, its formation, and influence on land features.

In your preview explain that today we are going to look at the structure of the Earth and some of the vocabulary used to describe its layers and the processes that take place. You could then catch pupil's interest by posing some short answer questions about key facts about the earth for example its age, radius, depth of oceans, and meaning of some of the less taxing related terms such as mantle and ice cap. Keep this to a short quiz type activity, and explain but it doesn't matter if they don't know some of the answers at the start of the session.

Then read the first third of page 4, section 1.2, 'The Formation of the Earth' and look at the diagram below this.

You could then use a ball or round fruit to show while you explain about the different layers of the Earth, and how much of the object you are showing they would take up. This might help learners understand that the outer mantle of the earth is very thin in comparison to the Earth's radius.

Learners would find it helpful to have a diagram in their notebook which labels the layers of the Earth and to also have some of the key terms about the structure of the Earth. Go on to look at the diagram on the top of page 5 with the learners, and give some thought as to how you might help them understand the nature of each of the layers shown. Some ice cream desserts for example are made-up of many layers and using this image might help learners understand that the earth also has a series of different layers. A wedge diagram such as on page 5 might be drawn in pupils' notebooks. Make sure that pupils can explain how we know about these layers because it is impossible to tunnel to the centre of the earth despite Jules Verne's famous book!

You could test whether your learners understand the nature of these layers by getting some to come and sit at the front of the class to explain the principles to the rest of the group in a 'hot seating' activity. This can be challenging but fun as the pupil must coherently explain the notion without any sense of confusion undo repetition or deviation from the point.

Plenary

In drawing things together mention the key terms which you really want all pupils to have grasped and challenge them to try and memorise these terms and some of the key facts which are associated with them. You will start the next lesson seeing how much they remember.

Lesson 4 Why do Tectonic Plates have such a Big Impact on the Earth?

Textbook Section: Section 1.3, The Restless Earth, pages 5-7

Aim: This session should be used to further develop pupils understanding of the structure of the Earth, and will introduce the principle of tectonic plates forming a key part of the outer structure of the Earth's layers. Learners should also understand that these plates are actively moving and causing significant changes to the landscape above, for example in the devastating Turkish and Syrian earthquake of early 2023.

Learning outcomes: Learners will:
- Know the meaning of the term tectonic plates and who developed and proved the theory;
- Explain how the process of continental drift works

In your preview explain that today we are going to understand the rotation of the Earth and the way that man count found it difficult to explain the physics of the solar system and the movement of the earth; the notion that the earth surface is also moving, and the theory of continental drift, and the notion of fault lines along the tectonic plates.

Your starter activity could be a short recall test, with some straight-forward definitions provided and pupils asked to recall, or match, the correct terms to go with the definitions. This should help refresh learners' memories of some of the key vocabulary about the structure of the Earth

Next read section 1.3 on page 5. Discuss why early man felt that the earth was being orbited by the sun and ask if learners knew that some of the early civilisations were based on sun worship. Today our better

understanding of science helps us know that the universe we live in is one of many and that all of the planets in our universe are orbiting the Sun. Ask the class what suggestions they might have as to why it was so difficult to work out what was really happening.

Now look at what Sir Francis Bacon said about the Earth's continents (bottom of page 5). The diagrams on page 6 are a useful visual reference, you should also read about Alfred Wegener's theory of continental drift. In the diagrams Pangea is shown splitting into the modern seven continents over time. You could ask the class which continents they feel became most like their modern form first. Use the paragraph on the modern confirmation of tectonic plate theory to see how the theory was confirmed.

You could ask pupils to respond to some questions to consolidate their knowledge of these things.

Now read the next subsection which explains the theory of plate tectonics (bottom of page 6 onto page 7). If you wish to make learning more active, you could ask learners to stand in two rows facing each other, to represent two sides of a fault line.

1. Ask one row to take a step backwards, thus moving away from the other row. this represents plates experiencing a rift.
2. If the rows take a step closer to each other this represents pressure between the plates, and could lead to a fold. you could ask one row to kneel, thus representing a fold.
3. If each row takes a step to their left this would represent the fault line moving and plates travelling in different directions. this often happens at the meeting point of several plates.
4. If both rows step apart and kneel, then an ocean basin or drop of height and formation of a trench can be represented.

Decide how you would like pupils to capture the key information about plate movement and the key terminology, if possible, without involving lots of copying.

Plenary

During the lesson, try to represent the movement of the plates using your hands. Put your two palms together to represent two sides of a fault, move them apart, one up one down, sideways or pushing one down on the other to represent the different types of movement along the faults. At the end of the lesson, you could ask learners to put their hands together and they have to show you which way things should move if we see a fold, a rift, subduction, and forward and backwards (two directional) movement. Explain that in the next lesson we will look at the impact of these movements.

Lesson 5 What happens when the Tectonic Plates Clash?

Textbook Section: The Clashing Tectonic Plates, Section 1.4, pages7-9

Aim: This lesson is about the impact of the movement of the tectonic plates. learners should understand that there are significant impacts on land shape and nature because of tectonic plate movement.

Learning outcomes: Learners will-

- Understand why the movement of the plates has a significant impact;
- be able to use key vocabulary;
- know that there are 7 major plates and a number of minor plates;
- show they understand which plates the land of Pakistan sits on;
- explain convergent, divergent, and transform processes.

refresh learners' memories about fault line movement. Explain that today a greater understanding of the impact of these movements could be developed.

Read the start of section 1.4 and ask what they notice about the names of the major tectonic plates (they are named after the continents which sit upon them). Ask whether anyone can explain why also having minor plates makes predicting movement more difficult. They should be able to suggest that multiple plates mean movement in many directions is possible if multiple plates are jostling for space. This could be explained by asking several pupils to put their flat hands out next to each other in the air, warming a raft of hands. Explain that if someone moves a hand it has an impact on the whole raft, and that this is what happens when the Earth's plates move.

Look at the map on page 8 which shows the location of the tectonic plates. Ask: Can they name some minor plates? Look at the 'To Discuss...' panel; are they able to answer the question about impact from this map? Check that pupils understand why the plates move, and that this is due to forces from within the core of the Earth pushing magma towards the surface.

Now begin to explore the notion of convergent, divergent, and transform processes is using pages 8 and 9(Changes at the Plate Boundaries). They should be familiar with these concepts because of the activity with the hands, and now have the technical terminology to be able to properly name the different types of movement. You could play the same game but this time using the new terms convergent, divergent, and transform processes. If learners are confident enough you could also ask them to show what is shown by naming examples, for example, the Andes (Convergent, subduction), the Himalayas (Convergent fold upwards) The East African great Rift Valley (divergent), and San Andreas Fault (a transform process, i.e. sliding in different directions). Ensure that learners know the difference between constructive and destructive processes and which plate movements cause these changes.

Plenary

Redemonstrate the different forms of movement at fault lines and reinforce the use of the key language whilst summarising the key points of the lesson. Encourage your learners to look up some of the real-world examples of these types of movements along plate faults. In later lessons we will look at the impact old protect tectonic plate movement. Chck that learners remember that Pakistan sits above more than one tectonic plates and therefore faces constructive, destructive, and disruptive processes as a result.

Lessons 6 and 7 How do Geographers Classify Rocks and Explain their Creation?

Lesson 6 Types of Rocks

Textbook Section: The Formation of Rocks. Section 1.5 page 9; and The Rock Cycle, section 1.6.

Aim: In this session learners should be helped to study and understand how rocks are classified and how the 3 major groupings are created during the rock cycle.

Learning outcomes: Learners will-

- Understand the formation and nature of igneous, metamorphic, and sedimentary rocks;
- Explain the difference between intrusive and extrusive rocks;
- Be able to correctly use and explain key terms in relation to rocks.

At the start of the lesson hand around some rock samples or images of different types of samples of rocks. Ask the pupils to look closely at the examples they have in front of them: What observations can they make about the nature and features of rocks, and what similarities and differences can they identify between different images or samples? Note that it is not necessary to have more than a few examples of 'typical' rocks, and that if physical samples are not available then images and perhaps short descriptions of the rocks shown will be adequate.

After discussing the samples read the textbook section on Types of Rocks, page 9. Ask 'Does this information help them describe their samples more precisely? Why?' Some rocks might show signs of being formed from sediment, for example a fine grainy structure, or a coarse-grained structure. In most cases however it is not easy, without experience and further evidence to classify rock from handling it/looking at a sample. You might want to ensure learners have definitions of minerals, igneous, metamorphic and sedimentary rocks (all covered on page 9).

Now look at the explanation of intrusive and extrusive or volcanic rock on page 10 and ask the pupils to write down the difference between the way intrusive and extrusive rock are created. Then read the section on how metamorphic rocks are created (page 10). Learners should be encouraged to add an explanation of how metamorphic rocks are created, and give examples. Learners could be asked to complete the 'Going Further' task (Finding out about Pakistan's marble extraction industry) as Home Learning or as an extension task.

Plenary

Summarise what has been learnt today about the formation and nature of igneous, metamorphic, sedimentary, intrusive, and extrusive rocks.

Lesson 7 How are Sedimentary Rocks Formed and Why are they a Key Part of The Rock Cycle?

Textbook Section: page 11

Aim: To explore the nature of sedimentary rocks and understand its importance in 'The R Cycle.'

Learning outcomes: Learners will-

- Explain the formation and nature of sedimentary rocks and how they contribute to the Rock Cycle;
- Correctly use and explain key terms in relation to sedimentary rocks and the Rock Cycle.

Begin with a recap activity by asking the class to explain to you how the three main types of rocks identified in geology are formed (igneous, metamorphic, and sedimentary rocks). Explain that each rock has the clue to its meaning, and the nature of the rock in the name: Ignis comes from the Latin for fire, a metamorphosis is a dramatic change, and sediment is fine [particles which form at the bottom of a solution or liquid.

Now read the section on page 11 about sedimentary rocks. The diagram and side panel alongside it explains how sedimentary rocks form in liquids. Pupils could be asked to either create a version of the diagram in their notebooks, and to write their own list of the stages that happen in the formation of sedimentary rock; or design a poster explaining the nature of sedimentary rocks using information taken from page 11 and any other available sources.

Plenary

Use the diagram of The Rock Cycle (Section 1.6) from page 12 to explain how rock breaks down and gradually re-forms as a summary, re-explaining briefly how igneous and metamorphic rock are formed in intrusive and extrusive processes, and how when these rocks breakdown they can re-form in sedimentary or metamorphic processes.

Lessons 8-10 How does Geology influence a national economy?

Textbook Section: Section 1.6, pages 12-13

Aim: Learners will learn about and then research the ways that the geology of a country has an impact on a national economy, using Pakistan's primary extractive industries as a case study.

Learning outcomes: Learners will-
- Understand the notion of primary extractive industry;
- Be able to explain why the geology of Pakistan makes an important contribution to the national economy by providing employment and raw materials which can be used nationally and exported.

In the first lesson, begin by asking if anyone knows what an extractive industry is, or can give an example of one. If they are struggling to speculate accurately, ask if the word has a clue in it: and explore the meaning of extraction. Ask 'what might be being extracted or taken from the environment?' to try and help establish the nature of extractive industries. Move on to read the first part of Section 1.6, page 12. with the class, and then work together to agree a definition of extractive industries. Then ask the group to write a paragraph or two about why geology is an important economic activity.

Then read the second paragraph of 1.6 on page 12, and page 13 together. These pages begin to provide examples of specific rock types, precious and semi-precious stones and minerals extracted from the environment in Pakistan. Set pupils the task of researching about the geology of Pakistan and the contribution that these extractive industries make to Pakistan's national economy. The map on page 3 of Pakistan's geology, and other sources could be of value in discussing issues which might be raised, or sources used in the research task.

Planning the research task

Decide and plan on how you will resolve these issues:

What format will your research task take? For example, a poster, podcast, radio or TV documentary script, a letter to a newspaper, a text, and images for a textbook entry for school pupils or another vehicle to help learners think about audience, design, and content.

How much time will you give pupils? What resources will you need to provide for the pupils? Who will need support or some form of scaffolding? Who will need to be encouraged to stretch themselves?

What would constitute a successful response to the task and how can this be modelled for pupils, so they have clear success criteria before embarking on the task? How will you communicate to pupils how the work will be assessed?

Set out the requirements for the pupils and explain the task, then give them working time. If the task

continues over one or more lessons and includes home learning, ensure that the plenary at the end of any lessons, and the preview at the start of any subsequent lesson reminds pupils of the success criteria and provides an upbeat sense of the importance and purposefulness of the task.

Ensure that any presentations of the work are crisp and do not accidentally create an overlong or tedious and repetitive use of lesson time: thirty very similar presentations are a tedious way to celebrate what pupils have achieved- and not a good use of curriculum time. Instead think whether a gallery of work or some form of peer marking criteria agreed by the class at the start of the task might have a stronger formative value.

Lessons 11 and 12 How do Geographers Find Specific Locations using Tools like Maps, Globes, and Atlases?

Textbook Section: Pages 14-15, Section 1.7, Finding Locations on Maps, Globes, and Atlases

Aim: These lessons are intended as vital skill development sessions to equip pupils with knowledge about how to read maps. They build on the simple introduction to map grids, Eastings and Northings, discussed earlier in this chapter.

Lesson 11 What are Four and Six Figure Grid References and how do they Work?

Learning outcomes: Learners will-

- Know how four and six figure grid references are constructed and how to read them on example maps.

In your preview look back at the basic map grid, shown on page, with the class. Hold up a small round object- a fruit or ball, or a scrunched-up sheet of paper... a point on a small sphere is relatively easy to find and mark with a small grid, but on a geoid the size of the Earth this is not so simple. When a life, or a major business matter, or an environmental protection issue (and lots and lots of other decisions/actions) depend on finding an *exact* location then being able to find a very exact place very efficiently and quickly is important, – for which a very reliable geo-location system is needed.

Now look at page 14 in the textbook, and read the page, stopping at appropriate points to check pupils are following the explanation.

Decide what you would like pupils to write in their notebook to explain how the system works: they will need a logical, clear, and simple explanation to refer back to whenever they feel unsure about four and six figure grid references- so ensure what is recorded is clear and correct!

