

GEOGRAPHY

Teaching Guide

Alive

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Revised Edition



A Geography Course for Secondary Schools

OXFORD
UNIVERSITY PRESS

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Diversity

Emphasize the startling diversity that is found in Pakistan, geographically, ethnically, linguistically, etc. This is a good opportunity to ask pupils to prepare a large wall chart. A small map of Pakistan can be placed in the centre with photographs, photocopies, and captions pointing to various parts of the map: scenery from tundra, desert, fertile plain, barren plateau; people from different ethnic communities; scenes of village and city life, etc. Some of the contrasts pupils might wish to examine are: great modern cities like Karachi and Lahore versus traditional villages or nomadic settlements in the west; the lifestyles of farmers, nomads, city workers, industrial labourers, etc.; agricultural, industrial, and village output; languages.

Tell students that Pakistan was the gateway to the subcontinent. Historically, wave after wave of invaders from central Asia and even as far away as Europe swept into this region. Many of these invaders, left behind settlers.

Rainfall

Pupils might find it easier to understand the concept of 'rainfall' with the help of the following simple demonstration. Borrow two glass jars from the science lab. Fill one with 50 millimetres of water and the other with 900 millimetres of water. Explain that these are the levels which the water accumulated from rainfall would cover in one year if none ran off or evaporated.

Answers to Pupil's Book page 4

- Using a scale of $1,000,000 \text{ km}^2 = 1 \text{ cm}^2$, the areas of each country would be: Afghanistan—0.662092; Iran—1.663; India—935.774; China—1221.462; Pakistan—0.796095. This would mean squares of sides: Afghanistan—0.81 centimetres; Iran—1.29 centimetres; India—30.59 centimetres; China—34.95 centimetres; Pakistan—0.89 centimetres. If the squares are drawn one inside the other on a large sheet of paper, China can be drawn first with the others arranged in size in the bottom left-hand corner.
- Climate: Burning waterless desert; permanently frozen land; fertile, semi-fertile, barren land
 - Height: From 100 metres above sea level to 8607 metres above sea level
 - Rainfall: From 125 millimetres to 750 millimetres
 - Population: From sophistic dwellers to peasant farmers
 - Settlements: From huge cities with populations in the millions and modern amenities to sparsely populated primitive hamlets without electricity and running water

3. Individual work. Pupils should be asked to consult *Oxford School Atlas for Pakistan*.
4. Individual work. Pupils should be asked to consult encyclopedias and other reference material. They may wish to visit embassies and consulates for additional information.
5. Individual work. In addition, ask pupils to look at brochures from travel agencies and then make posters, advertising a specific aspect of Pakistani tourism: mountains (scenery, adventure, roughing it out, exploration, photography, etc.); historical sites (Mohenjo-daro, Taxila, Gandhara, etc.); river cruise along the Indus, with descriptions of scenery along the way, etc.

Additional exercise

MCQs

Choose the correct answer:

1. Which country is not a neighbour of Pakistan:
 - a. Iran
 - b. Afghanistan
 - c. China
 - d. Turkey **(Turkey)**
2. The Indus Plain is one of the:
 - a. coldest regions
 - b. driest regions
 - c. wettest regions
 - d. most fertile regions **(most fertile regions)**
3. The area of land Pakistan covers is:
 - a. 800,000 sq km
 - b. 900,000 sq km
 - c. 500,000 sq km
 - d. 600,000 sq km **(800,000 sq km)**
4. The highest land of Pakistan is permanently:

a. dry	b. wet
c. freezing	d. warm (freezing)
5. K2, which rises to a height of 8607 metres, ranks at which number in the world:

a. highest	b. second
c. third	d. fifth (second)

PAKISTAN'S PHYSICAL REGIONS

Pupil's Book 5-7

Answers to Pupil's Book page 8

1. Individual work
2. Individual work. Ask pupils to think of reasons other than those given on page 6 of the Pupil's Book.
3. 'Doab' is the land between two adjacent rivers.

Additional exercise

MCQs

Choose the correct answer:

1. The northern and western parts of Pakistan are:
a. mountainous b. plain
c. desert d. plateau **(mountainous)**
2. In length, Pakistan is about:
a. 1000 km long b. 1600 km long
c. 1800 km long d. 2000 km long **(1600 km long)**
3. In width, Pakistan is about:
a. 200 km wide b. 180 km wide
c. 457 km wide d. 675 km wide **(675 km wide)**
4. Few people live and work in the Karakoram range due to:
a. lack of water
b. hot climate
c. cold Climate
d. heavy rainfall **(cold climate)**
5. Which of the following is not a desert region of Pakistan:
a. Thal
b. Thar
c. Balochistan
d. Potwar **(Potwar)**

THE NORTHERN MOUNTAINS

Pupil's Book 9–10

Famous peaks

Ask pupils to make a list of the famous peaks in and around the Pakistan region, with photographs, if possible: K2; Nanga Parbat; Gasherbrum 1; Broad Peak; Gasherbrum 2. These are 2nd, 9th, 11th, 12th, and 14th highest in the world respectively.

It might be worth mentioning that all of the mountains in the world over 8000 metres in height are in the Himalaya-Karakoram-Hindu Kush Ranges. These are very young fold mountains, growing at the rate of 10 centimetres a year.

Mount Everest

When Sir George Everest, the Surveyor-General of India in the 1840s, mapped Mount Everest, he said that its height was 29,028 feet (8,847.73 metres). Despite the fact that he was using simple and primitive surveying equipment, when the height of Mount Everest was calculated with the help of satellites in 2000, this figure was off only by a few metres.

Silk Route

Explain to pupils that the Gilgit/China route through the Khunjerab Pass was the old Silk Road from the subcontinent to China. Ask pupils to prepare a map of this route. (They can use the map on page 73 of *Oxford School Atlas for Pakistan* as a base map.)

The main routes were from Italy, through what is now Turkey, Iraq, and Iran to the Hindu Kush, the area of the Turfan Depression, then eastwards across China to the Huang He River. The goal was Xian/Loyang, which is roughly where the main tributary joins the Huang He from the north.

Another section of the route originated from various parts of the subcontinent and merged at the Khunjerab Pass, north of which it joined the main European section of the Silk Route.

Discuss the Silk Route. Ask pupils to measure the distance between Italy (take Rome as a starting point) and Xian. Ask pupils how long it would have taken merchants to travel from Europe to China by caravan. Tell them that it usually took two years for a round journey.

Answers to Pupil's Book page 11

- Mountains block cold winds from central Asia. They also cause precipitation, especially during the south-eastern monsoons as the winds rise to cross the mountains.
- a. The Karakoram Range; b. the Hindu Kush Range; c. the Himalayan Range
- This is a general knowledge question. a. Mount Everest (8848 metres); b. the Hillary/Tenzing Norgay expedition in 1953. Pupils can be asked to work in groups and prepare posters on the expedition.
- a. apricots; b. hydroelectricity

5. Ask pupils to design a travel poster or leaflet. Refer to question (5) on page 2 of this Guide.

Additional exercise

MCQs

Choose the correct answer:

- Which of the following is not a famous mountain range:
a. Himalaya b. Karakoram
c. Hindukush d. Khunjerab **(Khunjerab)**
- In terms of height, K2 is:
a. the second highest in the world
b. the third highest in the world
c. the highest in the world
d. the smallest in the world **(the second highest in the world)**
- Khunjerab Pass is:
a. 4700 metres above sea level
b. 2000 metres above sea level
c. 4000 metres above sea level
d. 4900 metres above sea level **(4700 metres above sea level)**
- The only cereal that survives cold, high altitude is:
a. barley b. maize
c. corn d. wheat **(barley)**
- Which is the rare mineral found in Chitral?
a. antimony
b. graphite
c. sapphire
d. marble **(antimony)**
- Khunjerab Pass carries road traffic from:
a. Gilgit to China
b. Karachi to Gilgit
c. Peshawar to China
d. Peshawar to Gilgit **(Gilgit to China)**

Wind erosion

Try to obtain pictures of sand dunes. In windy areas, the force of the wind carries away the smaller (and more fertile) particles of soil, leaving behind only the coarser, infertile particles. The Sindh Desert is said to be advancing at about 0.8 kilometres annually because of wind erosion. Overall, it is estimated that 140 square kilometres of soil is eroded annually, although the government is doing its best to halve—or even reverse—this.

The cutting down of trees for fuel in the past is largely responsible for the poor condition of the soil. In some parts, particularly in the western half of the country, depredations of the herds of goats who eat everything even vaguely vegetative has impeded regeneration.

Indus River

Draw special attention to the Indus River as it is the lifeblood of Pakistan. Ask pupils to prepare a map of the course of the river, with photographs and text on the countryside through which it passes, including regions, products, vegetation, irrigation, etc.

Answers to Pupil's Book page 17

1. Pupils will have to use their imaginations for this question. On the Potwar Plateau, looking:
 - North: In the far distance, one can see the snow-capped peaks of the Karakoram and Hindu Kush Mountain Ranges; poor agricultural land; the breeding of sheep, camels, and donkeys.
 - North-west: One can see the distant mountains of Afghanistan; the fertile valleys of Peshawar and Kohat; extensive irrigation.
 - East: One can see the cities of Islamabad and Rawalpindi; Kashmir.
 - South-east: One can see the fertile area around Sialkot.
 - South: One can see the barren Salt Range and, beyond that, the fertile Indus Plain and the Thal Desert.
 - South-west: One can see the Balochistan Plateau; poor soil; scattered settlements.
2. Individual work
3. south-western Tibet. Bunji. Jhelum; Chenab; Ravi; Beas; Sutlej. The Land of Five Rivers. the melting of ancient glaciers; the present snowfall is insufficient to maintain the existing flow of water in the rivers. very slowly. deposits silt and mud brought down from higher levels, which forms rich alluvial deposit. floods; from time to time, changes course; splits into channels.

4. Karachi and Port Qasim. Much of the coastline to the east is marshy and full of mangrove swamps. Much of the coastline to the west is undeveloped and backed by the Makran Desert, so that communications with the rest of the country are poor.