Then, use the remainder of the lesson prior to the plenary to give pupils a series of prepared 'location or feature finding' tasks based on maps you have available or copies of maps with four and six figure grid references printed on them which require them to use first four, and then later, six, figure grid numbers to find particular features. Start with several simple tasks, and then increase the level of challenge, moving on to six figure references when pupils can do so. Make a mental note of who is struggling and engage with them to help them better understand 'the rules' around reading along first, then up (X axis figures first then Y axis figures; and boxes divided into tenths. Some learners find this very challenging, and you will need to continue to reinforce the skills required during later lessons.

Plenary

Ask a pupil or pupils to explain how four and six figure grid references work so you can again reinforce the class's understanding of the system.

Lesson 12 What are Lines of Longitude and Latitude, and how do they work to find locations?

Learning outcomes: Learners will-

- Know what the terms latitude and longitude mean and how they are used to identify specific parts of the globe/map locations and how they create a notional grid pattern across the Earth.
- Understand that degrees of latitude and longitude are further broken down into minutes and seconds;
- Be able to explain key terms such as World Geodetic Systems (WGS) and the role of Global Positioning Satellites (GPS) in navigation and location finding.

In your preview ask pupils to further explain how four and six figure grid references work.

Now explain that this is not detailed enough for finding a very precise location or for maritime navigation or movement across almost featureless environments like oceans, dry or ice deserts. Ask if anyone knows what a line of latitude or longitude is? Using a classroom globe (or inflatable child's globe/football if something more basic is all that is available,) explain that the idea of latitude came from the ancient Greeks more than 2000 years ago, and that an agreement was made in 1884CE to set the 0 degrees longitude line as passing through Greenwich in London, England. Explain how longitude and latitude lines work and read through page 15 with the class.

Ask the group to record the key points of this information in a suitable manner and then provide opportunities to check their understanding of the notions of longitude and latitude, minutes, and seconds. Ask learners to use the Oxford Schools Atlas to look up the coordinates of several cities and key features as a test of levels of competence/understanding: this could be peer marked.

Discuss why modern technology can help us determine global location in very precise ways and ensure that learners understand terms such as World Geodetic Systems (WGS), and the role of Global Positioning Satellites (GPS) in navigation and location finding. Ask learners to explain why Geographic Information Systems (GIS) are key tools for many purposes in the modern world.

Plenary

Ask different pupils to - Explain what is meant by GIS, WGS and GPS. Then encourage pupils to explain the notion of longitude and latitude, minutes, and seconds.

Answers for the end of unit recall questions.

Section One, Quiz Questions

1. 'Define geography': A definition can be found in section 1.1 on page 1.
2. 'Research the roles of GPS and GIS'. Learners will need to use sources beyond the textbook to respond to this task.
3. 'What is an easting and a northing?' This can be answered using section 1.1 page 3.
4. 'Define the geological meaning of rock, element, and mineral': see definition box at the bottom of page 9.
5. 'Explain how igneous, sedimentary, and metamorphic rocks are formed.' See 1.5 on page 9.
6. Research-based question.
7. 'Describe the difference between mechanically, chemically, and organically formed sedimentary rock.'

See Page 11, section on types of sedimentary rock, points 1 to 3.

8. 'Compare the uses of igneous, sedimentary, and metamorphic rocks.'
9. 'Draw a simple diagram to show the rock cycle.' See section 1.6 on the top of page 12.
10. 'Give examples of the types of rocks found in Pakistan and explore how they are used' and
11. 'Give examples of raw materials extracted in Pakistan' both can be answered from the section on Pakistan's geology on page 13.
12. 'The importance over geology in the economy of a country, and focus on Pakistan.'
13. 'Describe the theory of continental drift' – can be answered from section 1.3, pages 5-6.
14. 'Define tectonic plate and fault line and give examples of both.' See definition boxes on pages 6 and 7.

Section 2 Multiple Choice Questions

1. 'Human geography is about: b. Human use of the planet.'
2. 'Under the land mass the earth's crust can be as thick as: b. 32 km.'
3. 'Oceans can be as deep as: a. 4267 km.'
4. 'Oceanic bedrock is usually formed of: a. A basalt rock.'
5. Research-based question: roughly 75 percent of the Earth's surface is covered with sedimentary rock.
6. 'Limestone is made from: a. Plants and sea creatures.'
7. 'In Pakistan marble is found in: c. Balochistan and Khyber Pakhtunkhwa.'
8. 'Marble is mainly exported to: The Gulf States, The Middle East and Turkmenistan.'

Opportunities for Longer Prose Responses, Debating and Extended Writing

There will be occasions when you want to develop the ability of pupils to either write or speak at greater length, and you will wish to think about where you can plan in regular opportunities to develop literacy and oracy, research skills, individual and collaborative working and the use of information communications technology (ICT).

Become older and more independent the approach can be less scaffolding and more demanding but at grade 6 you might still need to think about building opportunities for well scaffolding reading, writing, speaking, listening, and research. There may well be a number of opportunities to develop pupils' ICT skills.

In the chapter about the structure of the earth and types of rocks you could ask pupils to complete written essays or spoken explanations, for example, on these topics:

1. Explain what it is that makes geography unique as a discipline.
2. Describe the structure of the earth and how different layers each have different characteristics from the core out to the atmosphere.
3. Explain how modern technology, for example GPS, GIS, WGS, offer humanity high tech solutions to identifying precise location in ways that were not possible for earlier societies.
4. Evaluate the impact of the Earth's tectonic plates on landform.
5. Analyse the importance of geology to Pakistan's economy.
6. Debate whether the rocks and minerals of Pakistan are a significant part of the economy.
7. Explain orally how four and six figure grid references work and why finding location using longitude and latitude requires a more complex use of coordinates.

Chapter 02

Mountains, Plateaus, and Valleys

After studying this chapter pupils will have gained knowledge of, and used skills in relation to mountains, plateaus, and valleys.

Textbook Section: pages 17-24

Aim: To discover the different types of mountains, plateaus, and valleys and their impacts on lifestyles

Learning outcomes of the chapter:
Learners will—

- Identify different types of mountains, plateaus and valleys and explain how these features are formed;
- Give examples of these features in Pakistan and elsewhere;
- Evaluate how the physical features of a location impact on land use and the local wildlife and human population.

Textbook Section: 2.1 Page 18-19

Aim: This chapter introduces learners to three common land features: mountains, valleys and plateaus and provides information about their creation and erosion, and the distinctive habitats they offer.

Learning outcomes: Learners will-

- Know a range of technical terms classifying and describing mountain, valley and plateau types;
- Be able to describe the geographic processes that create and erode these three types of land feature;
- Be able to give specific examples of places where these features can be seen globally and in Pakistan;
- Know that each type of feature creates particular conditions to support habitats for flora, fauna and human settlements;
- Demonstrate awareness of habitats that are remote from human here

Lesson 1-3 Looking at landscape and land shape

Lesson 1 Mountains

In your Preview explain that you will "all be studying different types of landforms for the next few lessons: Mountains" (Put your fingertips together to make a dome or mountain shape),

"Plateaus" (Put your hands flat, fingertips to fingertips- but keep the hands reasonably high) "which are raised flatlands, while plains" (drop the hands, still fingertip to fingertip, lower) "are lower flatlands, and

Valleys" (now drop the fingertips to make a v-shape). You could repeat the statement and gestures with the pupils joining in.

Key Landforms

Activity 1

Read the text on page 18. Ask pupils to write simple definitions of each of the four land shape types listed here, and draw a simple shape to represent the land shape e.g., /\/\/\ for mountains, ------ for plateaus, _____ for plains, and V for valleys.

Optional Home Learning

The 'Going Further' task on page 18 (to research where these landforms might be found in Pakistan) could be set as a home learning task. If you choose to do so, give some suggestions as to where learners might look to find suitable information, and how they might present a summary of what they find and the amount of work/time they should invest in the task.

Types of Mountains

Activity 2

Next read the text on page 19, which is about the classification of types of mountains.

Decide on a suitable method to ensure learners understand and record the information provided here- this could take the form of a presentation using images of real examples of each type of mountain either:

- presented by pupils, with groups tasked to research one type of mountain, prepare a 3 minute presentation and then each group presents while the remainder of the class make notes, or
- presented by you, with the pupils noting down key information

In your **Plenary** you could ask the class how they would change the hand gestures to represent and fold, residual, volcanic, horst, and dome mountains. The pictures in the textbook on page 19 might be helpful for pupils trying to visualise the shapes needed.

Lesson 2 Understanding Plateaus

Textbook Section: 2.2, page 20

Aim: To support learners to understand that there are different classifications of plateau based on their creation and structure.

Learning outcomes: Learners will-

- Know that plateaus can be classified according to their creation or decay as Continental (Shield), Piedmont, Intermontane, Volcanic, and Dissected plateau types;
- Know some examples of specific locations where there are plateaus of each type;

In your **preview** explain that we are going to look at large expanses of flat, higher land that are formed in different ways, offer varied habitats and breakdown in different ways and at different rates.

Classifications of Plateaus

Activity 1

Read page 20, and ensure that pupils understand the definition of a plateau in general, and that there are a number of examples of sizable plateaus in Pakistan. Then move onto reading about and discussing the five types of plateaus listed.

Decide on how you would like learners to record the information. You could use comprehension questions, or simple note making instructions – for example:

Task

For each of the plateau categories A-E

A Continental (Shield) Plateaus
B Piedmont Plateaus
C Intermontane Plateaus
D Volcanic Plateaus
E Dissected Plateaus

- Explain how this form of plateau is created.
- Make a simple drawing of the shape of the plateau.
- Give an indication as to whether they are very prone to decay (if indicated).
- Give examples of where such plateaus can be found around the world.

In your **Plenary**, summarise the learning from this session. You could ask the class how they would change the hand gestures to represent the five types of plateaus: continental, piedmont, intermontane, volcanic and dissected types. The pictures in the textbook on page 20 might be helpful for pupils trying to visualise the shapes needed.

Lesson 3 Types of valleys

Textbook Section: 2.3, page 21.

Aim: Learners will be able to classify valleys according to their shape and formation, and to use key vocabulary in relation to the characteristics of valleys.

Learning outcomes: Learners will-

- Be able to classify valley types;
- Understand and use key related vocabulary correctly;
- Be able to give examples of the location of different types of valley.

In the preview explain that we will look at the nature and creation of valleys in this lesson, and that they are going to write a time-limited (20 minute) essay about the different types of valleys.

Types of Valleys Essay

Activity 1

Read the textbook page 21 which explains about how geographers classify valleys. Explain that their essay has to respond to this question.

How are different types of valleys classified by geographers?

Also explain that they must not just copy the text, but should think about how they can explain the four types of classifications in their own words. In the time available you might wish to give them some further reading and planning time, or help them think about structure- the intention is not to stress them but to provide an opportunity to gather information quickly, precis it and create a clear, well-explained synthesis as this is an important transferable skill.

In your Plenary, summarise the learning from this session. You could ask the class how they would change the hand gestures to represent the four types of valleys: V-shaped, U-shaped, Hanging and Rift types. The pictures in the textbook on page 21 might be helpful for pupils trying to visualise the shapes needed.

Lessons 4 and 5

Textbook Section: 2.1, Living in different habitats, pages 22-23.

Aim: Learners will develop an understanding of how habitats are shaped by their location and how flora and fauna adapt to particular landforms.

Learning outcomes: Learners will-

- Know that the landform and climate of a location is key in shaping what flora and fauna will thrive in that location;
- Be aware of example locations (river valleys, high terrain, and plateaus) which demonstrate how local conditions help shape what life is supported at those locations;
- Understand and use key terminology related to habitat such as climate adaptation to explain how species adapt to site conditions.

Lesson 4

This activity runs across two lessons.

In your preview explain that different landforms create ecosystems that are particular to a number of factors: for example the climate, soil or water type, vegetation supported and therefore the lifeforms that can exist at that location. In this activity the group will spend two lessons exploring how species adapt to locations, and therefore how the local 'geography' shapes the local ecosystem.

Living in Different Habitats

Activity 1

As a class read and discuss the text in the first two sub-section of page 22 (River Valley Settlements and High terrain communities.) Ask the group to respond to this question in their notebooks using the information they have just read:
How do we know that physical geography (terrain, landform, and ecosystem, etc.), has an impact on the settlement patterns and lives of human communities?

Now read the Plateaus section of text, and ask the class to add further evidence to their answer.

After an appropriate amount of time to respond, move on to the Unique cultures and languages section and ask the class to now add to their writing by responding to this question:

What benefits and threats are experienced by communities which have retained very strong and unique traditional cultures and ways of life?

Optional Home learning task

Pupils could be asked to respond to the Going Further task as home learning, and to research the mountain communities in Pakistan.

Lesson 5

In the **preview** explain that we will continue to look at how people, plants and animals adapt to their surroundings. Read the first part of page 23 as far as the start of Climate adaptations. Explain that is risky to assume that people living in remote places or traditional lifestyles are primitive or lacking in some way. People in the steppes (grasslands) or polar circle can still own televisions and mobile phones, be aware of the wider world and share many of the values of other communities. We need to be careful not to stereotype others or make ill-informed assumptions about their lives and values.

Finding out more about how people adapt to accommodate the demands of 'their local geography'

Activity 1

Ask learners to read the Climate adaptations section and then the Importance of the Himalayas to Pakistan section on the same page.

Ask the group to further add to their work about how lifeforms adapt to their surroundings using material from this page.

Plenary

Ask learners if they can summarise what they have learnt in these two lessons.

Answers for the end of unit recall questions.

Section 1, Quiz Questions

1. Endogenic forces are those that occur below the surfaces of the Earth, and exogenic forces occur above the Earth's surface
2. Definitions of plains, plateaus, valleys and mountains can be found on page 18.
3. Fold mountains (see page19) are formed when sedimentary rock is forced together and the rock pushes together and upwards. Examples include The Alps, Andes, Himalayan and Karakoram range and The Rockies.
4. A dome mountain is formed when hot magma pushes the surface layers upwards from below.
5. Refer to the text given in the chapter.
6. A dissected plateau is a former flat plateau which has been eroded so the surface is no longer smooth and even.
7. Refer to the heading, 'River Valley Settlements' on page 22.

Research-based task Section 2. Multiple Choice Questions

1. Rift valleys are formed as a result of **A. The movement of The Earth's tectonic plates.**
2. Corrasion is: **C. An abrasive forces.**
3. Corrosion is: **C. The dissolving of mineral material.**
4. Wide plateaus or tablelands are known as: **A. Intermontane Plateaus.**
5. People have lived in the Quinghai-Tibetian Plateau for **B. 30-40,000 years.**
6. The national animal of Pakistan is the: **A. Markhor.**
7. Pakistan has more than: **A. 100** 7,000 m mountains.
8. **C. K2** is the highest mountains in Pakistan, and is found in the Karakoram mountain range.
9. Residual mountains are: **B. Decaying and eroding mountains**
10. 10. June and September

Opportunities for Longer Prose Responses, Debating and Extended Writing

In this chapter about mountains, plateaus, and valleys you could ask pupils to complete written essays or spoken explanations, for example:

1. Describe the processes that lead to the formation of mountains.
2. Research and report on examples of plateaus as a geographic feature.
3. Make a presentation about the variety of valleys found in different sorts of landscapes and their creation.
4. Make a recording or script for a podcast about the distinctive nature of high terrain communities.
5. Debate whether areas where there are endangered species should be protected from commercial, industrial, and housing development, or if they should be developed to make local communities wealthier.
6. Research the topography and ecosystems of the Himalayan, Hindu Kush, and Karakoram mountain ranges in Pakistan to create a chapter for a school Geography textbook

Chapter 03

The Climatic Regions of the World

The diversity of Earth's climatic conditions is explored in this chapter. It further focuses upon the climatic region of Pakistan. Factors that effect the climate of a region and impacts of climate on lifestyles, flora and fauna are also discussed.

Textbook section: Pages 25-34

Aim: After studying this chapter pupils will have gained knowledge of, and used skills in relation to the climatic

regions of the world.

- **Learning outcomes of the chapter:**
- **Learners will—**
- Use specialist vocabulary;
- Use physical maps;
- Demonstrate an understanding of the difference between weather and climate;
- Identify factors that affect the climate of the region;
- Name and describe the climatic zones of the world;
- Identify how flora and fauna have adapted to their circumstances, and name some examples;
- Describe the climatic zones of Pakistan.

The Climatic Regions of the World

Textbook section: 3.1 pages 26 to 27

Aim: Learners will understand how we define climate zones, and their key features.

Learning Outcomes: Learners will –

- Be able to define 'climate zone', describe the characteristics of the different zones, and give examples;
- Be able to explain the nature of arid and desert climates.

Lesson 1-2 What is a climate zone?

Lesson 1

As part of your preview: Read section 1.1 'Exploring different climate zones' beginning with the introduction: How do geographers classify climate regions. Discuss this with pupils, and explain that flora and fauna has to be able to survive in the habitat around it, and therefore unless it is suitable to survive in, or adapt to, that habitat will not survive.

Activity 1 How are climate zones classified?

Now look at the table on page 26 'A classification system for climate zones.' This presents six different climate zones and summarises the extent to which they are hot, cold, wet, or dry. Ensure that you also use the language in the definitions box at the bottom of the page to reinforce pupil understanding and build their vocabulary. Decide how you would like your learners to capture this information and ask them to do so. You could for example make A Climate Classification Game

This would involve you compiling:

- a series of A5 sized cards with photographic images of scenes, plants, and animals from each of all six of the different climate zones (choose images which learners will be able to identify as coming from specific zone but also have some challenging images which might go into more than one zone to promote thought and discussion;
- smaller cards with the climate zone titles on them for example the words are Arid/ desert (hot and dry); Mediterranean (hot and wet) etc;
- Descriptions of the conditions on a different colour set of 6 cards;
- Named examples on the further coloured set of six cards.

Pupils would work with the game in groups, with each given a plastic grip-seal bag or large envelope with the full set of cards inside in random order. They would spread these across a table top, and together work to match the pictures the titles the descriptions and the examples.

You might want to have number or letters on each card T1, T2,- P1, P2, E1, E2,- D1, D2, etc., for the title, picture description, and examples. To make it fast to check the bags are complete (pupils could have a checklist for the start of the activity – this would save you needing to check each time they are used!

You might also want an A4 sheet (kept separately) with the answers on to aid speedy self-checking by pupils/speed up your own checking.

After successfully completing the activity they could be given a photocopied version of the chart to stick into their notebooks so they have a record of the different classifications.

In your plenary summarise the key features of the climate zone classification to reiterate the learning from today.

Lesson 2 What is distinctive about arid and dry climates?

In your preview recap on the previous lesson. Ask if learners can remember the six climate zones or any details about them, and restate the fact that we classify climate zones according to how hot or cold they are and how wet or dry they are throughout the year.

What are arid climates like?

Activity 1

Read and discuss the first two thirds of page 27 'What are arid climatic regions like?'

Ask pupils to respond to the following questions in their notebooks:

1. What is the definition of an arid climate?
2. Where are the arid and semi-arid regions in Pakistan? (See page 33 map)
3. What is it that makes semi-arid areas suitable for agriculture?
4. Why is irrigation essential for agriculture in a semi-arid climate?
5. How is the water for irrigation delivered to the fields?

Semi-arid, semi-desert, and scrubland.

1. What is the definition of semi-arid, semi-desert, and scrubland?
2. Where in Pakistan would you find this sort of land?
3. Is this land more suited to crops or the rearing of livestock adapted to the climate? Why?

What is distinctive about desert climates?

Activity 2

Now read the paragraphs on the features of desert climates at the bottom of page 27.

Ask pupils to summarise this paragraph.

You could then set the 'Going Further' task as a research activity in class or as home learning. If you decide to do this in class think about the materials that pupils would need to be able to successfully complete the task, for example information about The Sahara, Arabian, Somali, Kyzyl Kum, and Dasht-e-Lut deserts.

If you have Internet access, then visit the sites suggested in advance and think about whether any scaffolding is necessary to help students navigate this site or focus on particular elements of its information. You could also research other suitable sites and sources of information. If this is a home learning task you will still need to think about what scaffolding is required perhaps also suggesting particular websites and specific sections and/ or providing some written guidance to help learners focus effectively on using geographical thinking and generic research and communication skills rather than just acquiring 'cut-and-paste' information with little thought or discernment.

In your plenary remind the pupils of the key features of arid and desert climates.

Optional Home Learning

You could ask the class to memorise the climate zones and their characteristics, and perhaps also find out about examples from around the world. This would allow you to set some a short recall test or fun quiz activity as a follow up at some stage while we are studying climate zones.

Lessons 3-4 What is distinctive about cold climatic regions?

Textbook section: 3.2, pages 28 and 29.
Aim: Learners will understand the nature of cold climatic regions under the notion of adaptation to climatic conditions.

Lesson 3 What is a cold climatic region?

Learning outcomes: Learners will be able to –
- Explain what is meant by Polar, Tundra, and Arctic zones;
- Give examples of where the zones are found;
- Give reasons to explain why these zones are often sparsely populated and some are protected by international law;
- Cite examples of wildlife in the zones and explain what is meant by adapting to a climate.

As part of your preview, ask the group what they know about the cold places of the world and make a list on your classroom board. This should give you an indication of their prior knowledge and any misconceptions. Discuss with them why they know these things. It is likely that much of their knowledge comes from television and the internet. Explain that it is very easy to stereotype the cold places as all being very similar, but in geographical terms the habitats can be very diverse and the ecosystems support very different flora and fauna due to the different geology and climate conditions. Explain that today we are going to look at these cold places and we will refine and extend their knowledge!

What do we know about cold climatic regions?

Activity 1

Read section 3.2 'Cold climatic regions' on page 28. If you have access to computers, you could ask pupils to make a short presentation using information about cold climatic regions from page 28 and any other available sources.

Alternatively ask pupils to divide 2 pages of their notebooks into three equal sized sections, which they will use to make notes about Polar, Tundra and Arctic climate zones. You could provide photocopies or small photocopied images of each of these zones, downloaded from the internet and cropped to a suitable size for pupils to stick into their notebooks so they can see a representation of the landscapes in each. In your plenary summarise the features of cold climate regions.

Lesson 4 What do we mean by adapting to a climate?

In your preview link back to the learning from last lesson and ask whether they feel the cold climate regions are rich in biodiversity and types of flora and fauna. Do they think these are heavily populated places with lots of humans across the landscapes?

They are likely to know that these are often wide open spaces with fairly restricted flora and fauna, and because of the harsh conditions relatively few people, although there may be indigenous peoples who have inhabited the territory for a very long time, and some rugged others carrying out modern day tasks, for example economic activity and scientific inquiry.

What is adaptation?

Activity 1

Read page 29, pausing to discuss text or images as appropriate, you might wish to ask pupils to write 'What is adaptation?' and to define the term using the early text from the page. Placing a coloured box around the

definition in pupil notebooks will help it stand out. Simple steps to help pupils notebooks stay tidy and well-presented are important for pupil motivation and a sense of self-worth

In the second main paragraph there is a discussion of why humans are so good at adaptation. Ask the group if they can suggest how these named indigenous peoples might have adapted to life in such difficult conditions.

Ask pupils to use this textbook paragraph to answer the following question in their notebooks:

- Which peoples have a long history of adapting to life in the outer Arctic Circle?

The third main paragraph explains that change can be a threat to traditional ways of living, even for those in very remote and isolated communities, and those with very strong cultural traditions.

Ask pupils to use this paragraph to answer the following question in their notebooks:

- How is human activity changing life for some remote communities in cold climates?

Next use the bottom third of the page and the images from the first 'To Discuss' section to explore how animals and people have adapted to living in polar regions.

Optional home learning/ Lesson Extension Activity

Depending on the amount of time available the following could be completed in class or as home learning: using the second 'To Discuss' section on page 29. Write an essay which answers the question 'Should we allow mineral extraction from the world's cold regions?' To do this well you might want to help them understand the value of looking at both sides of an argument and then reaching a well-supported conclusion. Pupils might need to do some further thinking, research, or discussion to complete the task well.

In your plenary ask several pupils to restate what we mean by adaptation by each giving a single example of a form of adaptation to living in a cold climate.

Teacher: "What do we know about animals, plants and people adapting to a cold environment?"

Pupil 1 might say "The Arctic foxes have white coats to blend into the scenery"; Pupil 2 might talk about how Inuits survive in polar conditions; Pupil 3 might talk about plants that are adapted to cold conditions; and Pupil 4 could mention how modern technology such as snow ploughs or snowmobiles help with keeping supply lines open in snow covered territory, so that remote communities can still have 21st century lifestyles if they wish and so on…

Lessons 5-6 What is Distinctive ibout Tropical and Temperate Climates?

Aim: To understand the nature of tropical and temperate climates and their characteristics.

Learning Outcomes: Learners will –

- Distinguish between temperate and tropical zones on the globe;
- Know the key characteristics of temperate and tropical zones;
- Describe tropical and temperate grasslands;
- Differentiate between Mediterranean and other climates.

Lesson 5 What is distinctive about the Tropical and Temperate Climates?

As part of your preview/ starter activity show a large ball or sphere to represent The Earth. Talk about how we are going to look at the way that different zones experience particular climates because of where they are in relation to how the sun shines on The Earth.

Using the ball indicate where The Equator, and the Tropic of Cancer (northern hemisphere) and Tropic of Capricorn (southern hemisphere) are situated. Explain that they are imaginary lines to represent changes in the climate. Explain that the areas either side of the equator get more intensive light/heat from The Sun, and experience tropical climates, while the zones beyond them experience temperate or milder climates.

Pat the top and the bottom of the ball with your hand, and explain that these are the ice caps: Arctic at the northern hemisphere, Antarctic at the southern hemisphere.

Where are the tropical and temperate zones?

Activity 1

Read the first part of section 3.3 on page 30, focusing to begin with on the globe diagram.

Either ask pupils to draw the diagram- or provide a copy to label -or a full copy. Decide how much detail you wish pupils to have in their notebooks, for example do they need to know that the Tropics of Cancer and Capricorn are found at 23 degrees North/23 degrees South?

You may find it helpful to also get pupils to represent these zones physically to help them memorise the terms:

Ask learners to form one hand into a fist with the thumb tucked underneath the fingers, so that when you look at the fist you can see the four fingers only.

The space between the middle two fingers is the equator, the notional line around the centre of the earth at what would be the middle point if we look sideways onto the globe.

The two middle fingers of the four represent the Tropical (or Equatorial) zones North and South of The Equator.

The two outer fingers represent the northern and southern hemisphere's Temperate zones.

At the edge of the hand, top and bottom, are the Arctic zones.

Depending on the ability of your class you may wish to withhold the following information or use it… sometimes this is better not to overload pupils with too much information.

The space between the little finger and the finger below it is the Tropic of Cancer.

The space between the finger that is next to the thumb and the finger above it represents the Tropic of Capricorn. These are imaginary dividing lines.

A trick for remembering which pole is which, is to remember that ants walk along the floor: and the southern polar regions are the Antarctic.

Tropical or Equatorial Climate

Activity 2

With the class, read the section 'Tropical or equatorial climate' and the box 'Micro-climate'.

Decide if you want pupils to add anything to their notebooks, and then move on to read the section 'Tropical grasslands' together.

Discuss whether they think it was right for farmers to clear the grasslands for agriculture in Pakistan and whether any land should be preserved or protected for the natural wildlife even if it meant there would be less agricultural land.

Decide if you would like pupils to write anything into their notebooks.

In your plenary for today's lesson, sum-up the learning and then ask if there was anything surprising about climate zones or the fact that Pakistan had tropical grasslands in the past.

Lesson 6 What is distinctive about the Temperate climate regions?

In the preview explain the class will continue learning about different types of climate this time focusing on temperate climate and temperate grasslands.

Activity 1

Form the class into small teams and ask them to read the first part of page 31 'Temperate climate regions' together. Now ask the class to imagine they are the teacher. What questions would they ask about that paragraph? Discuss their questions with them, and how we can decide what is important, and what counts as interesting but additional information.

Now set the group the task of reading through the remainder of this page together and then deciding what they think is/are the most important element(s) of the information presented. They can ask up- to, but no more than, 10 questions: ask them to decide on and write these, and then write answersin their notebooks.

Explain that this is a collaborative exercise and therefore the group needs to work together and agree what will be asked and what counts as a good answer. Tell them that any group where individuals are over-dominant, or there are passengers, will not have completed the task effectively. Whereas a group which has worked collaboratively and negotiated and co-created the questions and aspects of the answers will have been successful.