Additional exercise

MCQs

Choose the correct answer:

1. Average rainfall west of River Indus is:
a. 250 to 380 mm b. 220 to 300 mm
c. 200 to 250 mm d. 150 to 200 mm **(250 to 380 mm)**
2. Potwar Plateau lies:
a. East of River Indus b. West of River Indus
c. North of River Indus d. South of River Indus **(East of River Indus)**
3. The Salt Range is of interest to geologists because:
a. It has massive salt reserves.
b. It is like a rock museum.
c. It receives heavy rainfall.
d. It has prehistoric fossils. **(It is like a rock museum.)**
4. Length of Indus River is:
a. A bit less than 3000 km b. A bit more than 3000 km
c. About 4000 km d. More than 4000 km **(A bit less than 3000 km)**
5. What percent of total land area of Pakistan does Indus Plain cover
a. 40% b. 25% c. 50% d. 35% **(40%)**
6. Cholistan desert is an extension of:
a. Sahara desert b. Thar desert
c. Thal desert d. Nara Desert **(Thar desert)**
7. It is possible to irrigate and grow crops in which desert:
a. Thar b. Balochistan c. Thal d. Nara **(Thal)**
8. The Indus River enters Pakistan near:
a. Bunji b. Attock c. Peshawar d. Noshera **(Bunji)**
9. A possible reason for the downfall of Indus Valley Civilisation may be:
a. flooding b. War c. Famine d. Epidemic **(flooding)**

Rainfall

It is difficult to determine a figure for average rainfall in Pakistan because the regions vary so widely, from 0 to 1500 millimetres. A temperate country such as the United Kingdom, for example, has a range of about 550 to 1,250 millimetres. Ask pupils to compare these figures with the world record of 22,900 millimetres in Assam; if all of the rainwater had stayed on the ground, it would have been almost 30 metres deep. Point out a building of that height in the local area so that pupils can imagine what it would have been like.

Soils

In much of Pakistan, the soils are not particularly fertile. Alluvial soil (fine mud), brought down by swift-flowing mountain streams and rivers from the erosion of the sides and river beds, is generally very rich. This soil is deposited when these rivers slow down and flood the plain.

Aside from rich alluvial, the soil in Pakistan requires irrigation. Irrigation brings its own problems, including salination and waterlogging (see page 17 of this Guide).

This section in the Pupil's Book should be read in conjunction with pages 15 to 18 of *Oxford School Atlas for Pakistan*. As the map on page 18 indicates, the really fertile soil is only found in the two sections along the River Indus.

Temperature

Temperature is also highly variable in Pakistan. Show pupils the following temperature chart:

Place	January temperature (°C)	June temperature (°C)
Multan	10 to 15	35+
Chitral	0 to 5	Up to 27
Lahore	10 to 15	32 to 35
Karachi*	18+	27 to 32
Jacobabad	10 to 15	35+
United Kingdom	4 to 5	16

*Ask pupils why the range between January and June temperatures is so much narrower here. (The moderating influence of the sea.)

Natural vegetation

Plants in Pakistan have to struggle in order to cope with the frequent variations in temperature and rainfall (including drought) and poor soil. Much of the natural vegetation in level parts of the country is called rakh. Rakh consists of rough, drought-resistant shrubs or small trees, often

covered with sharp spines to protect them from animals. These shrubs are rarely more than 3 to 4 metres high and are only useful as fuel. They are not large enough for use in buildings. The main species of rakh forests include acacia, tamarisk, capparid, salvadora, dodonaea, and prosopis. Ask pupils to collect twigs/leaves of some of these for display in the classroom. Books that might be of interest in this respect are T.J. Roberts' *Wildflowers of Pakistan* (OUP 1998) and *Pakistan: Natural Wonders* (OUP 2000). The latter is written especially with the young reader in mind and gives a succinct and clear overview of the natural regions of Pakistan.

Along the banks of rivers, where there is a good supply of water, there are narrow bands of bela forest. These trees – like poplars and willows—are larger and more useful economically. *Shisham* is used widely in furniture making and *babul* for house building and farm tools. Mangroves have little economic use except as firewood. Coniferous forests, especially those in the north like fir, pine, spruce, and cedar, and deciduous trees such as oak, maple, willow, birch, horse chestnut, walnut, and juniper, are useful for industrial purposes and for making boxes and furniture.

Forests cover only about 4.5 per cent of Pakistan's land area, which is very low, as a balanced economy should have about 20 per cent forest coverage. This low per centage is due to centuries of chopping down trees for fuel and for agricultural land. The government has started an extensive reforestation programme to remedy this problem.

Answers to Pupil's Book page 22

1. July to September. South-eastern monsoons. the north; 1500 millimetres. 500 millimetres
2. Refer to pages 15 and 16 of *Oxford School Atlas for Pakistan*.
3. a. Rich alluvial soil brought down by mountain streams and rivers is found mainly in the Indus Basin.
b. Poor, dry soil is found in the rest of Pakistan, except the deserts, where there is sand. The soil near the Indus estuary is salty.
4. The ways in which people have changed the face of the countryside include: deforestation (trees cut down for fuel, leading to soil erosion and, over centuries, deserts); over-grazing (especially by goats) has turned once fertile land into desert; irrigation (which has only enabled a small proportion of land to produce healthy crops); reforestation (a recent government programme to restore some forests); reclamation (of some desert areas, especially in the Thal Desert).

Additional exercise

MCQs

Choose the correct answer:

1. By world standard rainfall in Pakistan is:
 - a. modest
 - b. high
 - c. low
 - d. very high **(modest)**
2. Western Depressions refer to when winds blow:
 - a. from the drier centre of Asia
 - b. from any direction
 - c. from north to south
 - d. from east to west **(from the drier centre of Asia)**
3. Alluvial soil is:
 - a. rich and fertile
 - b. infertile
 - c. salty
 - d. dry **(rich and fertile)**
4. During winter months amount of rainfall is less and concentrated in:
 - a. the North
 - b. the South
 - c. the East
 - d. the West **(the North)**
5. Estuary refers to:
 - a. the U shaped mouth of the Indus
 - b. the V shaped mouth of the Indus
 - c. mouth of the Indus where the soil is alluvial
 - d. mouth of the Indus where the soil is suitable for crops
(the V shaped mouth of the Indus)

THE INDUS RIVER SYSTEM

Pupil's Book 23–27

Indus River

The Indus River, at about 3000 kilometres in length, is approximately half the length of the Amazon, Nile, Huang He, and Mississippi. At first glance, it does not offer many of the advantages that these rivers do—excellent transport systems, fairly regular flow, rich fishing, etc. However, without the Indus, Pakistan would be little more than semi-desert. The Indus is the bloodline of Pakistan, particularly now that its earlier seasonal flow has been tamed and the water is released throughout the year. The Indus is a major source of electrical power for the country, producing about 40 percent of all electrical energy. It contains a modest number of fish, but for irrigation it has no parallel. Almost half (45 per cent) of the farm land is watered by the Indus (75,100,000 square kilometres).

Path of the Indus

In the earlier days, the Indus (like the Huang He in China) was very liable to change its course because the land in the lower half of its journey was relatively flat. Especially south of Sukkur, the course of the Indus has moved westwards. It reached its present position about 200 years ago. With the control over the waters by dams and barrages, today it is less likely to make big changes in its course.

Floods

Controlling the waters of the Indus so that there were not huge floods at the south-western monsoon time, and then long dry periods, made a vast change in agriculture. The system of canals and side canals allows water to be directed to specific areas and fields by means of sluice gates. Nevertheless, floods do sometimes occur.

The Indus usually floods about every 7 or 8 years. However, there were a series of floods in 1973, 1974, 1978, and 2010. The 1973 flood covered 36,000 square kilometres, killed 1600 people and demolished 3 million homes. The 2010 floods caused even more devastation, making 20 million people homeless, killing 2000. Major crops standing on 30 per cent of the country's agricultural land were destroyed causing food shortage.

Indus Water Treaty 1960

The Indus Water Treaty 1960, under which the waters from the Ravi, Beas, and Sutlej were given to India, has also reduced the total flow on the lower reaches of the Indus. Some agreement had to be reached over the division of the waters as the headworks of the Ravi and Sutlej were in Indian territory and could consequently be controlled or cut off by them. As part of this treaty, Pakistan had to build—with aid from the United States, Canada, the United Kingdom, Australia, and New Zealand—two huge storage dams (Tarbela and Mangla), five barrages as well as a number of canals. Even India had to contribute to the cost.

Answers to Pupil's Book page 28

1.
 - a. By providing water for irrigation
 - b. By providing silt for fertile soil
 - c. Hydroelectric power
2.
 - a. Seasonal flow of the river because of the monsoons (dams have to be built to help control flooding and maintain an even flow throughout the year).
 - b. occasional flooding causes damage to land and property.
3. By building dams, weirs, and barrages to contain the water and release it steadily throughout the year; by building banks to contain the water.
4. Ask pupils to consult a dictionary.
 - a. A weir is a low dam built across a river to raise, divert, or restrict it into other channels or to regulate its flow.
 - b. An embankment is a bank that is raised artificially to prevent a river from overflowing onto the surrounding countryside.
5.
 - a. Natural vegetation consisted of harsh, tough plants suitable for semi-arid conditions, including thorns, acacia, tamarisk, vetches, and thistles.
 - b. This has changed over the centuries owing to the chopping down of trees for fuel and for building; clearing away the land for agricultural purposes; overgrazing by herds of goats and sheep.
6. The picture shows a gnarled old tree covered with thick leaves and what appear to be small orange fruits. Notice the otherwise rocky landscape.

Additional exercise

MCQs

Choose the correct answer:

1. Pakistan's economy is mainly based on:
 - a. agriculture
 - b. industry
 - c. mining
 - d. exports

(agriculture)
2. The per cent area of Pakistan that Indus and its tributaries cover is :
 - a. 40%
 - b. 30%
 - c. 25%
 - d. 10%

(40%)

3. Barriers of mud or cement built up on the sides of a river to prevent flooding are called:
- a. weirs
 - b. embankments
 - c. dams
 - d. bridges **(embankments)**
4. Barriers built across rivers or canals to regulate their flow are called:
- a. weirs
 - b. dams
 - c. bridges
 - d. embankments **(weirs)**
5. In the flood season, when the Indus joins its tributaries it can be as wide as:
- a. 6 km
 - b. 2 km
 - c. 10 km
 - d. 5 km **(6 km)**

The Indus Water Treaty 1960

The Indus Water Treaty was jointly financed by the United States, the United Kingdom, West Germany, Australia, and New Zealand, with a contribution from India. The remainder was to be financed by Pakistan itself. The construction of these dams not only helped to control the water flow but also provided much-needed hydroelectric power. At the time of their construction, Pakistan had not discovered its large reserves of natural gas and was in need of fuel.

Irrigation problems

Pakistan is an arid or semi-arid country and can produce little in terms of crops without irrigation. However, there are several problems associated with irrigation.

Waterlogging from unlined canals (i.e. canals just cut into the soil) can now be remedied with concrete lining, which is one of the reasons why Pakistan needs so much cement. Fortunately, the raw material (limestone) is readily available. Tube wells help to lower the water-table so that the water sinks to deeper levels.