In your plenary discuss with them what they have learned about grasslands and how it felt to be trying to work collaboratively deciding what was important information about temperate climate regions.

Lessons 7-8 What sort of Climate is Experienced in Pakistan?

Textbook section: 3.4, pages 32-33.

Aim: To develop an understanding of the climate of Pakistan, how it is monitored and measured and its significance in shaping life in the country.

Learning Outcomes: Learners will –

- Become familiar with climate maps, the measurement of climate and the specialist vocabulary used in relation to climate;
- Develop knowledge about the national climate and its impact on life in Pakistan;
- Develop an understanding of how technology assists in monitoring climate.

Lesson 7 What is distinctive about the topography of Pakistan?

In your preview explain that today they are going to work to become more familiar with the topography of Pakistan. Explain what topography means and why it is an important element in determining climate, land use, economic activity, and population settlement.

Activity 1

Read page 32 and look closely at the map which shows the physical topography of Pakistan. Ask pupils what questions they have about the map and whether it is easy to understand.

Explain that the map includes a lot of detailed information and help them understand how the shading works to demonstrate land height and sea depth. Explain that this map is a mixture of physical and political geography, because it shows the land topography, and human-made divisions of land into administrative districts and national boundaries.

Decide the level of complexity you feel is appropriate to help pupils retain the information shown here. You could, for example, provide a blank map of Pakistan and ask them to shade the map to represent some of the key features, for example land height above sea level. You might ask them to write in the administrative districts, key rivers, or mountain range names. Alternatively, you could provide a partially shaded map-or a map with labels for key features already on a key, so that time can be used more efficiently and that you can focus on what you see as the most important element for the pupils to note.

In your plenary summarise what the map has shown us, and say that Pakistan is a country with a considerable amount of high land and several major rivers bringing water from mountainous areas. Remind them that this has a significant impact on where people live and work, and the terrain has a huge impact on the potential for agriculture and other uses of the land.

Lessons 8 What are the climate zones of Pakistan?

Aim: To understand a climate map and gain knowledge about the climatic zones of Pakistan

As part of your preview explain that they will become more familiar with the details of Pakistan's climate by looking carefully at a map showing climatic regions. This means looking at whether land is arid or tropical, i.e., dry or wet, and therefore what sort of habitat is likely to be supported.

What does examining a climate map of Pakistan tell us?

Activity 1

Read the section on 'The climatic zones across Pakistan.'

Now look carefully at the climate map with the class. Discuss the colour coding with them and ask them to tell you which climatic regions are found in Pakistan, and where they are found. Ask them what they think this means in terms of the suitability of the land for particular economic activities such as farming, rearing animals, industrial use, housing or leisure. Think carefully about what their answers tell you about their level of geographical understanding and note any gaps and misconceptions as well as their level of prior knowledge.

Decide what level of complexity of task you will be able to set, for example shading blank maps or partially completed maps; or providing a map to stick in and asking prose factual response questions, or something more interactive and fun such as a hot-seating activity. This would involve a nominated pupil sitting on a chair in the middle of the classroom and telling the rest of the class about the climate of Pakistan from what they remember.

In one approach: the other learners can ask question and the person on the chair has to give up the seat if they cannot answer correctly. You would need to keep a tally of how many points you will award if the person on the hot-seat gives a reasonable answer, and could vary that according to the complexity of the question or difficulty of answer.

In an alternative approach: a pupil is asked to speak about the climate of Pakistan for a fixed period of time and without, hesitation, deviation, or repetition. If they reach the end of a target time span, for example, 30 seconds, a minute, or longer (you decide), then they can be declared victorious and a geography expert.

If another class member challenges them for hesitation, repetition, or deviation, and you agree— then they have to vacate the chair and the challenger can take over, with the clock still running against the original time limit. So, if someone had managed 45 seconds from a minute target but was successfully challenged at that point, then the challenger would only have to speak for 15 seconds to win the point.

In your plenary summarise the key points that you feel they should know about the climate of Pakistan and using climate maps.

Answers for the end of unit recall questions.

Section 1 Quiz Questions

1. Research-based question
2. Research-based question

3. A comparison of the climate in tundra zones and grasslands can be found in the table on page 26.
4. Research-based question.
5. Adaptation relates to a creature or flora adapting to the climatic conditions, for example an Arctic fox having a summer length coat and a winter coat of thicker fur.
6. A monsoon is a storm of a heavy nature, bringing extreme rains, with the water collected from the Indian Ocean And dropped on the surrounding countryside which causes great damage. In Pakistan the monsoon season lasts between June to September with cyclones coming inland from the Arabian Sea and impacting on the coastline in particular. At around the same time thunderstorms and dust storms can build up in northern Pakistan and some other districts.
7. Pakistan's climate is heavily influenced by the shape of the terrain and Pakistan's global position. With a significant amount of high and mountainous land, Pakistan is heavily reliant on the Indus River Valley land for the most productive agriculture.

Section 2 Multiple Choice Questions

1. The bands at the edge of the tropics are: A. The topics of Cancer and Capricorn.
2. Approximately: A. 2/3 of Pakistan's land needs irrigation for productive agriculture.
3. The canal system that irrigates the fertile region of Pakistan uses water from: C. the Indus and its tributaries.
4. The climatic zone that experiences hot and wet conditions all year is: A. Tropical.
5. The climatic zone that experiences little or no rain is: C. Arid.
6. Answer C. is false, there is no temperate tundra.
7. Answer A.
8. Grasslands can also be called: C. steppes, veldt pampas or prairies.
9. The Indus is approximately: C. 3,200 km long.
10. Monsoon season is between: A. June and September.

Opportunities for Longer Prose Responses, Debating and Extended Writing

By grade 8 pupils should be becoming more independent but there is still a need to strengthen memory, develop literacy and oracy, research skills, individual and collaborative working and the use of information communications technology (ICT).

In this chapter about The Climatic Regions of the World you could ask pupils to complete written essays or spoken explanations, for example:

1. What is the difference between weather and climate?
2. Which factors impact on the climate of a region?
3. Explain why the world has a number of different climate zones.
4. Evaluate how easy it is to live in cold or arid climates.
5. What challenges does the climate of Pakistan present with regard to land use and the support of the population?
6. Based on our understanding of Pakistan's climate, we agree that it is vital to conserve water. (Debate)
7. In what ways does modern geographic technology help us predict climate change and weather?
8. We believe that the disappearance of temperate grasslands is a major threat to international wildlife and species survival. (Debate)

Chapter 04

Forests of the World

The nature of the Earth's forests and their important role in life on Earth is explored in this chapter, which also considers how forests in Pakistan vary and present different types of habitat. Challenges to the sustainability of forest environments and their role in the economy and character of a nation are also explored.

Textbook Section Pages 35-46.

Aim: To understand and evaluate: the nature of different types of forests, their features, the benefits they bring, challenges they face and their importance in the global ecosystem and economy.

Learning outcomes of the chapter:

Learners will --

- Understand the connections between climate, habitat type and natural vegetation;
- Compare and contrast different types of forests globally and in Pakistan;
- Demonstrate knowledge of forests in Pakistan;
- Evaluate the benefits of, and risks to forests;
- Use specialist terminology.

Lessons 1-2 Habitats and Ecosystems

Textbook Section: 4.1, Pages 36-37.

Aim: To acquire key terminology and knowledge for describing forest types and understand how each offers a different sort of habitat shaped by location and climatic conditions and human interaction with the environment.

Learning outcomes: Learners will-

- Understand the connections between climate, habitat type and natural vegetation;
- Compare and contrast different types of forests globally and in Pakistan;
- Use specialist terminology.

Lesson 1 What do we mean by forests?

In the preview explain that we have already learnt that the climate and landforms are the key influencers around what sort of habitat and ecosystem is present at any given location. Today we will look at different types of forest and how these are shaped by climate and landforms.

Show some images of different types of forest as part of your starter activity to capture the pupils' attention. Ask them to describe the images one by one using the most accurate geographical terminology that they can imagine. Help them with this and model, mentioning climatic conditions that can be inferred, nature of landform and visible evidence such as tree type.

Explain that there is some important technical vocabulary related to tree type and forest habitats that we will acquire over the next few lessons.

Climate and Natural Vegetation

Activity 1

Read the opening section of page 36 'Climate and natural vegetation'. This repeats some already familiar terms and reminds readers that human settelements and intervention in various areas has been a large determinant of plant type at a site. Ask the class to write an explanation in their notebooks about what we mean by natural vegetation, and why humans sometimes introduce new plant species in an area. Ask them to think about how changing the plants at a site might change the nature of the habitat and ecosystem.

What do we mean by forests?

Activity 2

Before the textbooks are opened: provide each pupil with a roughly A5 sized paper. Ask them to work independently. Tell them they have 30 seconds to draw a tree and specify that this isn't about being an excellent artist.-.

After the given time ask them all to hold up their drawings to compare, and look at what others have drawn. What are their comments?

Now they should take their image and for 30 seconds write around 'the features of a tree' i.e. adjectives or short phrases describing trees. Then ask them to first compare what was written with a couple of neighbouring pupils and then ask for volunteers to share what they wrotewith the class.

This should reveal some variability, and some commonality in mental images of the concept of 'tree'. It provides the chance to explain that we all carry schemas or ideas of particular things in our heads, and this one with this language came into their heads this time. If the stimulus task had been more specific then they might have all thought of a particular type of tree, so for example if you had said mangrove tree or pine tree then a very similar response might have been given. 'Tree' is actually a very broad range of different things, Wikipedia defines it as, 'a perennial plant with an elongated stem, or trunk, usually supporting branches and leaves' which leaves plenty of room for variability! There are lots of different types of trees, and describing them carefully helps us in thinking about how the different types are adapted to particular climates. Now ask what we mean by the term forest. Do all forests only contain one type of tree? Why is there variation in forest types?

Decide what you would like leaners to record in their notebooks.

In your plenary draw things together from today's lesson about typologies and key terms.

Lesson 2 How do climate and land shape create different sorts of forests habitats and ecosystems?

Aim: To explore how climatic conditions and landforms determine the sort of trees and forests found in particular locations.

Forest types

Activity 1

Next read the bottom section of page 36- how does this show that climate and land shape create different sorts of forests habitats and ecosystems?

Ask pupils to write the title Forest Types, and then write down definitions for the four types of forest which the World Wildlife Fund uses as a classification typology: Boreal, Tropical, Temperate, Subtropical.

The role of forests in the economy of a region

Activity 2

Read the text at the top of page 37, and ask pupils to write in their notebooks what economic and other benefits forests offer.

Plant Habitats

Activity 3

Ask learners to look at the diagram showing plant habits, and discuss it with them. It shows the typology of common natural vegetation (top labels); the climate (indicating temperature-humidity) typology at root level; and the four forest types (labels in capitals).

You could provide a 'stick-in' copy for the pupils to stick in their notebooks, either without labels- asking pupils to add the labels, or a completed copy for later reference.

In your plenary recap on the learning from the two lessons- using the language on the plant habitats diagram, and pointing out how landforms and climate is key in influencing habitat.

Lessons 3-4 Rainforests, Tropical and Temperate Climate Forests

Textbook Section: 4.2, Pages 37-39.

Aim: To understand the importance of the world's rainforests to the planet and be able to explain their nature, structure and features.

Learning outcomes: Learners will-

- Understand the connections between climate, habitat type and natural vegetation;
- Compare and contrast different types of forests globally and in Pakistan;
- Demonstrate knowledge of temperate and tropical forests
- Demonstrate knowledge of forests in Pakistan;
- Evaluate the benefits of, and risks to forests;
- Use specialist terminology.

Lesson 3 What are the key features of tropical and temperate forests?

Aim: To investigate the key features, and significance, of topical and temperate rainforests

In the preview explain the importance of forests to all life on Earth as oxygen producers and carbon dioxide absorbers. Without the production of oxygen by plants, and especially by trees, because of their size and prevalence, the oxygen in the atmosphere we breathe in would not be replenished

Why are the rainforests described as 'the Lungs of The Earth'?

Activity 1

Read the text for 4.2 on page 37 with the class, discuss the information, and ask pupils to answer these questions:

1. Why are trees, and in particular large forests like the Amazon rainforest, vital to keeping the atmosphere healthy?
2. Where on Earth are rainforests found?
3. What is special about the climate in this part of the Earth?
4. What are the soil and plant life like in a typical rainforest?
5. To what extent are rainforests biodiverse habitats?
6. Why might a world precipitation map be useful in explaining where rainforests are found?

How do rainforests operate as a habitat?

Activity 2

You could show some video footage at this point to show examples of the plants and animals in a rainforest.

Now, as a group, read 'How do rainforests operate as a habitat?' on page 38, which explains the nature of the rainforest habitat and its tiers or layers of plant life.

The diagram is important in understanding how a rainforest is a series of layered and interdependent habitats, with an upper and under canopy, shrub and forest floor or litter layer. Therefore discuss it carefully with learners and talk about the sorts of life found at each layer.

Decide if you wish to provide a copy of the diagram for pupils notebooks, or to have them write down some information from the text and diagram in relation to video footage or other sources you might want to use, to show life in the rainforest.

Optional Home Learning

You could set an optional task of making a two or three dimensional representation of a rainforest to show the layers which form the forest habitat. If pupils want to make a model they could use scrap card, for example, to make a pop-up rainforest.

Images of versions made by others, and even instructions and templates are available online (although watch out for sites which charge for access or try to market things).

In your plenary summarise why rainforests are important and diverse habitats and reiterate some of the specialist vocabulary we use to describe their structure and features.

Lessons 4-5 Why is mass loss of rainforest a problem for the planet?

Aim: To explore the impact of mass rainforest deforestation, and its global significance.

In the preview for both lessons explain that today they are going to write the front-page story for Geography News: a journal for people interested in geography around the world. They will have to read about,

and report on, in careful and well thought out terms why the massive destruction of rainforest land is a significant problem for our planet and its people.

Newspapers, Magazines and Journals

Activity 1

Talk with the group about why newspapers, magazines and journals are produced, and what they are intended to achieve (inform,entertain, educate…. Make a profit…spread certain information, develop awareness…etc.).

Discuss how the front page or first article might be laid out (Headlines, sub-headings, font size, images, and so on… what features should their work include). Perhaps show examples and talk about which ones they feel are most effective.

Why is rainforest clearance accelerating and what is its impact?

Activity 2

Read the text on page 39 with the group section by section, asking the pupils to record any information you would like them to have in their notebooks as you proceed. Use a mind map to display this information on the board.

This gathering of core information should be interspersed with other activities such as looking at case studies of deforestation, attacks on native peoples, eradication of wildlife, etc. from written and visual sources, and film from the internet- all carefully chosen and checked in advance. Large environmental charities or organisations like National Geographic will have given due care to fact checking, so are often a good source of suitable information.

Ensure that the pupils understand and can correctly explain terms such as land clearance and land exhaustion, and can make links and connections between both and the degradation of the rainforest and impact on native flora and fauna, including indigenous peoples.

Activity 2

can continue into the following lesson/be interleaved with research and writing time so that pupils are working on their articles for 'Geography News'.

Optional Home Learning

Could be set to continue the writing or research tasks associated with the assignment.

In your plenary for both lessons remind them of how important it is that reporting of environmental problems is accurate as it will undermine public confidence if the reporting is flawed.

The work could be teacher or peer assessed. In your feedback look for opportunities to praise careful and well thought out responses to the task and individual or team effort that reflects particularly strong effort by pupils.

Lesson 6 Pakistan's Forests and Trees

Textbook Section: 4.3, Pages 40-43

Aim: To generate awareness of the nature of the trees and forests in Pakistan.

Learning outcomes: Learners will-

- Understand the connections between climate, habitat type and natural vegetation;
- Demonstrate knowledge of forests in Pakistan;
- Evaluate the benefits of, and risks to forests;
- Use specialist terminology.

Investigating the Natural Vegetation of Pakistan

In the opening part of your lesson, use your preview to ask how many plants native to Pakistan the class can name (have an alphabetical list printed so you don't get caught out): the list is likely to be short. Ask why they know so little about national botany…. And what we mean by the word botany. Can they remember from science what names botanists use for the different types of plants? A common typology their parents might use is the terms we use when we see plants in the landscape include bulbs, algae, mosses and lichens, low growing annuals and perennials plants and herbs, ferns grasses, bushes and shrubs, trees- or at the food store- fruits and vegetables! You might want to check with your school's science colleagues/the curriculum requirements so you are mirroring the correct language use. Point out that the map on page 39 uses the geographical classification which is determined by climate type (see key, top left of map) rather than the botanists breakdown of classes of plant in relation to whether they are seed bearing or not, or from particular family groups.

The Vegetation of Pakistan

Activity 1

Read page 39 together, looking at the shading of the map which indicates how climate is creating habitat and how habitat determines natural vegetation that can survive. Discuss what this is likely to mean in practice and show pupils some images of natural vegetation in Pakistan, or a video-film to give them examples. Decide if you wish pupils to have a copy of the vegetation map to stick into their notebooks, and/or a list of the vegetation types.

What are the different types of trees In Pakistan?

Activity 2

Ask pupils to turn ahead a couple of pages to page 42-43, 'What are the different types of trees?' Read about each of Coniferous, Deciduous, Evergreen Trees and Thorn Forests.
Ask pupils to create a cube of four boxes, with a brightly coloured border, in their notebook and write in some information about each of these four types of trees. They will need to estimate how much space to set aside to describe the class of tree and give examples.

Optional Home Learning

You could ask learners to find out more about Pakistan's natural vegetation as a home learning task, and perhaps make something like a small Spotter's Guide, perhaps for small children, therefore simple, clear and with illustrations of common plant types. If a standard format was used for different entries pupils could be assigned different plants and collectively a class could create an actual guide or wall display about our natural flora.
In your plenary consolidate the learning by mentioning that they have new knowledge about classification systems, technical language and the influence of climate on biodiversity.

Lessons 7-8 Forest Habitat Types in Pakistan

In your preview explain that in the previous lesson we looked at vegetation types, and today we will study forest habitat types, looking at how land type and climate impact on the sorts of trees which a landscape can support.

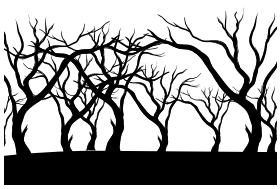
What are Pakistan's forests like?

Activity 1

The text on pages 41-42 explains the features of Thorn, Hill and mountainside, Tropical, Sub-Tropical, Coastal margin (Mangrove- or Littoral/Shore Swamp and Wetland) Forests, Alpine and Sub-Alpine Coniferous Forests. Read and discuss this and show some images of the habitats and native plants.

Allocate time for the remainder of this lesson and the next lesson to pupils to make a poster style summary of the key facts about forest types in Pakistan, for example using photographs and details of tree, leaf seed and timber types- and habitat for each category. Set clear success criteria with the group before they start the work, and agree how it will be marked. You might, for example, 'gallery' the work at the end of the final lesson, so people can comment (positively) on the content, clarity and design features used and how successfully the key geographical information, skills and knowledge are transmitted.

Forest Habitats in Pakistan



Thorn Forests

Hill and Mountainside Forests

Tropical and Sub-Tropical Forests,

Alpine and Sub-Alpine Coniferous Forests.

Coastal margin (Mangrove- or Littoral/Shore Swamp and Wetland) Forests

In your plenary ask pupils to summarise the nature of the forests we have in Pakistan, and encourage the use of the correct terminology to describe both vegetation and habitat.

Lesson 9-10 Forestry Problems and Possible Solutions

Textbook Section: 4.4, Pages 43-45

Aim: To understand that economic drivers (causes) can have an environmental impact (consequences) and assess significance (impact) after arguing a balanced case.

Learning outcomes: Learners will-

- Demonstrate knowledge of forests in Pakistan;
- Evaluate the benefits of, and risks to forests;
- Demonstrate communication skills in creating a balanced account and reaching a supported conclusion;
- Use specialist terminology.

Lesson 9 What problems do Pakistan's forests face?

The aim is to set up a 'Two-sides of a coin' enquiry'
In the preview - explain how a 'two sides of a coin' argument works.
A balanced case has to be constructed arguing for and against an idea, then make a judgement based on the evidence gathered.
In our first lesson, one side of the issue will be presented, and in lesson two we will look at arguments for the other side of the enquiry, before deciding on, and writing a conclusion as home learning.

What problems do Pakistan's forests face?

Activity 1

Read and discuss pages 43-44, which present information about the problems that Pakistan's forests face: deforestation in general, overgrazing of thorn forests, and the development of accessible forest land. Pupils will need to be helped to think about what information here can be used to show that there is a problem, but also what are the counter arguments in favour of the economic case around the need for development, for grazing land, for ordinary families to have work and comfortable lives in return for hard work. Discuss with the pupils what additional information they need, and from where we might find it to give a balanced view of development and to evaluate the level of the impact with current statistics and further data.

Ask pupils to use any remaining time to begin to write up 'the first side of the coin'
In your plenary help pupils think about any follow-up actions which might be useful, and completing anything half-finished while it is fresh in their minds.

Lesson 10 Why are forests so important?

In the preview remind the group that they will now look at the 'other side of the coin', and need to use today's information to continue and to strengthen the argument as to why forests serve a country's needs and make the counter case that they need to be protected.

Activity 1

Read page 45 with the group, and discuss what it suggests about the importance of forests, and how we might limit the damage to forests and seek solutions to environmental problems.

Activity 2

Introduce any other materials you have assembled to the group and ask them to take the information they see as useful for the case they are making. This might include government ministry figures or maps (perhaps adapted into formats which are suitable for Grade 6 pupils), commentary from other sites and sources, and things which might help them organise their case making. Helping pupils to understand some of the conceptual issues will be important, they might for example lean towards having an emotional attachment to protecting the environment, and not have a well-developed prior awareness of the importance of economic development and very real need for work and income in many communities. Therefore helping them make their case on the basis of rationality, and considering viewpoints which might not have naturally occurred to them will be important steps in helping them develop their critical awareness and ability to make 'two sides of the coin' and a conclusion arguments.

Optional Home Learning

Depending on how much information pupils have been acquiring, and their progress in their two sided case making, they might need to complete parts of the work, and/or the conclusion, at home.

In your plenary sum up what a 'two sides' argument must achieve and draw together any key points from discussion and information sharing today.

Answers for the end of unit recall questions.

Section 1 Quiz Questions

1. Definitions for a. Flora, b. Fauna, d. Boreal, e. Tropical, f. temperate are given on page 36; and for c. agriculture on page 35.
2. Descriptions of the features of these trees are found as follows: a. conifers and c. deciduous page 42; b. evergreens page 43.
3. The nature of mangrove forests, (warm coastal margin muds and waters) is explained on page 42, so they are not suitable for cold, rocky land alpine settings because it is not a habitat which will sustain marginal plants.
4. I suggest delete current Q4 here as the content it refers to was deleted in the changes) and suggest the section 1 starts with: Define/describe and then the existing 1a-f, and 2a-c become Qs 1-9 and the current 3 becomes Q10:

Section 2 Multiple Choice Questions

1. The World Wildlife Fund report 18.7 million acres are deforested yearly.
2. The comparison to how many cricket pitches this would make is NOT because A. Cricketers are mostly to blame for deforestation.
3. The Date Palm is a deciduous tree.
4. The correct figure is missing from the list of options. Please amend C. to show 5.45. C. 5.45% of Pakistan is covered with forest.
5. The wording does not work in a couple of places. Amend the statement and options as follows: Regeneration of littoral swampland mangrove plantations does NOT create:

A. natural coastal defence. B. a specialized habitat for wildlife. C. A way of removing salt from the swampland.

6. |The wording does not work in a couple of places. Amend the statement and options as follows:
   Land exhaustion in the rainforests happens when:
   A. Too many native trees and shrubs are growing.
   B. Workers are tired from clearing rainforest land. C. Poor soil becomes unproductive after 'slash and burn' clearance and over intensive crop growing. And this is the answer for this section Land exhaustion in rainforests happens when C. Poor soil becomes unproductive after 'slash and burn' clearance and over intensive crop growing.
7. A. Pakistan spends a lot importing timber.

Opportunities for Longer Prose Responses, Debating and Extended Writing

In this chapter about 'Forests' you could ask pupils to complete written essays or spoken explanations, for example:

1. Explore how the removal of forests disrupts natural cycles, impacts water availability, leads to soil degradation, and contributes to climate change by releasing stored carbon dioxide.
2. Discuss case studies from around the world that highlight the ecological implications of deforestation.
3. Investigate the social implications of deforestation, particularly on indigenous communities whose livelihoods and cultures are intertwined with forests. Explore their unique knowledge of sustainable forest management and the ways in which their voices can contribute to conservation efforts. Discuss the ethical considerations of displacing indigenous populations due to deforestation.
4. Engage in a debate about the balance between economic development and environmental preservation. Analyze the arguments put forth by stakeholders advocating for deforestation as a means to promote agriculture, infrastructure, and economic growth. Contrast these with the arguments for sustainable development and forest conservation.
5. Examine the role of corporations and consumer demand in driving deforestation. Explore supply chains, corporate practices, and the impact of products like palm oil and soy on deforestation. Discuss ways in which consumers can make informed choices to support sustainable industries and reduce their ecological footprint.
6. Analyze the effectiveness of international and national policies aimed at curbing deforestation. Discuss challenges in enforcing regulations, the role of governments, and the potential for global cooperation to address this issue. Explore success stories and areas for improvement in policy implementation.
7. Research and discuss viable economic alternatives that promote forest conservation and sustainable land use. Explore ecotourism, agroforestry, and community-based initiatives as ways to generate income while preserving forests and promoting biodiversity.
8. Investigate technological innovations such as satellite monitoring, data analysis, and reforestation techniques that can help combat deforestation. Evaluate their effectiveness in tracking deforestation, identifying illegal logging, and promoting reforestation as a means of ecological restoration.
9. Explore the role of media in shaping public perceptions and awareness of deforestation. Analyze how documentaries, news coverage, and social media campaigns can influence public opinion, policy changes, and global initiatives to address deforestation.
10. Examine the connection between deforestation, carbon emissions, and climate change. Discuss the potential of forests as carbon sinks and the role of reforestation and afforestation in mitigating the impacts of climate change. Explore the global significance of preserving forests for climate stability.

11. Discuss the importance of collaboration among governments, organizations, and individuals in tackling deforestation. Highlight successful international efforts, such as the REDD+ program, and explore ways in which grassroots movements and local communities can contribute to global conservation goals.

Chapter 05

Natural Disasters: Earthquakes, Tsunamis, and Volcanoes

This chapter is focused on Natural Disasters. Remember that there will be sensitivities in many families around loss incurred as a result of natural disasters, so be respectful and careful in how you mention particular events where there might be any 'local experience' or traumatic memory.

Textbook Section: Natural Disasters, pages 47-58.

Aim: To explore the causes, nature and consequences of different forms of natural disaster.

Learning outcomes of the chapter:

Learners will --

- Describe the types and causes of natural disasters;
- Identify the consequences of natural disasters;
- Evaluate the significance of natural disasters for the environment, human beings and ecosystems;
- Analyse preventative and post-disaster relief measures;
- Use specialist terminology;
- Identify how technology supports monitoring and predictive actions in relation to disaster management.

Lessons 1-2 Exploring Natural Disasters

Aim: To understand and begin to be able to discuss the concept of natural disasters, and develop knowledge of key terminology and human agency in causes and consequences.

Textbook Section: 5.1 pages 48-49

Learning outcomes: Learners will-

- Define the term natural disasters;
- Identify that geographers note three impact phases: primary, secondary and tertiary impacts with regard to natural disasters;
- Use specialist terminology;

Lesson 1 How do we measure the impacts of Natural Disasters?

Aim: To consider the key term 'Natural Disaster' and understand that geographers identify three phases of impact which cover immediate and longer term consequences: primary, secondary and tertiary impacts.

In the preview ask what we mean by the term 'natural disaster'?, and whether they are able to give examples. Write on your board the suggestions they make for the definition and the examples and discuss them. Which of them happen in Pakistan? Are there any that do not?

Ask pupils to write down the version of a definition of 'Natural Disaster' that has been agreed/placed on the board.