Salination is another problem associated with irrigation. Relate this to the saltiness of the sea. To cleanse some of the salt from the upper layers where the roots are, land can be rinsed with pure water, often drawn from deep in the ground by tube wells, or desalinated chemically by sprinkling gypsum (a material which Pakistan fortunately has plenty of).

Try an experiment with the class to illustrate how waterlogging and salination affect plant growth. Plant seeds (beans or other legumes are quick and easy) in pots until they are established with a couple of leaves. Keep one pot full of water (if you use a flower pot, you will have to make sure there are no holes at the bottom) and water the other with strong salt water. Ask pupils to monitor their growth.

Other methods of irrigation

About 43 per cent of the water for irrigation comes from the Indus and its tributaries. The rest comes from wells or *karez*. Shallow wells only contribute about 1.5 per cent of the water for irrigation on small peasant holdings because the effort of extracting relatively small amounts is so great. About 54 per cent comes from tube wells.

Karez provide about 1 per cent of the water for irrigation. Although this system of irrigation is found only in Pakistan, China, and Iran, the author found an identical system being practised recently in the foothills of the Atlas Mountains in Morocco.

Answers to Pupil's Book page 34

1. a. The treaty was more important to Pakistan than India because all of the rivers except the Indus originated in Indian-occupied Kashmir. India could, in theory, jeopardize much of Pakistan's precious water resources (which they in fact did for a month in 1948).

- b. The Treaty allotted the three western rivers (Indus, Chenab, and Jhelum) to Pakistan, while the eastern rivers (Ravi, Beas, and Sutlej) were allotted to India. Pakistan was given till 1970 (or 1973 if necessary) to build storage dams, barrages, and weirs.
2. The pictures should show farmers lining canals with cement, digging deep tube wells to lower the water-table, and planting trees along the banks of the canals.
3. a. waterlogging b. salinity
4. A tube well is a deep well bored into the ground by a mechanical 'drill' to reach the pure water deep under the surface of the Earth. Tube wells are important because they do not dry up like shallow wells do. The water that comes from deep under the ground is pure.
5. Ask pupils to refer to page 31 of their Pupil's Books. They may wish to consult other sources of information as well. They should be encouraged to act out the scene in class, preferably with simple costumes and props.

Additional exercise

MCQs

Choose the correct answer:

1. The first major modern irrigation scheme began in the:
 - a. middle of 19th century
 - b. early 19th century
 - c. late 18th century
 - d. early 20th century **(middle of 19th century)**
2. The water dispute with India was resolved through the World Bank in:
 - a. 1955
 - b. 1970
 - c. 1947
 - d. 1960 **(1960)**
3. The treaty gave Pakistan the right to build this dam near Jhelum.
 - a. Tarbela Dam
 - b. Kalabagh Dam
 - c. Mangla Dam
 - d. Hub Dam **(Mangla Dam)**

4. The system of irrigation involving boring of wells and tunnels is called
- kinara
 - karez
 - doab
 - persian wheel **(karez)**
5. Waterlogging refers to:
- a system of soaking logs in water
 - when water in unlined canals gets soaked into the surrounding soil
 - using logs to make bridges in water
 - a system of pumping out water from marshy areas
(when water in unlined canals gets soaked into the surrounding soil)
6. Which of the following is not an alternate form of irrigation?
- karez
 - tubewells
 - shallow wells
 - embankments **(embankments)**
7. The poisonous effect of salt through water logging can be neutralized with the use of:
- sodium
 - silver
 - mercury
 - gypsum **(gypsum)**

Land

Emphasize how most of the land in Pakistan is dry or semi-dry, with poor soil in general, mountain and desert terrain—and yet, the country is remarkably self-sufficient in wheat, barley, rice, and cotton. Pakistan exported 2,829,503 metric tons of rice in 2009–10.

Agriculture and agriculture-related exports of 2009–10 were:

Product	Percentage of total export value
cotton/yarn and thread	1.2
rice	2.4
raw cotton	0.1
cotton fabrics	1.6

Rabi and *kharif* crops

Rabi crops are mainly bread-and-butter crops—survival crops—for the average small farmer. They are relatively easy to grow and form the bulk of the domestic diet.

Kharif crops, like cotton, tobacco, and rice, are usually cash crops, sold at the market to buy goods the farmer needs. They tend to be more valuable than *rabi* crops.

Oil-seeds

Oil-seeds (rape/mustard) have actually fallen in output in the last 25 years. This may be owing to the fact that people are using more sophisticated cooking oils. Edible oil-seeds are generally considered much more healthy than the fat derived from animal sources. They are also cheaper and are being used more and more in the developed world.

Pulses

Pulses are a very valuable source of food, as they are rich in protein. Vegetable protein is not as beneficial as animal protein but is, of course, much cheaper and perfectly adequate for a normal, healthy diet. Beans, peas, and lentils are also being used extensively in developed countries as a substitute for meat.

Fruit

Fruit is a valuable export item. The quantities being exported are steadily rising. 533,000 tons of fruit were exported in 2010 as compared to 260,000 tons in 2000.

Cotton

Fragments of cotton have been found at Mohenjo-daro, dating back to 3000 BC. The native variety of cotton is short and stapled (i.e. the fibre is coarse) and is suitable for coarser fabrics. About 90 per

cent of the crop today is of improved, more valuable varieties with longer staple. Insect damage can be severe; the cotton plant needs constant pesticide spraying, the expense of which is generally too much for the smaller farmer.

Sugar

The second largest cash crop to cotton is sugar. Pakistan is self-sufficient in sugar. The average consumption has risen from 3 kilogrammes per capita per year in 1947 to 25 kilogrammes today. This is still low by western standards, where consumption is over 50 kilogrammes per capita per year.

Discuss these figures in class. Countries in the west are very concerned about the high consumption of sugar which is bad for the health in every way. High consumption of sugar leads to tooth decay, heart disease, obesity, and many other medical conditions. Sugar is insidious in the western diet: huge amounts of it are found in soft drinks, ice-cream, cakes, and pastries, corn flakes and other cereals, commercial sauces, etc. It is difficult to find products that do *not* contain sugar in the west.

Tobacco

The area under tobacco cultivation presently is 57,000 hectares, yielding about 1,20,000 tons. This comes to nearly 2 per cent of the total area under cultivation. Pakistan has become the fifth largest tobacco producing country. The crop contributes 4 per cent to the G.D.P.

Fertilizers

Fertilizers are crucial for higher yields. Unfortunately, most have to be imported so a balance has to be struck between the cost of importing fertilizers and increased yields. The use of fertilizers in Pakistan is about 133 kg/hectare. Even though this is higher than the world average of 94.1 kg/hectare, the yield productions are much lower. Ask pupils why there is such a disparity in the use of fertilizers. Larger countries have lower figures because they have vast areas of farm land and little need to produce very high yields per hectare.

Pesticides

Pesticides are also crucial for higher yields, especially for cotton and fruits, which are unsaleable on the export market if damaged by insects. The great majority of pesticides are imported. The value of imported pesticides rose from Rs. 3,477,000 in 2000 to Rs. 8,741,000 in 2010, an increase of over 130 times.

Answers to Pupil's Book page 42

1. *Rabi*. October–December; April–May. a. wheat b. barley c. oil-seeds d. gram.
Kharif. April–June; October–December. a. cotton b. rice c. tobacco d. maize e. millet
f. sugar cane
2. a. cloth, clothing, yarn b. cotton seed oil c. 'cake' for animal feed

3. a. It is by far the biggest export earner for Pakistan.
b. It produces valuable by-products like oil and animal feed.
4. a. Rice provides home-grown basic food for many millions of Pakistanis.
b. Cotton needs rich, very well-drained soil, moderate rainfall, and plenty of fertilizer. Rice needs vast amounts of water and heavy soil. It is planted underwater in paddy-fields.
5. a. The rest is consumed within Pakistan.
b. Growing one's own food crops means less expenditure of valuable foreign credit for imports.
6. a. Smoking causes lung cancer, cancer in general, heart conditions, respiratory conditions (like bronchitis and asthma).
b. Individual, pair or group work
7. a. Wheat is the main grain used in Pakistani food.
b. It grows under a wide variety of climatic conditions as long as there are no extremes. It is reasonably tolerant to a lack of water.
8. Class work. The main fruit crops are citrus, mangoes, bananas, apples, apricots, almonds, grapes, and guavas.

Additional exercise

MCQs

Choose the correct answer:

1. What fraction of Pakistan's workforce is employed by farming?
 - a. one quarter
 - b. one fifth
 - c. three quarters
 - d. half **(half)**
2. What fraction of Pakistan's wealth is produced by farming?
 - a. one quarter
 - b. one fourth
 - c. three quarter
 - d. half **(one quarter)**
3. What percentage of Pakistan's cultivated land is covered by Rabi crops?

a. 55	b. 40		
c. 50	d. 30	(55)	

4. Which of the following is not a Kharif crop?
- cotton
 - rice
 - maize
 - wheat **(wheat)**
5. Kharif crops are planted just before the wet season from:
- May to June
 - April to June
 - July to August
 - January to February **(April to June)**
6. The quantity of pulses eaten each year in Pakistan is:
- 1 million tons
 - 5 million tons
 - 2 million tons
 - 3 million tons **(1 million tons)**
7. Which Rabi crop is grown all over Pakistan?
- wheat
 - barley
 - oil seeds
 - pulses **(wheat)**
8. The most important area for tobacco growing is:
- Rawalkot
 - Chuniyan
 - Chitral
 - Mardan **(Mardan)**
9. Sugar is a greedy plant requiring ample rainfall, heavy fertilizing, and the following sessions of irrigation
- twelve
 - eight
 - sixteen
 - twenty **(sixteen)**

ANIMALS AND POULTRY

Pupil's Book 43–44

Animals and mechanization

Mechanization is still very limited in Pakistan. Animals continue to play a major role in the agricultural economy as draught animals for carts and ploughs, for turning simple machinery such as the Persian wheel, for threshing grain with their feet, for providing milk and, often among poorer families, meat when due to old age their working days are over. Animals on the whole are not well looked after or well fed because fodder is at a premium.

Meat consumption

Goat meat forms the largest percentage of Pakistani meat consumption. Per capita meat consumption in 2007 was 12.2 kg.

Cattle

Indigenous species of cattle are generally all-purpose beasts of not very good quality. They are not bred specifically for meat or milk. Cattle dung is the normal source of manure and fuel among rural populations.

It is estimated that even the smallest holding really needs two buffaloes, but statistics show that this is not the case in real terms, and that larger farms have more than two. Smaller farmers may have to borrow or hire animals.