Explain that in Pakistan the National and Provincial Disaster Management Authorities help coordinate the immediate response to emergencies (NDMA, and PDMA) and we will look at why these organisations are needed throughout the next lessons, and today will also think about what happens after the disaster happens.

Exploring Natural Disasters

Activity 1

Read the opening statement on page 48. Explain that the NDMA shows alerts for Droughts, Floods, Earthquakes, ExtremeWeather, Infrastructure (risk), GLOF (Glacial Lake Outburst Floods), Landslides and Heatwaves. Ask: Did we miss any of these from our list? Were some of the items in our list from particular categories that seem to occur (in their view) more in Pakistan?

Now read and discuss the middle section of page 48, 'What are the impacts of Natural Disasters' and discuss the contents, which explains the three stages of disaster management related to: 1. The disaster event, 2. The immediate aftermath consequences, 3 the longer term support and recovery challenge.

Which of the phases do outsiders (people not directly impacted on by the disaster) see on the news? (Impacts 1 and 2.) Which are the short (1&2), and the medium-long term impacts (2&3)? Why are the longer term (3) impacts less likely to make global news? Does that mean people have lost interest or do not care?

Ask learners to create a table in their notebooks, and summarise the text we have just read-

The Three-Phase Impact of Natural Disasters:
1 Primary Impacts
2 Secondary Impacts
3 Tertiary Impacts

Optional Home Learning

You could use either the 'Going Further' panel, or the 'To Discuss' panel on page 48 as the basis for home learning.

In your plenary ask different pupils to verbally summarise: what we mean by natural disasters; to provide examples; to explain primary, secondary and tertiary impacts of natural disasters.

Lesson 2 Are humans triggering an increase in natural disasters?

Aim: To consider human agency in the triggering of natural disasters.

In the preview recap briefly on the previous lesson and the important point that a disaster is not a brief moment and then everything is 'normal again.' Some of the impact is generational- having an impact on several generations of a family, and other things permanent such as land shape change or fatalities.

While natural disasters are, by definition 'natural' today we will look at whether human action is increasing the risk of natural disasters.

How does Global Warming have a causal effect on, and influence in Natural Disasters?

Activity 1

Read, with the class, the passage on pages48-49 '*What is the role of Global Warming in natural disasters?*'

Discuss how global warming is accelerating some types of disaster. Do they feel it also increases suffering or delays recovery in types of disaster that it does not directly cause? Why?

In what other ways are humans the cause of natural disasters?

Activity 2

Read and discuss the section 'Do humans have a hand in causing natural disasters?' on page 49

Ask pupils to write a paragraph or two in their notebooks to explain in what ways humans must take the blame for triggering or worsening some natural disasters.

Taking steps to help

Activity 3

Read and ask pupils for their reaction to suggested positive steps we can take to reducing risk in the final 'How can we help?' section on page 49. Also discuss the question in the 'Going Further' panel: In what other ways can people help preserve natural resources? Ask why this might have a role in disaster prevention.

In your plenary summarise why people can be a problem (cause), victim (involved in) and solution to alleviating and responding to disasters.

Lessons 3-4 Earthquakes: The shaking Earth

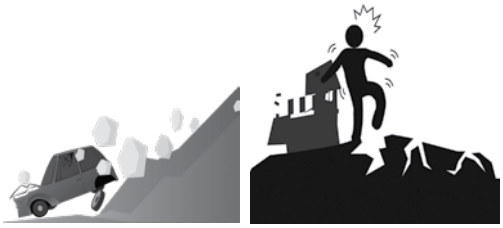
Aim: To understand the nature, causes of and measurement of earthquakes.

Learning outcomes: Learners will-

- Define and describe the causes and nature of earthquakes;
- Explain how earthquakes are measured;
- Use specialist terminology;
- Identify how technology supports monitoring and predictive actions in relation to disaster management.

Lesson 3 What is an Earthquake?

Aim: To define and describe the causes and nature of earthquakes and explain how they are measured.



In the preview ask the group to stand, with space between each other and furniture. Ask them to stay standing in the same place, but to move their body gently in a way that represents the beginnings of a small earthquake. They are likely to shake or

wobble their torso a little to represent the forces and energy which take place in an earthquake. Ask them to stop and see if someone can explain why they made those sorts of moves. Ask if they know what is happening in an earthquake and if someone can explain the process.

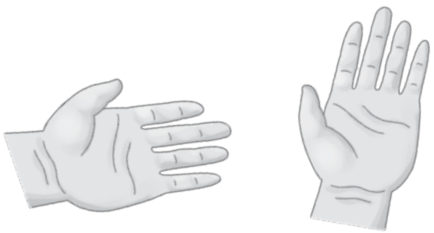
The National Geographic describes an earthquake as 'The clash of the (tectonic) plates…, where the Earth's surface shakes. When those plates scrape against each other and cause an earthquake, the results can be deadly and devastating.'

Additional resources, including documentary film and explanatory animation about the process which causes earthquakes, and examples of earthquakes are available on the National Geographic's webpages: Earthquake (nationalgeographic.org)

What causes an earthquake?

Activity 1

Read the text on Page 50 explaining the three causes triggering earthquakes: tectonic plate action, volcanic eruption and human drilling and extractive industries. Ask pupils to choose a title and write some of this information.



How are earthquakes measured?

Activity 2

Now read the central part of page 50, discuss it and look at the scale table. The text explains why, when lots of ordinary people talk about earthquakes, they ask "How big was it on the Richter Scale?"

You could copy postage stamp size image of Charles Richter from the internet lots of times onto a computer – then print a sheet of A4 printer with enough copies of his image for the class to stick in, so they can explain that the old scale was named after this famous seismologist … and say what a seismologist does, and then stick in (or copy) the more modern scale shown on page 50.

In the plenary for this lesson you are going to represent (and ask pupils to mirror/ copy) the three actions causing earthquakes and to learn a statement:

"Earthquakes are caused by tectonic, volcanic, and human processes."

I. **Tectonic action:** hold your hands out in front of you so they sit next to each other,forming a flat surface with the thumbs underneath. Get the pupils to copy this.

The two hands represent tectonic plates alongside each other. Move one or both of your hands slightly forward and backward, and ask the pupils to do the same. Explain that this represents the tectonic plates clashing and the friction leads to earthquakes. The amount of friction and resistance will determine the severity of the earthquake

II. **Volcanic action:** Now hold the two hands fingertip to fingertip to form a volcano shaped cone, (and ask the pupils to copy). This represents the volcanic cause of earthquakes. The massive

pressure from inside the earth causes the earth to tremble and generates earthquakes along the fault line.

III. **Human Action (Drilling/large underground explosions).** Finally, hold one hand flat out horizontally, and the other above it with the finger tips upright: that hand represents people/ human action- so 'Wiggle the fingers'.

Then turn the fingers of that hand down, and hit them against the other (still flat) hand- to represent the force of drilling.

Repeat the demonstration and statement:

"Earthquakes are caused by tectonic, volcanic, and human processes."

Lesson 4 Memorable Earthquakes

Aim: To extend knowledge of how earthquakes operate as a process, and be able to cite examples of very destructive earthquakes.

In the preview explain that we are going to look at the destructive power of earthquakes today, and consider why the impact of earthquakes can be long lasting and severe.

Activity 1

Read the opening sentences on page 51, and look at the first table, 'Where did the largest earthquakes happen in history?' Discuss what both tell us about the destructive nature of earthquakes.

Show the pupils some appropriate film footage about the terrible destruction caused by high magnitude earthquakes. Ask pupils to work in small teams and come up with an explanation as to why the worst earthquakes are so devastating.

Which parts of Pakistan have the greatest incidence of earthquakes?

Activity 2

Look carefully at the second table, and the map on page 51 which shows the list of high level earthquakes that the territory of Pakistan has experienced; refer to the table of six historic examples, and the map which shows Seismic Zones in Pakistan and which indicates the level of risk as a colour coded shading.

Use the 'To Discuss' panel task to begin to consider where in Pakistan is most at risk, and why this might be so. Decide what, if anything, you might wish learners to record in their notebooks.

Earthquakes Worldwide

Activity 3

As a group look at the world map on page 52. This shows places where there is tectonic plate movement, ocean ridges and examples of major earthquake destruction- on the map and on the key.

Help pupils understand what they are looking at (problems along tectonic fault lines).

Does the recording of earthquakes in areas of major population prove that the remainder of the tectonic boundaries is very calm and quiet?

You could use the 'To Discuss' panel to think about which parts of Asia are especially prone to earthquake damage, and if you have copies available look at the sections on earthquake data in the OUP World Atlas.

Optional Home Learning

You could set the class, individually or in small teams, of researching the earthquakes which took place in specific places and locations, in order to compile specific reports, display work or materials for comparison. Discuss with pupils what is needed and your success criteria as well as the format that any completed work should take.

In your plenary for the lesson restate that plate tectonics and the energy inside the Earth is the cause of most earthquake incidents, and that there are almost constant low level rumblings in the Earth's mantle and crust as a result of magma and plate movement. We do not feel most of this movement. Talk about how technology is important in monitoring seismic activity, and how early warnings of building levels of movement is key to issuing emergency warnings via the NDMA and PDMA

Lessons 5-6 Tsunamis: Giant Destructive Waves

Textbook Section: 5.3, pages 52-53.

Aim: To understand the key features and impact of tsunami waves.

Learning outcomes: Learners will-

- Describe the causes and consequences of tsunami waves;
- Evaluate the significance of tsunamis for the environment, human beings and ecosystems;
- Use specialist terminology;
- Identify how technology supports monitoring and predictive actions in relation to disaster management.

Lesson 5 What is a Tsunami?

In the preview for the lesson show a short video showing a tsunami and its impact to catch the interest and curiosity of the class. Explain that although the process is fascinating it is also deadly, and that we are studying the phenomena because of its geographic importance not to watch something with horrible consequences as a form of voyeurism.

What is a tsunami and how are they formed?

Activity 1

Read the part of Section 5.3 that is on page 52 and continues to form roughly the first half of page 53.

This explains the meaning of tsunamic (harbour wave) and how these are based on displacement, and distinguishes between the devastating force of a tsunami and the impact of the much smaller and less problematic tidal bore.

You could ask learners to write Tsunami in their notebooks and explain how they are formed using this text and the first paragraph of page 53. Now introduce some further film footage, for example from National Geographic's material online, or use appropriate photographs, to explain the formation of these waves and how the forces at work are built.

In your plenary draw together the main points that you want pupils to take away to summarise their learning about tsunami waves.

Lesson 6 What are the Causes and Consequences of a Tsunami?

What happens when a tsunami makes landfall?

Activity 1

With the group, read the text on page the bottom half of page 53. This explains the way that the impact of a tsunami might vary in. How it hits, damages and reshapes a coastal area. Decide what, if anything, you would like pupils to record in their notebooks. Look at the photograph on page 53, and any other materials which you are able to provide to strengthen pupil understanding of the impact on coastlines of tsunami landfall. There are, for example, a range of very informative documentary films online which could be used to support teaching.

Explain that geographers who specialise in tsunami processes study coastlines, and pay particular attention to places where tsunamis are thought to have hit in the past, and sometimes the distant past, to look at whether there are scour marks along valleys and coastal strips, and how far inland there might be evidence of the tsunami having travelled.

In your plenary draw together the main points that you want pupils to take away to summarise their learning about tsunami waves.

Optional Home Learning

Pupils could be asked to carry out research to find out about these seismic waves in more detail, to write written responses to particular tasks, for display or presentation work. ICT based work and creative activities are also possible, for example try typing 'tsunami cake', or 'tsunami model' and set the search to show you images.

The important point to make with setting any creative responses is to stay on the side of good taste: people die as a result of tsunami waves. You could discuss whether a 'disaster cake' is a "good thing", for example. With models the key marker of success is how well, and how fully, they show understanding of the processes of these seismic wave and their impact on hitting land.

Lessons 7-8 Volcanoes the Exploding Earth

Textbook Section: 5.4, pages 54-55.

Aim: To develop knowledge about the nature of volcanos and their environmental impact.

Learning outcomes: Learners will-

- Describe the causes and consequences of volcanic processes for the environment, human beings and ecosystems;
- Use specialist terminology;
- Identify how technology supports monitoring and predictive actions in relation to disaster management.

Lesson 7 What is a Volcano?

In the preview explain that the next lessons will look at how geographers study and make sense of volcanoes. Ask the class if they can tell you what a volcano is, and how the process works. This discussion should bring a basic level of knowledge into the room, and allow you to ask how geographers know about volcanoes if they are too dangerous to get very close to for study? Are all volcanoes the same? Are some possible to climb down into, like in Jules Vernes' story 'Journey to the Centre of the Earth'(which would make it possible to see inside)… or is that just a fun myth? Verne wrote the story in 1864 CE, and expanded it in 1867 CE, so the level of scientific knowledge of volcanology was still developing. Explain that we will start to answer some of these sorts of questions here and in any research. Link back to their prior knowledge about plate tectonics and fault lines, and talk about the molten state of the core of the Earth and tremendous pressures below the mantle.

What is a volcano?

Activity 1

Read the paragraph on page 54 with the class: 'What is a volcano?,' and look at the diagram showing a cut-through or section diagram of a volcano. Discuss each of the technical terms of the parts of the volcano, describing each, and showing additional photographs or film clips as you feel appropriate- and asking learners to record the key information, providing them things to stick into their notebooks. The definition here, and the diagram are both key things for learners to retain.

What does volcano shape tell us about volcanic activity?

Activity 2

Together, read the 'What are the two main types of volcano?' Draw on the board, or show pictures of, the two volcano shapes. Point out that the image we have in our mind, the stereotype, of a volcano might not be exactly how all volcanoes appear in practice, especially where an eruption has shattered a cone or broken the side of a volcano. You might ask learners to draw a cone type composite volcano, and a shield type volcano, and give examples of where each might be seen.

In your plenary discuss what the group thinks the two volcano shapes tell us about the level of pressure and magma underneath that location, and whether we think this might have an influence on how active the volcanoes might be along that fault line. Restate that this is a result of tectonic and subterranean forces, and although impressive as a landscape feature and event, also represents environmental problems whenever there is a significant eruption.

Lesson 8 Where have the Most Memorable Eruptions Taken Place?

Aim: To understand that volcanos are varied in type and nature, and extend our knowledge of their nature and impact.