Selective breeding

The government is trying to improve livestock—especially cattle—by selective breeding. Red Sindhi and Sahiwal are good local breeds. Friesians and Jerseys, with their fine milk yields, are being imported from Europe.

Explain the concept of selective breeding to pupils. Use it to illustrate why local cattle is generally poor. Village cattle usually mate more or less indiscriminately, so that their offspring do not stand much of a chance of improving. If, by careful selection, a pair of animals with known qualities (high meat or milk yields, for example) are mated, their offspring will most likely be better, stronger, and more productive. If both mating animals have poor genes, their offspring are most likely to inherit them. The same applies to good genes.

Goats and sheep

Goats and sheep are much hardier than cattle and can survive on just about anything. They can scavenge over a wide area so they are ideal for breeding in mountainous regions. However, they have a tendency to eat every vestige of herbage, turning already poor land into dry desert. In North Africa, one species of goat has even learned to climb trees so that not even these are safe from its ravages.

The wool of Pakistani sheep is tough and wiry, suitable mainly for carpets and coarse fabrics. As with cattle, the government is trying to improve the breeds.

Poultry

Poultry is the mainstay of many rural families. They can be bred on a minimum of food and usually scavenge around the house for sustenance.

Answers to Pupil's Book page 45

1. Machinery is far too expensive for the average farmer; often, the plots are too small to make machinery like tractors a viable option.
2. a. Cattle is often inbred, resulting in lower standards. Animals are usually not bred for a specific purpose—milk, meat or strength—but are multi-purpose and not the best in any particular task.
b. The government is trying to improve standards by encouraging farmers to breed local cattle with imported cattle like Jerseys and Friesians or with good local breeds like Sahiwal and Red Sindhi.
3. a. The care and upkeep of sheep and goats take up a lot of time; someone has to look after them constantly.
b. They are destructive, eating every green leaf in their path.
c. Their wool is generally of poor quality and does not fetch a high price in the market.
d. Sometimes, owing to the scarcity of grass in an area, a member of the family is forced to travel great distances in order to find fresh pasture for their herds.

Reasons farmers would give for continuing old practices: I don't like change. My family has been raising sheep and goats for generations. The number of sheep and goats I keep is a matter of prestige for me and establishes my standing in the community. These sheep and goats provide my family with meat and milk. The land is already very unproductive; what would we eat? I don't know how to grow or manage the new crops that are proving so lucrative in other areas of the country.

4. Individual work

Additional exercise

MCQs

Choose the correct answer:

1. Following is not supplied by animals and poultry:
 - a. milk and eggs
 - b. leather
 - c. fodder
 - d. wool **(fodder)**
2. The reason why much milk is not sold to the market:
 - a. It is of poor quality.
 - b. It is difficult to transport it.
 - c. It is insufficient in quantity.
 - d. It is contaminated. **(It is difficult to transport it.)**
3. Farmers do not like cross breeding of cattle because the better animals are:
 - a. more expensive
 - b. more weak
 - c. unhealthy
 - d. have a short life span **(more expensive)**
4. Pakistani cattle is of poor quality due to:
 - a. lack of good quality fodder
 - b. inbreeding
 - c. lack of vaccination
 - d. lack of good hygiene **(inbreeding)**

AGRICULTURAL PROBLEMS

Pupil's Book 46–48

Natural problems

Most of the natural problems have been dealt with in previous sections: only one-third of the land is arable; dry conditions with low rainfall; generally poor soil, etc. Relatively little can be done to remedy these problems, although remarkable improvements are being made: reclamation of land in the Thal Desert, mechanization on larger farms, the use of fertilizers, pesticides, and herbicides. Those problems created or perpetuated by humans are more intractable.

Quality of stock and seeds

This has already been dealt with earlier. The government is trying to improve the quality of both stock and seeds but the improvement of stock is a long-term project.

Basic problems

The three basic problems related to agriculture are: farm size, lack of capital, and conservatism (or a reluctance to accept change).

Fragmentation of land

Surveys show that more than one-third of all farms are below the subsistence level, indicating that most farmers are struggling to survive. The government recommends that the smallest size farm that can still benefit from mechanization still has to be at least 0.2 square kilometres. Only about 3 per cent of the total number of farms are above this size.

The fragmentation of land is a major problem. Because of inheritance laws, the land belonging to one farm is scattered over a number of plots that are interspersed with plots belonging to others. In Attock and Rawalpindi Districts, a holding of 10 to 20,000 square metres is often divided into 12 to 18 plots. This fragmentation wastes time and resources: time is wasted travelling from one plot to another; it is difficult to irrigate scattered holdings; tiny plots mean that it is impossible to introduce mechanization. The problem of fragmentation has been obvious for many years, and legislation has been passed over the last 80 years in an effort to amalgamate the land. There have been minor successes but, in general, the conservatism of farmers is a main hindrance. They are very reluctant to give up traditional patterns of farming.

Lack of capital

As with other areas, there is a shortage of capital for investment in new equipment, stock, and seeds. Overseas investors are often reluctant to invest in what are generally considered inefficient enterprises. With small-scale agriculture, farmers usually make little profit above living expenses to buy improved equipment.

Tradition

Many farmers with smaller holdings are very conservative, working with methods and materials that their ancestors have used for generations. It is difficult for them to break away from this pattern, especially as many are illiterate and cannot read the material the government produces to advise them about new farming techniques. The traditional inheritance laws also militate against good farming practice: the division of land among surviving children reduces the size of holdings but, as both good and bad land has to be shared out, the fragmentation of land is inevitable.

Statistics

In Pakistan about 81 per cent farms are under 0.05 square kilometres, 93 per cent under 0.1 square kilometres.

In the author's village in the southern United Kingdom, the local farm (arable; mainly grain) is over 2 square kilometres and is run by two men with large-scale mechanization. They spend much of the year in the farm office because nothing is required of them outdoors!

Answers to Pupil's Book page 49

1. Natural problems: Poor soil; only one-third of the land is suitable for agriculture; insufficient rainfall (and that, too, seasonal); erosion (both natural and man-made); diseases endemic in a hot climate; the cost of pesticides is very high.

Problems caused by humans: Over-grazing of sheep and goats, leading to denudation and desertification; poor quality stock and seeds; small, inefficient farms; lack of capital to make major improvements in farming techniques; traditional work patterns generally inefficient for large-scale production.

2. All of the points under 'Problems caused by humans' can apply here. Some ideas for posters include: The depiction of sacks of grain under the old and new systems, showing how the output has multiplied; a 'before' and 'after' drawing of a landscape, showing the once-verdant landscape transformed into a desert after sheep and goats have been allowed to over-graze; local breeds of stock shown with improved breeds, with buckets of milk to indicate increased yield, large chunks of meat to indicate better meat production and fleeces to show better quality wool; a map of scattered landholdings with lines to show how far the farmer has to travel from one area to another set against a map with holdings gathered into one block.
3. a. Small, scattered fields mean that traditional farming techniques have to be used in order to cultivate them. They are too small for mechanization because tractors have to leave edges round the fields and must have space to turn. Traditional farming techniques are not very efficient and are extravagant of labour.
b. Individual work. Pupil's can be asked to consult *Oxford History for Pakistan* Book 3 (OUP 1998), page 16, for additional information on the Enclosure Movement.

4.

Crops	Actual increase	Percentage increase
wheat	2252 tons	10.4%
rice	1858 tons	37%
maize	690 tons	25%
sugar	2129 tons	4.5%

Additional exercise

MCQs

Choose the correct answer:

- Which one of the following is not a naturally caused agricultural problem:
 - land
 - climate
 - erosion
 - money **(money)**
- Which of the following does not cause land erosion?
 - over grazing by cattle
 - water
 - chopping down trees
 - pests **(pests)**
- Which one of the following agricultural problems is not caused by humans:
 - poor quality stock and seeds
 - farm size
 - climate
 - reluctance to change **(climate)**
- What percentage of Pakistan's land is fit for crops of any kind under irrigation?
 - 25
 - 32
 - 38
 - 15 **(38)**

MINERALS AND MINING

Pupil's Book 50-56

As recent geological surveys show, Pakistan has a great potential in metallic minerals like copper, gold, silver, platinum, chromites, iron, lead, and zinc. There is also a presence of multi-coloured granite, marble, and other stones of high quality for export purposes.

Currently about fifty-two minerals are being mined, prominent among them being coal, rock salt, limestone, gypsum, sulphur, crude oil, and natural gas.

The present contribution of the mineral sector to the GDP, about 0.5%, is expected to increase with the commercial exploitation of Saindak and Reco Diq copper and gold, Duddar zinc and lead, and Thar coal and gemstone deposits.

Problems associated with mining

There is the purely physical problem of locating mineral sources and then reaching them through transport networks. Mining equipment, especially that of oil and gas, is very technical and expensive and has to be imported—and Pakistan is short of foreign exchange. The technicians who operate this machinery also require training and have to go abroad in order to acquire certain skills. Many of these trained workers prefer to go to other oil-rich states where they can command higher salaries.

Answers to Pupil's Book page 57

1.
 - a. There is a plentiful supply.
 - b. It is relatively easy to distribute.
 - c. It can be bottled for use in more remote places where laying gas lines would be too expensive.
 - d. It helps save on expensive fuel imports.
 - e. It is ideal for industry—a flexible fuel for power stations and other factories.
 - f. It is the basic raw material for a number of chemical industries.
 - g. It is a potential fuel for motor vehicles.
2.
 - a. low-grade fuel with heavy pollutants
 - b. thin seams, which are often unworkable
 - c. seams subject to faults, where rocks have folded or broken
 - d. some seams being exhausted, forcing miners to dig deeper and more expensive mines
3. Discussion
4.
 - a. Limestone: cement, chemicals
 - b. Salt: chemicals, flavouring food, fertilizers
 - c. Gypsum: cement, plaster of Paris, ceiling boards, desalination of land

- d. Marble: buildings, statues
 - e. Kaolin: pottery, tyre and paint manufacture, paper
5. a. Poor communication in some places (inaccessible to transport)
- b. Cost of importing expensive machinery
 - c. Shortage of highly trained technicians
 - d. Technicians trained abroad often do not return to Pakistan.
6. Discussion. Highlight the following points:

For leaving the country: Higher wages overseas (some of which can be sent home—there is, in fact, a very high input of money, especially from migrant workers in East Asian countries); equipment is often more modern and highly technical; greater opportunities for advancement and training.

For returning to Pakistan: The country needs technicians and there is a moral debt to the state that educated you; unless highly trained people work in Pakistan, there will be no development; as industry is relatively young, there are opportunities for promotion if you have the right skills.