In the preview recap on last lesson, where we said there were two common volcano shapes, and looked at some of the key features of volcanoes. However, there is also variety in shape and type, so today we will look at locations globally, and in Pakistan and think about why volcanic explosions catch the public's interest.

Why are there 'no surprises' in the location of volcanoes?

Activity 1

Discuss with the group where they might expect to find volcanoes, hopefully pupils will link to plate tectonics as a causal factor and will suggest volcanoes are found along tectonic plate fault lines. As a class, read 'Why are so many volcanoes in the oceans?' page 54, and (if you have copies available) use the OUP School Atlas, refer to maps which show: the 'Ring of Fire': the horseshoe shaped location of the volcanoes around the Pacific rim, and the location of the major tectonic plate edges (e.g. page 8 in the Grade 6 textbook). Consider the 'Ring of Fire' and provide and investigate some additional material about volcanoes and their location along the fault lines. You could refer to the 'To Discuss' panel at the bottom of the page at this point.

Link to, and read together, the 'Does Pakistan have any volcanoes?' paragraph (page 54) which explains that one of Pakistan's extinct volcanoes seems to have been dormant, and is possibly waking up (or at least yawning in its sleep). Decide if you would like to have pupils write down the location and condition of Pakistan's volcanoes.

Why are people so interested in volcanoes?

Activity 2

Explain that although Jules Verne's 'Journey to the Centre of the Earth' has no scientific basis whatsoever, it is still popular, and in print, and some modern films and books still feature volcanoes as part of the story. Documentaries about volcanic eruptions are also tremendously popular. Ask the group why volcanoes seem to catch the public imagination, and what it is that they think makes them seem so interesting and exciting. Show some further footage from a documentary recording showing volcanic eruption.

With the group, read the section on page 55 about memorable volcanic eruptions. You could contrast this with information about the March-June 2010 eruption of the (almost) unpronounceable Icelandic volcano at Eyjafjallajökull in Iceland, the smoke and dust particles from which brought international air travel to a halt until May that year.

Why is 'mud volcanoes' a misnomer?

Activity 3

Explain that a misnomer is a miss-naming of an object or person. With the group look at the Pakistan has 'Mud Volcanoes' section of page 55. Ask pupils to explain: why mud volcanoes should more properly be called mud domes, and the differences between a mud dome and an igneous volcano.

Optional Home Learning

You could link the History curriculum and ask learners to research the disaster at Pompeii and Herculaneum when Mount Vesuvius erupted.

Research might also be carried out about the evacuation of Montserrat in 1997, when the tiny (16 km long, 11 km wide) island experienced an eruption of the Soufriere Hills volcano took place.

For creative outcomes you could ask learners to script a podcast, design a webpage or make models.

Learners could be asked to make volcano models (lots of examples can be found online)

In your plenary remind learners of some of the technical terms they have learned, and help them recall where Pakistan's volcanoes are found and how they are different to those of the Ring of Fire or elsewhere in the world.

Lessons 9-10 Natural Disasters in Pakistan

Textbook Section: 5.5, pages 56-57.

Aim: To develop further awareness and knowledge of the natural disasters which are experienced within Pakistan.

Learning outcomes: Learners will-

- Describe the causes of natural disasters;
- Identify the consequences of natural disasters;
- Evaluate the significance of natural disasters for the environment, human beings and ecosystems;
- Analyse preventative and post-disaster relief measures;
- Use specialist terminology;
- Identify how technology supports monitoring and predictive actions in relation to disaster management.

Lessons 9-10 How can previous natural disasters in Pakistan help us survive future natural disasters?

In the preview explain that we will now apply our knowledge of natural disasters to Pakistan and will explore how earthquakes and tsunamis, droughts, floods and landslides impact on Pakistan's land, environment, habitats and people. Explain that in this two lesson-long activity there will be time to think, plan, gather information and then develop materials for use in a new children's section of the Disaster Management Authority's webpages. Explain that in this scenario government has decided that they want to begin educating quite young children about natural disasters, why they happen and what can be done to spot warning signs, behave more safely and survive if disaster strikes. Therefore, there will be a need for accurate information, written in a child-friendly and accessible way that is going to be part of a public information campaign.

Making a Children's briefing for the website and public information campaign of the Disaster Management Authority

Activity 1

Discuss the task with the pupils, setting the limits you want to impose around format, structure and media to be used. For example different pupils or groups might be tasked to design posters for schools and public buildings about historic examples of disasters, with part of the poster telling the reader what should be done as emergency action in the event of that sort of disaster striking again. Pupils might be given a remit for a particular section of the children's website, or specific types of disaster

Pupils should read pages 56-57, which given examples of significant incidents in different categories of natural disaster.

They will also need to be provided with other suitable materials and possibly with access to the internet to visit the web pages of the NDMA, and PDMA to look at what approaches are taken to educating adults and if any materials for teaching children about disasters are included.

Decide how the work will be assessed as part of your initial conversations with the group so they have clear and agreed success criteria in place and, if you wish, can include an element of peer assessment.

Optional Home Learning

To research 'what to do in a natural disaster' situation for particular situations, and think about how this can be put into child-friendly and accessible language without frightening the child. Suggest to the pupils that some crisis events will mean that adults are around and in control of the situation, and at other times they might need to be grown-up and take action such as calling an emergency number, leaving a building, and standing well away from buildings and walls in an earthquake, or something as simple as knowing where a family first aid kit or clean cloth is kept in case an adult is injured and they can help them.

In your plenary for both lessons you might include a three minute quiz about Pakistan's experience of natural disasters and safety actions that everyone should know.

Answers for the end of unit recall questions

Section 1 Quiz Questions

1. Earthquakes occur with greater strength in some parts of the world because… (page 50)
2. The deciding factor on where volcanoes are found is the position of the… (page 52)
3. Economically developing countries such as Pakistan are especially vulnerable to the effects of natural disasters because…(page56)
4. Scientists mention the domino effect of rising global temperatures because… (page 49)
5. When a tsunami is approaching a shore there is a dramatic sudden pulling back of the water away from the shore. This provides a slight warning and immediate total evacuation to high ground inland should urgently begin. (page 53)
6. As a tsunami approaches the shore its height grows as the water compresses kinetic energy. (page 53)
7. A 'mud volcano' is different to a 'regular' volcano because… (page 55)

8. Repeats Q7 currently. I suggest it is changed to What is difference between the shape of a shield and a composite volcano? Answer: A shield volcano has a shape like a shield laid flat, a bit like a shallow, wide bowl that is upside down. A composite volcano is shaped like a cone, or upside down funnel (page 54).
9. Technology can only reduce the effects of natural disasters if it is used to issue warnings, predict event and aid prevention and evacuation/post event care, for example monitoring seismic and volcanic activity. (page 56)
10. Human activities which contribute to pollution in the environment include: using fossil fuels, contamination of land and water (e.g. chemical, waste dumping, industrial waste, sewerage disposal, animal waste and run-off from agro-chemicals) Pollution is not fully explored here so this question doesn't quite site as right here! In any case, I suggest you remove the second statement part of this question in the book, then it remains more like a quiz q.

Section 2 Multiple Choice Questions

1. An earthquake is: B. The ground suddenly shaking. (page 50) In the textbook question the grammar is wrong. Reword B as B. The ground suddenly shaking.
2. Tsunami is a Japanese word which means: B Harbour wave. (page 52)
3. The most common cause of a tsunami is: A. Underwater earthquakes. (page 53)
4. A tsunami causes the most destruction: C. Along coastal regions (page 53)
5. The bowl shaped basin at the top of a volcano is called: B. The crater. (page 47)
6. Epicentre means A. The centre of an event. (page 50)
7. A tidal bore is: A natural surge wave along a river or estuary. (page 52)

Opportunities for Longer Prose Responses, Debating and Extended Writing

Remember that there will be sensitivities in many families around loss incurred as a result of natural disasters, so be respectful and careful in how you mention particular events where there might be 'local experience' and traumatic memory.

In this chapter about Natural Disasters you could ask pupils to complete research, prepare written essays or presentations, reports or spoken explanations, or to take part in debates, for example:

1. Explain what the function of the National and Provincial Disaster Management Authorities is, and why they are an essential part of Pakistan's government structure.
2. The impact of natural disaster can be seen in primary, secondary and tertiary phases. Explain each and evaluate whether intense international reporting at stages 1 and 2 means "people globally have ceased to care by the time the long efforts of phase 3 are underway"- or if a less simple explanation is needed.
3. 'Volcanoes are dramatic, but not really a very significant threat to humanity'. How far do you agree? (Can also be a debate question)
4. Flooding and Earthquakes show how little knowledge we have of disaster preparation (Debate)
5. What are the most serious natural disaster risks to face modern Pakistan?
6. To want extent can a developing economy with a large population ever be really fully prepared to cope with natural disasters?

7. Research incidents of major Tsunami waves and report on why they can be described as "terrifyingly powerful"
8. Research and create a timeline of either global or national natural disaster event.

Chapter 06

The Changing Earth

This chapter is focused on the processes of weathering and erosion and how they change coastal and inland landform; and how human land use and economic activity also leads to processes of erosion and change to landform.

Textbook Section: Section 6, pages 59-68

Aim: To understand the processes of weathering and erosion and their impact on landform.

Learning outcomes of the chapter: Learners will-

- Describe the processes of water and wind which causes weathering and erosion;
- Identify the four processes of coastal erosion;
- Explain how erosion changes landform;
- Explain how human needs, environmental and ecosystem needs, and economic activity can compete with each other for land use;
- Use specialist terminology
- Understand how technology helps us survey and map landscapes.

Lessons 1-2 Why are Weathering and Erosion Important Geographic Processes?

Textbook Section: Section 6.1, pages 60-61

Aim: To understand the definitions of and differences between weathering and erosion.

Lesson 1 What is weathering?

Aim: To understand the definition and nature of weathering.

In the preview explain that in this lesson we will learn about weathering, which is the process of soil and rock being broken down by the conditions around it, and the debris falling away but staying close to the original location.

What is weathering? Demonstrating weathering

Activity 1

If you can, have some dry sand or soil, or a light item like flour or semolina from your home kitchen, and a tray.

Clutch a small handful of the 'soil' and explain that natural or animal action sometimes wears away rock and soil.

Drop a little onto the tray directly below your hand as you explain that this debris just accumulates where it

has split away from the main body of rock or soil. This is weathering- and the debris stays put!

Now read the opening section of page 60, which explains weathering: decide if you would like pupils to write down a definition of weathering in their notebook. If so ask them to place a coloured box around the term. There is also an explanation of how grains of soil are created, and why some soil is unproductive.

With the group, read 'The three types of weathering,' pages 60-61 and explain/discus the three sections as you progress through them. You could ask pupils to create a t chart in their books to help them write down some details about the three types of weathering: for example

Weathering breaks down soil and rock and leaves the debris in situ:		
Chemical	**Mechanical (or Physical)**	**Biological**

As you work through each explanation you could show images of different examples of weathered rock and landscapes and talk about how the surfaces are being weathered. Allow time for pupils to add information into their table. If you are able to do so you could provide photocopies of some example images to stick into notebooks.

Optional Home Learning

Pupils could be asked to look at further images of weathering, and to research the topic in more detail, for example looking at geography films online.

In your plenary explain that we have been looking at the three key processes of weathering, and that they should now be able to correctly describe these long-term destructive processes, and use them to inform their observations when looking at soil and rock surfaces in the landscape or in images.

Lesson 2 What is Erosion?

Aim: To understand the definition and nature of erosion.

In the preview explain that in this lesson we will learn about erosion, where when soil and rock is broken down by the conditions around it the debris is carried away by the action of wind or water.

Demonstrating erosion

Now repeat the demonstration with the (flour or semolina) 'soil' in your hand. Explain that in erosion the item broken away does NOT stay where it falls, but is carried away by wind or water action.

This time as you drop a little onto the tray directly below your hand- blow it gently along the tray- explain that this debris is being carried off by wind or water. This is erosion and this is how it differs from weathering.

Water, wind and biological erosion

Activity 1

Read through the section on erosion on page 61 with the group, and discuss the content.

Show images of the different types of erosion, for example some of the amazing shapes of wind and sand-worn stone in deserts and dry locations where small grits 'sand down' the rock, or shapes in harder rocks where there has been erosion of coastal rocks.

Ask pupils to create a t chart, which they will complete missing information on this page - and from additional sources if you wish to provide supplementary materials.

Erosion breaks down soil and rock and carries the debris away:				
Physical or mechanical Erosion	**Chemical Erosion**	**Water Erosion**	**Wind Erosion**	**Biological Erosion**
Soil and rock is physically rubbed or scraped away and abraded in a process of attrition.	Minerals in the soil/ rock are dissolved and the structure crumbles or splits.			

Optional Home Learning

Ask pupils to explain the difference between weathering and erosion in a carefully worded personal explanation.

In your plenary summarise the difference between weathering and erosion and summarise the different ways that beds of rock and banks of soil are eroded.

Lesson 3-4 Why is Moving Water such a Destructive Force?

Textbook Section: 6.2, page 62-63.

Aim: To explore the erosive power of water and its role in changing landforms.

Lesson 3 Coastal Erosion

In the preview explain that today's lesson will focus on how water reshapes coastal landforms. Read the two introductory paragraphs on page 62 through to the end of the 'Destructive waves can change a coast' text.

Ask the group if they know how much of the sea is moving, and after taking a couple of suggestions explain that is not actually really heading inland. Although it looks like the waves are bringing the sea (or ocean) towards the shore actually the water usually does not move very far. The difference between high and low tide in some places can be surprising, but the water is not really about to flood the coast daily.

Instead it is the wind that provides the energy into the surface layers of the waves, and they pass the energy along. It is that energy that is breaking onto the shore and also aiding the process of erosion. Elsewhere in the water there are various currents and movements of water- so there is movement, but not inland. The water does have tremendous weight, and at times remarkable force. We are going to look at how this changes landform.

What causes coastal erosion?

Activity 1

Read and discuss the text on page 62 'What causes coastal erosion?' which explains the four erosion processes: Attrition, Abrasion-Corrasion, Corrosion-Solution and Hydraulic action.