Additional exercise

MCQs

Choose the correct answer:

1. Natural gas is not found in which following form:
- a. dissolved in oil
 - b. in a rock pocket above the oil
 - c. trapped in a porous rock
 - d. dissolved In water **(dissolved In water)**
2. Pakistan's own natural gas provides what per cent of all its energy needs:
- a. 30
 - b. 40
 - c. 5
 - d. 45 **(40)**
3. Pakistan's coal is of very poor quality due to:
- a. large ash and sulphur content
 - b. less ash and sulphur content
 - c. large granite content
 - d. high carbon content **(large ash and sulphur content)**

4. What is the required depth for a coal seam for it to be worth mining:
- 5 cm
 - at least 10 cm
 - 8 cm
 - 6 cm **(at least 10 cm)**
5. In which of the following areas are Pakistan's oil wells concentrated?
- Potwar plateau
 - Northern regions
 - Southern coast
 - Thar desert **(Potwar plateau)**
6. The main iron field is at:
- Zhob Valley
 - Abbotabad
 - Kalabagh
 - Badin **(Kalabagh)**
7. Where are chromite deposits found in Pakistan?
- Zhob Valley in Balochistan
 - Indus valley
 - Khewra
 - Dandot **(Zhob Valley in Balochistan)**

ENERGY AND ELECTRICITY

Pupil's Book 58–62

Comparative statistics

Energy consumption is shown in comparative tables in kilogrammes/coal equivalent; that is, the amount of energy that would be given off by burning the equivalent weight of coal.

The chart below gives some comparative figures.

Country	Energy consumed
Kenya	4.863 billion kwh (2008 est.)
Pakistan	72.2 billion kwh (2007 est.)
India	56.8 billion kwh (2007 est.)
Morocco	20.78 billion kwh (2007 est.)
China	3.438 trillion kwh (2008 est.) (vast reserves of coal)
Iran	153.8 billion kwh (2007 est.) (vast reserves of oil)
Malaysia	99.25 billion kwh (2007 est.) (vast reserves of oil)
Hong Kong	42.1 billion kwh (2009 est.) (a city state does not give a true picture because there is such huge industrial and commercial consumption)
Sweden	134.5 billion kwh (2007 est.) (a wealthy state with no fuel resources of its own and bitterly cold winters)
United States	3.873 trillion kwh (2008 est.) (has its own oil and gas reserves but buys huge amounts from overseas. This is gross extravagance.)

Electricity

Emphasize the convenience of having electricity. Ask pupils about boiling a kettle

- a. in their home (if they live in the city), and
- b. in a village where there is no electricity (collecting firewood, lighting the fire, putting the kettle on, and so on). Baking is even more complicated in rural communities.

Talk about how electricity is used in pupils' homes. List all of the domestic electrical appliances that consume energy, from stoves and air-conditioners to hair driers and shavers.

Discuss how electricity is used in Pakistan: almost half is used for domestic purposes.

There should also be some discussion on how electricity is used in rural areas and what benefits it can bring. See the answers to question (3).

Thermal power

Thermal power generators, which use oil or natural gas as energy sources, are the largest producers of electricity with an output in 2010 of 42.5 per cent of the total output. Oil is expensive as it has to be imported, although the proportion of locally produced oil is steadily increasing. Stations powered by natural gas are also steadily increasing.

Hydroelectric power

Hydroelectric power supplies well over 40 per cent of Pakistan's electricity. It is very expensive to build dams and hydel stations but, once installed, they are relatively cheap to run as there is no fuel to be bought.

Other sources of energy

There are small amounts of coal-fired stations (local coal mixed with higher grade, often from abroad). About 2.3 per cent of Pakistan's electricity is produced by nuclear power.

An interesting development in Pakistan is the introduction of solar power stations. As there is plenty of sunlight, they make use of this 'free' energy. Solar power is still in the experimental stage, but it is being installed in small stations, often to power one or two villages. One such station, financed by the EEC in Swat (1980s), supplies enough power for 170 houses, each with two lights, and a fan, 46 street lights, and lights and fans for three mosques. In the Pupil's book on pg 58, solar energy is not part of the pie chart as its generation in Pakistan is negligible at the moment.

Wind power, though very expensive to install, is again virtually free of regular costs, and would seem to be useful in the more remote regions of Pakistan.

Point out that there is nothing mysterious about nuclear power. Electricity is produced by a dynamo, which is turned by a turbine driven either by water (hydel) or steam from a boiler (thermal). In a nuclear plant, instead of using oil or gas to heat the boilers, a nuclear reactor is used. However, there are problems associated with nuclear power: the need for skilled workers; the threat of accident (tell pupils about the Chernobyl disaster in Russia in 1986).

Answers to Pupil's Book page 63

1. Note that the figures in the chart have been rounded off.
 - a. Pakistan is a warm country and does not need the heating that Japan does. However, India and Bangladesh are also warm countries.
 - b. Pakistan is a largely agricultural country and does not consume as much energy as industrial nations.
 - c. Pakistan does not have locally generated fuel resources to make electricity.
 - d. Pakistan is a developing nation—many people, especially in the remoter regions, have no electricity and rely on natural fuels such as wood for heating and cooking.

2. Hydel: Expensive to build but relatively cheap once installed; can suffer from reduced output in years when there is low rainfall to refill lakes; because the best sites are usually in the north at some distance from major centres, long and expensive transmission lines have to be built.

Solar: Very good for remote areas where it would be uneconomical to install power lines. Main weakness is the expensive initial investment and the comparatively low output per unit.

Thermal: Pakistani coal makes a great deal of ash and does not produce much heat. It is also a source of pollution when burned. Other fuels used in thermal boilers are, at the moment, imported and therefore expensive.

Nuclear: Although the cost of installing a nuclear plant is high, once running, it produces electricity very cheaply. However, skilled operators are required and safety standards must be very high.

Wind: Although the cost of building wind farms is high, once running, they produce virtually free electricity. However, they are dependent on wind speed, and are noisy and unpleasant to look at.

3. a. Increased standard of living, with lighting, television, and the use of small domestic machines.
b. Improved water supplies (deep tube wells powered by electric motors can be installed).
c. Faster agricultural processes with small agricultural equipment such as mills, winnowing machines, etc.
d. Increased leisure time as some of the manual work can be done by electric-powered machines.
4. Individual work

Additional exercise

MCQs

Choose the correct answer:

1. Pakistan consumes little energy because:
- a. It is a hot country and requires little artificial heating.
 - b. It has surplus rainfall.
 - c. It has adequate power plants.
 - d. It has low population.

(It is a hot country and requires little artificial heating.)

2. Which of the following is not an energy source:
- a. thermal
 - b. hydel
 - c. nuclear
 - d. aquatic **(aquatic)**
3. Which energy source does not require the use of 'dynamo':
- a. solar energy
 - b. nuclear
 - c. thermal
 - d. hydel **(solar energy)**
4. Which hydel station provides maximum hydroelectricity:
- a. Mangla
 - b. Tarbela
 - c. Warsak
 - d. Guddu **(Tarbela)**
5. Nuclear powered electricity has a low running cost due to:
- a. uranium rods
 - b. skilled operators
 - c. cost of building
 - d. security cost **(uranium rods)**

INDUSTRIES: An Introduction

Pupil's Book 64–69

Bar charts

Refer to the bar charts on page 64 of the Pupil's Book. The actual wealth has increased between 2002 and 2010 from Rs. 4,100,000 million to Rs. 13,850,000 million—an increase of about 3.38 times. The real point here is that the percentage contributed by the different sectors (agriculture, services, industry) has changed dramatically. Pupils can work this out in the exercises.

Link between agriculture and industry

It is important to stress the link between agriculture and industry. Industry needs agriculture to feed its urban workers as well as to provide raw materials for industrial work such as food processing. Agriculture also needs industry for machinery, chemicals (such as fertilizers, pesticides, and herbicides), etc. Ask pupils to look at the drawings on page 52 of the Pupil's Book (these make no allowance for improved strains of seed and stock).

Industrial pyramid

The industrial pyramid on page 66 is not to scale. It would be impossible to devise a scale which would incorporate textiles with exports of US \$ 4,533,000,000 and leather with US \$ 192,000,000—the cotton bar would have to be more than 23 times the length of the leather one!

Needs of industry

The needs of industry are fairly self-explanatory. Perhaps funding could be explained in more detail to pupils. Pakistan itself does not have enough money to finance major projects so it has to borrow from developed nations or organizations such as the World Bank. This money is normally on loan and has to be repaid with interest. The total foreign debt of Pakistan is now \$ 58.512 billion. Just two years ago, in 2008, it was \$ 47 billion.

Education

Education is a vital element in Pakistan's industrialization—literate, skilled workers are essential, especially in the supervisory and managerial ranks. One may continue to cling to traditional methods in agriculture, but industry is one area which is constantly changing so workers need to keep abreast of new developments.

Answers to Pupil's Book page 70

1.

	Agriculture	Industry	
2002	984,000	738,000	Millions of rupees
2010	1,523,500	4,155,000	Millions of rupees

2. Industry can help agriculture in the following ways: chemicals (fertilizers, herbicides, pesticides); equipment (tractors and other machinery); electricity (with many uses in agriculture, especially in tube wells and small milling machinery); processing; good communications.
3. Good supply of cheap energy: Pakistan has this thanks to hydroelectric and gas-powered plants.

Good supply of raw materials: Pakistan has relatively few mineral resources except natural gas and large amounts of relatively low-cost minerals such as limestone. Importing raw materials can be very expensive.

Capital: To invest in expensive industrial buildings and machinery. Pakistan is short of foreign exchange and has to borrow, repaying loans with interest.

Trained workforce: Pakistan has a poor literacy rate but the state of education is steadily improving—although not fast enough for the rapidly changing needs of modern industry.

Good communications system: Electronic communication is fine but physical communication (road, rail, etc.) still needs improvement. As good hard-surface, all-weather roads are essential, many such roads and highways were built between 2000–7. The railway network is in need of much capital for improvements.

Agricultural base: To feed urban industrial workers. Pakistan has this, but with the benefits of industrialization, the output can be increased.

4. Good communications are vital: to transport raw materials to industrial areas; to transport finished products to markets and/or ports for export; to keep up with world demands and orders from abroad; to swiftly and easily move workers from one place to another.

Additional exercise

MCQs

Choose the correct answer:

1. Which resource does Pakistan have in abundance?
 - a. communications infrastructure
 - b. funds
 - c. workers
 - d. good quality raw material **(workers)**
2. The reason why industry is more important to a country is because:
 - a. industrial goods are sold at a more stable price
 - b. demand for agricultural goods has fallen
 - c. industrial goods are cheaper to produce
 - d. industrial goods are superior quality **(industrial goods are sold at a more stable price)**

FROM AGRICULTURE TO INDUSTRY

Pupil's Book 71–77

Wool

The tough, hard nature of much of Pakistan's wool makes it highly suitable for carpets. In the west, one sees many photographs of very small Pakistani children making carpets, mainly on a domestic basis. This causes a very emotive outcry. Ask pupils to discuss child labour: is it innately wrong? If so, why? What would these children do otherwise? Is it better for them to learn a highly skilled craft at an early age—or should they be outside playing?

Rayon

In a country overflowing with cotton, it is surprising to find its rival, rayon, being widely manufactured, especially as much of the raw material has to be imported. Ask pupils to bring samples (or garments) of the different types of textiles—cotton, wool, rayon, silk—and talk about the differences in texture, weight, etc.

Sugar

The text is fairly self-explanatory. Perhaps discuss the disadvantages of a high sugar diet. Sugar has a pleasant taste; even babies are attracted to sweet rather than plain foods. Food and drink manufacturers, especially in the west, are playing on this natural taste for sweetness (intended originally perhaps to maintain calories during hard manual labour) by putting sugar or sugar substitutes in unlikely foods like bread, etc.

Sugar is a major cause of illness. In the United Kingdom in May 2007, 46 per cent of all males over 16 were overweight, and 17 per cent were obese. About 32 per cent of women were overweight, and 22 per cent obese. This extra weight puts a great strain on the body, especially on the heart and circulatory system, leading to heart attacks and strokes. It limits mobility which, in turn, also increases weight.

Point out how little of the sugar cane is wasted. Sugar cane is used to produce sugar and its by-products, and the residue (bagasse) is used for fuel in the refining process, for making building boards and for fodder. The less refined sugars can be used to make industrial alcohol (and in Brazil has actually been used to produce petrol).

Tobacco

In general, the native tobacco in Pakistan is too strong for international tastes and is consumed almost entirely within the country. Like sugar, it is a serious health hazard. Heart disease, lung cancers, circulatory problems, bronchitis and asthma are all potentially fatal and are directly linked to smoking.

Ask pupils to comment on the following table of smokers by socioeconomic grouping (1999):

Leather

The vast number of animals in Pakistan means that huge amounts of leather are available, and Pakistan has exploited this, especially in the field of sports equipment, which is sold all over the world, largely because of its high quality and relatively low prices.

Cooking oils

The problem of transporting and distributing milk and *ghee* to cities in a hot climate has resulted in a major switch to vegetable cooking oils. This has the advantage of improved health as the oils contain unsaturated fats, unlike milk which has a high proportion of saturated fats. Saturated fats are said to be a cause of cancer and increased body weight.

Jute

Jute is the ideal fibre for coarse packing material, although in some less developed areas (especially in China) it is used for clothing.

Answers to Pupil's Book page 78

1. cotton; 70. cloth, clothing, yarn, canvas, towels, hosiery. wool. carpets; Pakistani wool is tough and coarse, suitable for treading on. rayon/artificial silk. wood; imported.
2. a. Ginning or removing the seeds from raw cotton.
b. spinning into yarn
c. weaving
d. making into garments or other products.
3. a. Cricket balls and all cricket equipment, tennis and other rackets (like squash), hockey sticks, footballs
b. There is a plentiful supply of leather from all kinds of domesticated animals.
c. Pakistani sports goods offer high quality with very reasonable prices.
4. Sugar cane is used for: domestic commercial sugars for consumption as sweeteners or as an ingredient in processed foodstuffs; bagasse (crushed stems) for heating sugar-boiling furnaces; bagasse for coarse building boards; residue of crushed cane for animal food; by-products such as industrial alcohol for chemical factories.

Additional exercise

MCQs

Choose the correct answer:

- Ginning is a process from which:
 - cotton fibres are turned into yarn
 - seeds are removed from raw cotton
 - fibres are straightened for spinning
 - yarn is woven into cloth **(seeds are removed from raw cotton)**
- Rayon is produced from:
 - soft wood
 - silkworms
 - hard wood
 - gum trees **(soft wood)**
- The thick brown sweet liquid that is the by-product of sugar refining is called:
 - molasses
 - corn syrup
 - sucrose
 - honey **(molasses)**
- Which of the following trees does not produce wood for sports equipment?
 - Mulberry
 - Babul
 - Poplar
 - Neem **(Neem)**
- The bulk of raw material for jute comes from:
 - Burma
 - Nepal
 - India
 - Bangladesh **(Bangladesh)**

MAIN INDUSTRIES

Pupil's Book 79–82

Industries at Partition

Empathize with the precarious state of the economy of Pakistan at Partition. There was virtually no industry or mining, the agricultural sector was weak and the communications network was shaky. The progress that we see today may not be outstanding compared to some economies, but one must consider the very low base from which the country started, the interruptions of war and the unstable political conditions which have inhibited the inflow of foreign capital. On top of this, the soaring birth rate, the decreasing death rate and the influx of refugees have put an added strain on the economy.

Graphs

It might be worthwhile asking pupils to draw a graph of the population of the Pakistan region since 1901. The figures can be taken from the table below.

Year	Population (in millions)
1901	16
1911	19
1921	21
1931	23.5
1941	28
1951	34
1961	43
1971	65
1981	84
1991	114
2001	144
2011	175 approx.

A graph with 1 centimetre representing 10 million people on the vertical axis and 1 centimetre on the horizontal indicating the decades will reveal a dramatic picture. Ask pupils when the population began to soar, and why. If, on the same graph, curves are shown to indicate birth and death rates, some significant conclusions can be drawn. A different scale for the vertical axis must be used, of course.

Year	Birth rate per 1000 persons	Death rate per 1000 persons
1901	46	44.4
1921	49	48.6
1941	45	31.2
1981	43.3	11.8
1993	39.3	10.1
1997	36.7	9.0
2003	29.5	8.7
2008	28.3	7.8
2010	25.3	7.0

This illustrates quite dramatically one of Pakistan's major problems: while the birth rate has fallen by less than 10/1000 in a century, the death rate has fallen 34.4/1000. Economically, Pakistan has to keep abreast of these changes in order to maintain the status quo.

Building industry

Cement and iron are the building blocks of an industrial nation, not only for machinery but also for the entire infrastructure of buildings, roads, canal linings, barrages, and dams. Pakistan has the basic raw materials to produce cement. Shortly after independence, Pakistan was actually exporting cement. With the development of the country, it was forced to import. Today, it is exporting cement.

Chemical industry

With Pakistan's relatively poor soil and a climate which favours agricultural pests and diseases, a chemical industry is essential. Again, Pakistan is fortunate in its limitless supply of salt, which is an ingredient of many chemicals, and its petrol industry, which supplies many more raw ingredients for chemicals. Even so, chemicals and drugs are still a very large and expensive item on the import bill. In 2010, for example, Rs. 331,075 million was spent on machinery; Rs. 690,200 on oil; and chemicals and drugs were third at Rs. 195,755 million.

Petroleum

Petroleum by-products are used in the chemical industry to produce dyes, flavours for food products and raw material for synthetic textiles. Ask pupils to browse through their encyclopaedias or websites to obtain a complete list of petroleum by-products.

Answers to Pupil's Book page 83

1. a. Treating raw oil (crude oil), which is a thick, black, tar-like substance, to extract the various compounds it contains like petrol, diesel, and kerosene.
- b. It has developed to meet the ever-increasing demands of transport and industry.
- c. See Teacher's Notes above.

2. a. Cement is one of the foundations of the industrial world and is used in the construction of buildings, transport systems, harbours, dams, irrigation canals, airports, etc.
- b. Pakistan has the raw materials—limestone—for making cement.
3. a. Chemicals: 138%; Drugs and medicines: 272%; Chemical fertilizers: 609%; Electrical goods: 500%; Machinery: 242%; Transport equipment: 164%; Petrol and petrol products: 300%.
- b. Chemicals and fertilizers
- c. Because of the demands of agriculture (fertilizers and pesticides) and the demands of growing industries.
- d. The figures indicate a steadily growing industrial economy.

Additional exercise

MCQs

Choose the correct answer:

1. Capital refers to:

a. money	b. skilled workers	
c. infrastructure	d. Islamabad	(money)
2. Crude oil refers to:

a. kerosene	b. refined oil	
c. diesel	d. sludge-like unrefined oil	(sludge-like unrefined oil)
3. Main raw material for cement is:

a. limestone	b. sulphur	
c. caustic soda	d. soda Ash	(limestone)
4. The centre of iron and steel industry is at:

a. Nowshera	b. Faisalabad	
c. Karachi	d. Lahore	(Karachi)
5. What percentage of its chemical needs does Pakistan have to import?

a. 10	b. 15	
c. 18	d. 12	(10)

SMALL INDUSTRIES AND CRAFTS

Pupil's Book 84–85

Small industries

Small industries are those which are defined as having fewer than 50 employees (without electricity) and less than 20 (with electricity). The government encourages small industries with loans, technical assistance, and training, thereby helping to reduce the migration to cities where there is high unemployment. Often, people from villages are not trained for employment and life in urban areas.

Small industries generally cater to local trade—constructing doors, windows and furniture for village houses and pottery for local use; in larger communities, rice-husking, flour milling, oil-seed pressing, shoe and clothing manufacture, etc. Some of these items are for wider use and export, like sports equipment, surgical instruments, cutlery, carpets, and handicrafts.

Small industries suffer from lack of capital; lack of standardization; shortage of power; poor marketing; irregular supplies of raw materials.

Cottage industries

Cottage industries are defined as those where the owner (and often his family) produce the goods themselves, at times in their own home. Sometimes families produce craft items during seasons when they do not have to work the land. Cottage industries specialize in craft and decorative work, like embroidery, bead work, and carved wood and bone. These items are usually sold to tourists or exported to the United States or Europe.

Answers to Pupil's Book page 86

1. Possible reasons: the cost of land is lower; the cost of labour in the countryside is lower than the cost of labour in urban centres; the cost of transporting workers from their homes to places of employment is circumvented or reduced.
2. Individual work
3. While pupils can come up with individual answers, they should mention that cottage industries are important because they help preserve centuries of craft traditions which are an essential part of a nation's cultural heritage.