Ask the group to use the information to explain each of the four coastal erosion processes to each other and then complete a t chart summarising the details:

Attrition	Abrasion-Corrasion	Corrosion-Solution	Hydraulic action

Optional Home Learning

Ask learners to dig deeper into:

- How water-based erosion wears away rock, completing this as a research or creative activity.

In your plenary ask pupils if they had realised how powerful a single drop of water …magnified a million or a billion times could be?

Then show some images of water-based erosion.

What do these images show us about the action of water-based erosion?

Lesson 4 How can erosion be controlled?

Aim: To consider how we can slow or prevent water-based erosion

In the preview explain that we will look at how water action over very long period can reshape entire landforms like coastline features.

What steps can we take to control erosion?

Activity 1

Read the short text: 'How can erosion be controlled?' at the bottom of page 63.

Ask pupils to research erosion control measures using search terms such as coastal management, and to consider how the steps listed in the textbook would operate. Provide images and information about control and prevention measures to support this research and ask the class to evaluate these against likely cost,

effectiveness, investment of resources and any other criteria they feel are appropriate.

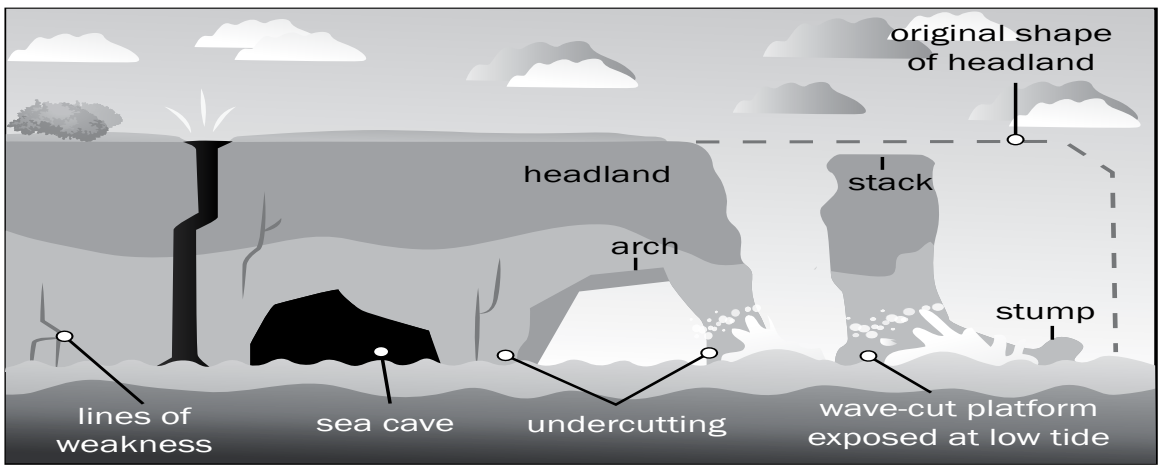
How are headlands and bays created by water-based erosion?

Activity 2

With the group, read the text on page 63: 'How are headlands and bays created?'

Decide what you would like pupils to write down in their notebooks. There are additional materials online which you might find really useful in explaining different coastal features- depending on what you would like to prioritise.

Example diagram on coastal erosion



Optional Home Learning

Ask learners to dig deeper into:

How water-based erosion wears away rock to create particular coastal features, or preventing water-based erosion.

And complee this as part of a research or creative activity.

Optional Home Learning

You could set the group the task of finding details of particular features that are created by water erosion and to represent these in a poster, web page or model.

In your plenary summarise how water erosion operates and how it changes coastal landforms.

Lessons 5-6 Destructive and Constructive forces.

Textbook Section: 6.3, pages 63-65

Aim: To identify how weathering and erosion are destructive forces, and how erosion can also contribute to construction of new landforms.

Lesson 5 Land-breaking and Land-making Forces

In the preview talk about what we mean by constructive and destructive forces. Ask the group to remind you whether weathering and erosion are each constructive and/or destructive. Explain that we will look at how water acts in different ways in different circumstances.

Exploring the effect of frozen water as a destructive force in glaciers

Activity 1

With the group, read the section on pages 63-64, 'Frozen water as a destructive force.'

Ask the group to write the title: 'Glacial Erosion.'

Show learners material which explains the nature of glaciers: for example National Geographic resources, or other sources which would help them to understand the nature of glaciation, and the very large amounts of water and ice which form glaciers. Help students acquire the specialist language which identify the different elements of glaciers.

Decide what information you would like students to record in their notebooks about the nature of glaciers, and their role in changing landforms and any related key terminology.

Look at the diagram on page 64 which shows how abrasion and attrition, plucking, and frost shatter all contribute to breaking down the bedrock and the debris that has already been created: you might want to provide a copy of this diagram for pupil notebooks and to ask them to explain the processes being shown- or to ask them to draw a copy and label it correctly. Your discussion with the class should check that pupils understand both the diagram and glacial processes as a destructive force.

You could, for example, run a hot-seating activity where pupils must speak about the subject without pausing or repeating themselves or going off-topic.

Optional Home Learning

Provide opportunities to consolidate knowledge of glaciers and examples of where they are found in Pakistan and the wider world.

In your plenary summarise the learning from the session and run a short quiz on key terms.

Lesson 6 Constructive and Destructive Forces

Aim: To develop knowledge and understanding of how water-based processes can be constructive as well as destructive processes.

In your preview explain that while glacier, with massive weight of frozen water scour landscapes and change landforms some erosional forces also have a constructional role in reshaping and creating landforms.

How can wind and water operate as constructive forces?

Activity 1

Read the information on the lower part of page 64: 'Water and wind as constructive forces.'

This text explains how water and wind can act as a constructive force as well as a destructive force. It then presents a series of keywords related to the transportation of materials which have become debris.

Ask pupils to create a drawing, like the one below the image on page 65, and underneath to add an explanatio of the terms (including transportation in this context, i.e. of debris)

The process of water-borne debris Transportation after erosion

Depositional landforms

Activity 2

Now read the 'Depositional landforms' part (first half of) page 65, which explains the coastal landforms that are formed by the deposition of eroded materials

Ask pupils to respond to these tasks: 1. Using text and illustrations explain what is meant by the term depositional or coastal landforms. 2. Explain how rivers also contribute to depositional land formation, and why this was of importance to many early civilisations.

What is mass wasting?

Activity 3

Read the final part of page 65: 'What is mass wasting?' then ask the group to respond to this task:

What is meant by the term mass wasting?

What forms can mass wasting take?

Why is human action often (but not always) a trigger for mass wasting?

Optional Home Learning

You could ask learners to write-up a response to the 'To Discuss' panel at the end of page 65 about further action to prevent environmental problems.

In your plenary summarise the learning about depositional land formation.

Lessons 7-9 Competing Demands for land use

Textbook Section: 6.4, pages 66-67.

Aim: Learners will begin to understand how human needs, environmental and ecosystem needs, and economic activity can compete with each other for land use.

This is a three lesson activity with a timed essay to be completed in the third lesson.

In the first lesson the notion of competition for different sorts of land use results in pressure on the land, and how we are increasingly living as urban societies.

In the second lesson we will learn about how urban drift is having an impact on rural communities, and how business interests can suddenly take an interest in indigenous people's lands and territories if the profit motive is high enough; and how some land is then exhausted by rapid over-exploitation and use.

In the third lesson pupils must write an essay to explain 'How human needs, environmental and ecosystem needs, and economic activity can compete with each other for land use in the modern world.' You might wish to challenge pupils to complete this without looking at their notebooks, although some pupils might benefit from being given some support or scaffolding so they can achieve success.

Lesson 7 Pressure of the Land

In the preview explain the third lesson plan and that the lesson today is focused on gaining knowledge and reflecting on the notion of competition for different sorts of land use results in pressure on the land, and how we are increasingly living as urban societies.

Why is there pressure on the land?

Activity 1

Explain that although the Earth is a big place a lot of it is covered in water, a lot is difficult to live on because of its topography or climate, and therefore humans have tended to all favourable locations which are not too inhospitable. In the modern world many of us also need to live and work in towns and cities.

Read the introduction to 6.4 on page 66, and then 'Pressure on the land' and talk about what is happening to the land as a result of human needs and resource hungry lifestyles. Decide if you will ask pupils to make their own choices about what to record or not or if you wish to set comprehension or reflective questions for this and the next sections.

What advantages and challenges does urbanisation bring?

Activity 2

Now read the remainder of page 66, which explains how urbanisation can lead to rapid changes of land use and has an impact on the ecosystem and the needs of a city and the economy of a region. Discuss the paragraph with the group and again decide what (if anything) pupils should do with the information and their collective reflection from the discussion.

The panel at the bottom of the page begins to offer positive gains from urban living, but also the challenges and negative points which might be made about living an urban life. Pupils might be able to add to these lists, or come up with other things they might want to say about the trend towards living in towns and cities in Pakistan along the river valleys and towards the coast.

Optional Home Learning

– could be set to prepare for the essay.

In your plenary draw together the key points from today and remind them to keep thinking about how they will respond to the timed essay. You might sketch out some outline ideas for things to cover or talk about structure depending on the confidence levels of your learners.

Lesson 8 Changes in Settlement Patterns and Land Control

Aim: To discuss how land use is changing and how traditional and indigenous lands can be threatened by modern resource and space demands and needs.

In the preview remind pupils of the three lesson challenge and that today we will learn about how urban drift is having an impact on rural communities, and how business interests can suddenly take an interest in indigenous people's lands and territories if the profit motive is high enough; and how some land is then exhausted by rapid over-exploitation and use.

Control of the land

Activity 1

Read and discuss each of the three paragraphs on the top section of page 67: 'Urban drift,' 'Control of the land,' and 'Indigenous land ownership.' The first 'Urban drift,' provides a chance to discuss the impact that lots of younger people being attracted from countryside areas to towns and cities has on national life and the economy. This presents a number of interesting possibilities for pupils to explore their values, developing views about the future of Pakistan and also geographical issues related to human and economic geography, land use and pressures on resources.

The next two elements: 'Control of the land,' and 'Indigenous land ownership' can be used to open up discussion of how some lifestyles and traditional uses of land are threatened by changing patterns of land use. This should also be revealing about pupil views. Help them explore the issues around the balance between appropriate development and protecting both the ecosystem and the uniqueness of particular groups.

Decide what you would like pupils to record, and stress the value of supporting viewpoints with evidence and solid factual examples whenever possible- and remind them of the value of reasoned, respectful debate if there are differences of opinion about, for example, protecting the environment, developing the economy, or respect for diversity.

The 'To Discuss' panel could be used to stimulate discussion, or as a home learning activity.

Human causes of land erosion and landform change

Activity 2

Read the final part of page 67, which is a reminder of the environmental damage that over-development, over-intensive and use or inappropriate stewardship of land has done to parts of Pakistan. Discuss what this means for longer term national sustainability and prosperity, and what might be done to prevent an acceleration of these problems.

In your plenary remind pupils that in the next lesson they have to write a timed essay. Ensure they understand whether they will be asked to complete this without looking at their notebooks or if they are allowed to bring in some notes or look at their notebooks. As Optional Home Learning some might want to

plan the essay structure, or prepare some of the things they will say. Ensure pupils know what your marking criteria will be for the work, and if any element of peer marking will take place.

Lesson 9 Timed Essay

In this lesson pupils will write an essay to explain 'How human needs, environmental and ecosystem needs, and economic activity can compete with each other for land use in the modern world.'

In the starting sequence and preview remind pupils of any requirements about structure or written conventions you wish to have followed for example: whether there is an introduction or not, a conclusion or balanced series of points to make a well-argued and impartial case.

Answers for the end of unit recall questions

Section 1 Quiz Questions

1. a. Weathering refers to material being broken away (but not taken away) as a result of chemical action; physical weather conditions; or biological action breaking down soil or rock (pages60-61).

b. Transportation is the process of materials being carried to a new location by wind or water forces (page 64)

c. Deposition involves the dropping of material that has been carried by water or wind power (page 64).

2. Erosion (page 61) is the process of wearing away material due to water, wind or biological action and being moved away, while in case of weathering, the material is not carried anywhere.
3. Coastal bays are formed when softer rock erodes faster than more resilient rock to either side of the softer rock, and a curve is eaten into a coastline by erosive forces (page 63).
4. Water, acids, salt, plants, animals, and changes in temperature are all agents of weathering and erosion. [Students to evaluate factors in their own words].
5. Depositional landforms are new sections and shapes of land created by the deposition of sediment and debris by the wind or water, e.g. bars, spits barrier islands and tombolos (page 65).
6. Human activities such as building, farming, logging and industry significantly impact changing landforms.
7. This is a research-based question. Students write this in their own words.
8. Students illustrate these in their notebooks.
9. Students will write their responses in their own words.
10. Students will write their responses in their own words.

Section 2 Multiple Choice Questions

1. Waves breaking against sandstone cliffs can cause a collapse of the cliff. This is called: B. Slump
2. When erosion causes cliffs to recede (move back) from the sea this is called: A. Retreating cliff retreat
3. When weak acid-rain weakens or dissolves rock, this is called: B. Chemical weathering. (page60)
4. The following are part of the process of transportation: C. Suspension, tractions, solution, and saltation (page 64).
5. The term that is used to describe the broken fragments made by weathering and erosion is: A. Debris (page 61).
6. During the rainy season landslides are common in northern Pakistan due to: A. Mass wasting

7. A tree root splitting a rock apart is a type of weathering known as: B. Biological weathering (page 61).
8. The term that describes the process of material carried in water and being dropped and settling is: C. Deposition (page 64).
9. When a glacier dumps silt and boulders at the furthest edge of its spread it is called a: A. Terminal Moraine (page 64).
10. Strong wave pressure that causes erosion of coastlines is called: C. Hydraulic action (page 62).

Opportunities for Longer Prose Responses, Debating and Extended Writing

1. In this chapter, you could ask pupils to complete written essays or spoken explanations, for example: In what ways is erosion different to weathering?
2. In what ways do waves create coastal landforms?
3. How does deposition change landforms along rivers?
4. Land on Earth is not scarce, so it is unnecessary to clear natural habitats for farmland. (Debate)
5. Identify some 'resource hungry lifestyles' and suggest how it could be modified, in a realistic manner, to ensure a sustainable future.
6. Humans are changing landforms faster, and with more destructive and long-lasting effects than any natural process, mainly to serve greed for profit. (Debate)