Additional exercise

MCQs

Choose the correct answer:

1. Which of the following is not a cottage industry?
 - a. decorative brassware
 - b. carved wood objects
 - c. fancy needlework
 - d. steel **(steel)**
2. What fraction of Pakistan's industrial workers live in the countryside?
 - a. half
 - b. three-quarters
 - c. none
 - d. one-third **(three-quarters)**
3. Smaller factories that make an important contribution to the export market include:
 - a. sports equipment
 - b. pottery
 - c. ivory objects
 - d. footwear **(sports equipment)**

TRANSPORT AND COMMUNICATIONS

Pupil's Book 87–91

Importance of transport

Emphasize that communications are the vital arteries of modern civilization. Small, self-contained communities in the past did not need extensive communications systems. However, today they are essential. Pakistan, apart from the great Indus area, is generally difficult for transport because of its desert, mountain, and other different terrains. In many of these areas, there are few people so that building communications systems such as road and rail are not a practical solution. It is a pity that the great artery of the Indus is not navigable for the large ships that are used in trade.

Railways

The change in railways since 1960 is really minimal, and the rolling stock and substructure of the railway system is getting older. The consistent apathy shown to the department has resulted in the deterioration in the quantity and quality of service. From 1994 to 2003, the quality of track kilometres fell from 8775 to 7791 kilometres. The year 2010 saw the suspension of many inter-city train services.

Refer to the figures below for distances, freight, and passengers. Ask pupils to draw bar graphs for these and other transport figures.

Transportation statistics

Railways

Year	Length (kilometres)	Passengers (millions)	Freight (millions of tons)
2000	77,91	68.80	5.89
2010	7,791	58.97	4.63

Roads

Year	High (kilometres)	Low (kilometres)
2000	144,652	105,320
2010	179,290	80,328

Cargo at Karachi Port

Year	Total (millions of tons)	Export	Import
2000	25,982	5,918	20,064
2010	20,545	6,536	14,009

Motor vehicles

Year	Motor cars	Buses	Motorcycles
2000	1,182,307	154,401	2,260,772
2010	1,688,562	194,857	3,357,134

Roads

The bulk of traffic for both passengers and freight has moved to roads, which are much more convenient, carrying goods and passengers from door to door. Roads are expensive to build and maintain. There is still much work to be done, even though some of the terrain in Pakistan militates against road building.

Ports and shipping

Pakistan's relatively short coastline in relation to its area precludes a good system of ports. Much of the coastline is inhospitable; to the west of Karachi, backed by desert, and to the east, swampy.

Telecommunications

Pakistan has a sophisticated system of telecommunications and is well up to the world average for international communications. Progress in this sector has been phenomenal. In 1999, there were just 2.1 phones per 100 Pakistanis. By 2005, the number had risen to 2.9 per 100 Pakistanis. The number of mobile phone users has risen from 742,600 in 2000 to 97,579,940 in 2010.

Answers to Pupil's Book page 92

1. People are travelling more; goods are moved more frequently from one place to another; communities are no longer self-sufficient; exports and imports are on the rise; workers have to be transported.
2.
 - a. Too shallow, especially in the lower reaches
 - b. Too variable in water flow from season to season
 - c. Dams and barrages and other waterworks for irrigation make it impossible for ships to travel long distances.
 - d. It meanders so that the actual distance by water is many times more than what it would have been in a direct line by land.
3.
 - a. Rolling stock and track are out of date and need repair.
 - b. Two gauges can make travel difficult as one train cannot travel over the other track.

- c. Road transport is much more convenient (door to door without the inconvenience of loading/unloading).
 - d. As local coal is unsuitable for firing the engines, either expensive foreign coal or oil has to be imported.
4. a. Direct transport of goods from factory/port/market to destination without loading/unloading; quicker.
 - b. Direct travel from door to door without having to transfer from one train to another; can travel whenever it is convenient (i.e. in private cars); no need to follow schedules; easier to carry belongings, etc.
5. Increased consumption of petrol; increased car imports. Other problems: increased pollution; not as suitable for heavy or bulky loads such as coal, rock, oil, machinery, grain, etc.; increased congestion; road accidents.
 6. Individual work. Ask pupils to consult the local railway station, airport, etc. They may also wish to consult a road atlas to help them with (b).

Additional exercise

MCQs

Choose the correct answer:

1. Conditions along which part of the country allow for a relatively good transport network?
 - a. eastern part
 - b. western part
 - c. southern part
 - d. northern part **(eastern part)**
2. Indus River is not a good means of transport because it is:
 - a. too deep
 - b. too shallow
 - c. lacks dams and barrages
 - d. too rough **(too shallow)**
3. Which form of transportation is very important in Eastern Punjab for expansion of agricultural industry?
 - a. roads
 - b. railway
 - c. waterways
 - d. air **(railway)**
4. Pakistan's major sea port is:
 - a. Karachi port
 - b. Port Qasim
 - c. Gwadar Port
 - d. Pasni Port **(Karachi port)**
5. What percentage of Pakistani sea-borne trade is carried by Pakistani ships?
 - a. 50
 - b. 100
 - c. 20
 - d. 70 **(20)**

POPULATION

Pupil's Book 93–98

Diversity

Because the region that is now Pakistan was on the invasion route from central Asia to the rich subcontinent, many different people have passed through this area. Ask pupils to make a wall display of the same sentence written in as many different local languages as possible.

Population explosion

The main problem in Pakistan is that of the population explosion. Improved medical care has reduced the incidence of epidemics like malaria, etc. However, the funds for this medical care have been stretched to capacity, especially in urban areas.

The birth rate has fallen only slightly since 1901 (46 per 1000 people) to 2010 (28.40 per 1000 people). The death rate, however, has fallen dramatically since 1901 (44 per 1000 people) to 2010 (7.60 per 1000 people). More people are surviving to adulthood; they in turn will have children, and so the population will increase exponentially. This imposes a great strain on the nation's economy: more people means much more has to be spent on education, health care, and other facilities. The rising economy of the country is barely keeping pace with the increasing population.

Male/female ratio

One might comment on the proportion of males/females in Pakistan. Pupils should look at Question 2 on page 99 and discuss the reasons for the disparity. In almost all of the developed countries, the number of males is less than that of the females. This is natural because in all developed countries female life expectancy is greater than that of males, sometimes up to 5 to 8 years longer. Why is it different in less developed countries? This can be the subject of a serious class discussion. There are many factors to consider: constant pregnancies (and, therefore, a higher birth rate); overwork (especially in rural areas); the dominant male syndrome where men expect the best of everything and do little domestic work; lower status of women and less concern for their welfare; death in childbirth.

Point out the difference in birth rates in urban and rural areas. In 2009, 60.87 million (urban) and 109.07 million (rural). Ask pupils why they think there is a higher birth rate in rural areas.

Urbanization

Urbanization is a problem throughout the developing world. When people in villages see (through exposure to television, newspapers, radio, etc.) the superior living conditions of cities, they think there is a better life for them there. The mass migration of people from rural to urban areas is a problem difficult to reverse, despite the fact that the conditions for many of these newcomers are often more squalid than in their villages. In 1961, Karachi had a population of 2 million; by 2010 it had risen to over 16 million.

Answers to Pupil's Book page 99

1. There are so many ethnic groups in Pakistan because of centuries of foreign invasion.
2. a. Fairly straightforward.
b. The topics for discussion are listed above. Russia has fewer males than females because of the appalling casualties they suffered during World War II. According to estimates, about 20 million people (mainly males) were killed during the war.
3. a. The standard of living can rise only very slowly because any increase in the national wealth is almost always matched by an increase in population.
b. There is an increasing burden on all government services, including education, health, etc.
c. Unemployment
d. Migration from rural to urban areas, with a resultant rise in urban overcrowding, poverty, crime, etc.
4. a. Although primary education is, in theory, compulsory and free it is not rigorously enforced, particularly in rural areas. The standard of schools is often extremely low, and parents sometimes withdraw their children from schools because there is little or no progress. Child labour, especially in rural areas, is also a factor; often, parents feel that it is better for their children to be earning a wage, however small, instead of attending school. There is no compulsory education at the secondary level. The disparity between boys and girls attending schools is also disturbing.
b. Class discussion
5. Class discussion

Additional exercise

MCQs

Choose the correct answer:

1. By what rate is the population of Pakistan increasing per year?
a. 2.8
b. 5
c. 1.5
d. 3.5 **(2.8)**
2. The original inhabitants of the region were called:
a. Dravidians b. Aryans
c. Kalash d. Mughals **(Dravidians)**

3. Urbanization refers to the process of emigration from:
- East to West
 - village to city
 - city to village
 - North to South **(village to city)**
4. What fraction of Pakistan's urban population lives in Karachi and Lahore?
- one-third
 - two-third
 - half
 - quarter **(one-third)**
5. Which factor does not contribute to low crop yield?
- salinity
 - water logging
 - water erosion
 - fertilizers **(fertilizers)**

Imports and exports

Ensure that pupils understand the principle of spending within budgets. No country is able to exist without imports. Even Pakistan, which is largely self-sufficient in basic foodstuffs, has to import most of its technology, machinery, and fuel.

Some developed countries (Britain, for example) are almost entirely dependent on exports. In the past, this largely consisted of machinery, chemicals, and other manufactured goods, but today, as with many countries, the exports are called 'invisibles'. While machinery and physical goods can be seen (i.e. 'visibles'), there is a vast trade in insurance, banking, and share dealing. These are collectively called 'invisibles'. Pakistan is not very active in invisible exports.

Pakistan has to import far more than it exports. In 2010, it exported US \$ 14,162 million in goods and imported US \$ 25,107 million worth of goods. Pakistan does have a moderate invisibles income from wages sent home by Pakistanis living abroad. Unfortunately, the majority of those who send back money are poorly paid manual workers whose incomes are not very high.

Borrowing

Point out the problems of borrowing from international organizations, primarily the repayment with high interest rates. Almost 45 per cent of the total budget of Pakistan is allocated to debt servicing. By comparison, expenditure on defence, which is high by normal standards because of the threat of powerful neighbours, and security related expenditures within the country, was Rs. 32.9 billion in 2009. Note that most countries struggle to pay the interest on foreign loans while the capital sum borrowed remains. Today, there is a strong lobby at the United Nations to cancel these debts for developing countries.

Gross Domestic Product

Ask pupils to look at the GDP chart on page 103 of the Pupil's Book carefully. Discuss the various items. Agriculture still provides almost one-quarter of the total GDP, although the proportion generated through manufacturing is rising.

Answers to Pupil's Book page 104

- Balance of payment is the relationship between the amount a country exports (so earning foreign credit) and the amount it has to pay for imports (so using up foreign credit).
 - Most countries are not self-sufficient and need to import goods in order to survive. Some European nations, Japan, and the United States are fortunate in exporting high-value manufactured goods and importing relatively low-value food goods. If a country sells more goods overseas than it buys from abroad, it saves on foreign exchange and living standards rise.

2. The money the country borrows has to be repaid with very high rates of interest. Most countries struggle to repay the interest while the bulk of the loan remains.
3.
 - a. The amount of money earned inside the country
 - b. The amount of money earned inside the country plus any foreign earnings for rents, shares, etc.

Additional exercise

MCQs

Choose the correct answer:

1. Balance of payment refers to:
 - a. a record of a country's exports and imports
 - b. country's earnings
 - c. country's expenditures
 - d. interest payments

(a record of a country's exports and imports)
2. One of Pakistan's largest lenders is:
 - a. United States of America
 - b. Canada
 - c. UK
 - d. France

(United States of America)
3. Gross Domestic Product refers to:
 - a. the amount of debt accumulated by a country
 - b. the amount of wealth inside a country
 - c. the amount of interest to be paid by a country
 - d. the difference between exports and imports

(the amount of wealth inside a country)
4. GNP stands for:
 - a. Gross National Product
 - b. Gross National Projection
 - c. Grand National Product
 - d. Gross Natural Product

(Gross National Product)
5. $GNP = GDP + \underline{\hspace{2cm}}?$
 - a. wealth generated by income from abroad
 - b. interest
 - c. bank loans
 - d. credit

(wealth generated by income from abroad)
6. Life expectancy refers to:
 - a. number of years an average person can expect to live
 - b. number of babies a woman will expect in her life
 - c. number of years a sick person will live
 - d. number of years a rural person can expect to live

(number of years an average person can expect to live)

Population explosion

The population explosion is one of the more serious global issues. Although the world seems capable of supporting its present population, in practice it is not because of poor agricultural production. Ask pupils to look at the list of the most rapidly growing populations (below). Which among these are from the developing world? The rate of increase of smaller countries (Qatar, Oman, Yemen, Macao, etc.) will not cause a massive surge in population because they have low populations to begin with. However, in countries like China, India, and Pakistan, with their massive populations, even a low percentage increase translates into huge figures.

Ensure that pupils understand what percentage increase means. If the percentage increase is 4 per cent, for example, that means that for every 100 people in one year, there are 104 the next. This, of course, is a compound calculation, not just a steady rise of 4 per cent a year.

Fastest growing populations

Country	Percentage increase
Jordan	2.19
Malawi	2.78
Oman	3.14
Gambia	2.52
Yemen	2.71
Qatar	.86
Macao	.89
Libya	2.11
Saudi Arabia	1.54
Syria	1.95
Swaziland	1.21
Iran	1.25
United Arab Emirates	3.56
Congo	3.16
Zambia	3.11

You may wish to ask pupils to find out the actual population figures for the countries listed above.

Birth rate

It is a tragedy that the South African states which have such high birth rates also have very high death rates, mainly because of the spread of AIDS. The death rates for Nigeria (16.31 per 1000 people),

Congo (11.39 per 1000 people) and Zambia (12.84 per 1000 people) are much higher than those for Saudi Arabia (3.34 per 1000 people) and Pakistan (7.06 per 1000 people).

Like so many world problems, the basic answer is to educate people and teach them that traditional ideas about large families—a sign of virility and extra hands to help in chores/work—are no longer viable in the modern world.

Life expectancy

Ask pupils to look at the disparity in life expectancy on page 108. Notice how there is less difference between the male and female figures in developing nations than in developed ones.

Discussion topics

Discuss other problems, including housing, sanitation, waste disposal, education, health, and employment, especially as technology develops.

Discuss the morality of the one-family-one-child policy in China. Is this accepting reality and taking strict if unpopular measures to counteract it, or is it a gross infringement of civil liberty?

Population tree

The population tree on page 110–111 is interesting. In all developed countries, the ‘tree’ is roughly symmetrical, with a larger number of females throughout the groups, especially in the upper sections. Pakistan’s population tree is very unusual: while there are more girls born, after age 5 there are consistently more males. Similarly, the 55–69 and 65–75+ figures are very unusual. Can anyone suggest the reason for the bulge in the birth rate between 1917 and 1921 (the 60–64 range), and why the numbers in the top three blocks actually increase?

Answers to Pupil’s Book page 112

- Better health care, with more babies surviving the early years
 - dramatic increase in life expectancy
 - better food and the elimination of widespread famines (improved transportation of food, relief, etc.)
 - improved sanitation with the elimination of many diseases
 - better education
 - better government health services
- Food shortages b. housing shortages c. unemployment
 - increased pollution and waste disposal problems.
 - increased demand on government services, like health, education, and welfare.
- Larger workforce
 - larger pool of people from whom the very best can be selected for certain jobs
 - more security in the home with large, traditional families.

4. (a) Asia in general. Pupils can list individual countries. (b) Many of these countries are among the poorest in the world so that standards of living, already very low, will fall even further.
5. More cars, rickshaws, buses, and motorcycles, to accommodate larger numbers, means more exhaust fumes, noise pollution, and traffic jams. More waste and garbage is produced by larger numbers; often, this is not efficiently disposed of and leads to unsightly and unhygienic garbage dumps on the side of roads. Ask pupils to think of more reasons of their own.

Additional exercise

MCQs

Choose the correct answer:

1. Every year world total population increases by:
 - a. 5%
 - b. 2%
 - c. 1%
 - d. 1.8% **(2%)**
2. The first thing to consider when discussing overpopulation is:
 - a. epidemics
 - b. communications
 - c. shortage of food
 - d. housing **(shortage of food)**
3. Traditionally people of less wealthy countries have larger families because:
 - a. children in these countries often die.
 - b. there are more job opportunities. In these countries.
 - c. there are more schools in these countries.
 - d. the medical system is better in these countries.

(children in these countries often die.)

LESSON PLAN

Topic: Pakistan—Our country and its physical regions—Northern mountains

Time: 40 minutes

Teaching objectives:

By the end of the lesson students will be able to:

- identify the location of Pakistan on the world map with reference to the surrounding countries
- describe the physical features of the country
- explain the influence of different physical features on the lives of the people living there
- locate the longitudinal and latitudinal position of Pakistan

Resources: political world map, physical map of Pakistan, *Oxford School Atlas for Pakistan*, textbook, video showing the scenic beauty of the country; blank Pakistan maps, colouring pencils

Introduction: 5 minutes

World map can be used to locate Pakistan and also to identify the neighbouring countries of Pakistan.

Explanation: 40 minutes

- Make the students identify the longitudinal and latitudinal position of Pakistan by looking at the World map.
- List these in their journal: neighbours, location (latitude/longitude), total square area
- From the physical map of Pakistan students will identify the physical regions. Students can plot them on the blank map of Pakistan using colours to differentiate.
- The physical regions shown on pages 1 and 2 of the textbook can be discussed.
- Students can then discuss in groups of three how physical features such as mountains, deserts and plains can influence the lives of people.
- Later students can give a presentation on the different physical features.

Recapitulation: 5 minutes

- A scenic video of Pakistan can be shown to sum up the lesson.

Homework:

- Reading of page 1–10 of the textbook
- Locating the physical region on the blank map of Pakistan
- Attempt questions on pages 4, 8, and 11.

LESSON PLAN

Topic: Central Pakistan

Time: 40 minutes

Teaching objectives:

By the end of the lesson students will be able to:

- identify the major landforms of Pakistan
- study the relief and drainage of the Indus system
- analyse the influence of relief and drainage on life and normal activities of people

Resources: physical map of Pakistan, textbook, board

Introduction: 5 minutes

Open discussion about the physical regions of Pakistan

Explanation: 30 minutes

- After recapping the physical regions describe each region.
- This can be done by listing the features on the board and the students can copy it in their books.
- On the blank map students can mark the drainage pattern of Indus River. The main tributaries can be highlighted and the features formed by the river can be discussed.

Recapitulation: 5 minutes

- Mind map the physical regions and their descriptions.

Homework:

- Reading of pages 12 to 16 of the textbook
- Attempt questions on page 17 of the textbook.

LESSON PLAN

Topic: Climate

Time: 40 minutes

Learning outcomes:

By the end of the lesson students should be able to:

- identify the differences in climate in different physical regions of the country
- explain the importance of rainfall in Pakistan
- demonstrate an understanding of the different types of rainfall with reference to Pakistan
- describe the different soil types found in Pakistan
- describe the natural vegetation of different regions of Pakistan

Resources: textbook, maps showing the temperature and rainfall variation in Pakistan (*Oxford School Atlas for Pakistan*), illustrations of the natural vegetation of various regions of Pakistan, samples of different types of soil, class sets of cards showing the physical regions and different climatic features of each

Introduction: 5 minutes

Open discussion of the influence of geographical features on the climate of a region, e.g. desert and mountains

Explanation: 30 minutes

Prior reading of pages 18 – 21 of the textbook is required.

- Use a map showing the temperature and rainfall variation in different physical regions of Pakistan to develop the lesson. At the same time, refer to the different physical characteristics of the regions.
- The teacher should adopt the inquiry method, i.e. elicit answers from students, while proceeding to discuss the different soil types.
- Students should study the soil specimens and should write down the characteristics of the different types on a piece of paper.

Recapitulation: 5 minutes

The teacher can use the cards to reinforce the concepts taught. This is a pairs activity where students match the cards showing different regions with their climatic features and soil types.

Homework:

- Read pages 18 to 21 of the textbook.
- Attempt questions on page 22.

LESSON PLAN

Topic: The Indus river system: Irrigation

Time: 40 minutes

Learning outcomes:

By the end of the lesson students should be able to:

- explain the contribution of the Indus system to the agricultural activities of Pakistan
- describe the climate and the natural vegetation of the Indus plain
- list the reasons for, and consequences of, the Indus Water Treaty and explain the need for a comprehensive irrigation system
- explain the causes and solutions to the problems of water supply
- describe different types of irrigation system

Resources: textbook, map showing the irrigation system of Pakistan, blank outline map of Pakistan for each student

Introduction: 5 minutes

Open discussion of the importance of agricultural activities to daily life and how they contribute to prosperity.

Explanation: 30 minutes

Prior reading of pages 23–33 of the textbook is required.

- Use the drainage map of Pakistan to explore the features of the Indus river system. Each feature can be described carefully using the inquiry method; students should use their previous knowledge of drainage basins.
- On the blank outline map of Pakistan, students can mark the dams and small dams shown on page 18 of the textbook.
- Students can also analyse the climate of Pakistan.
- The teacher should explain the reasons for the Indus Water Treaty of 1960.
- Students can assess its effects and solutions of problems caused by the treaty.
- Different irrigation systems can be introduced using illustrations/charts, and their advantages can be assessed.

Recapitulation: 5 minutes

- Mind map the climate of Pakistan.
- Mind map on the board the Indus system showing its drainage features, taking suggestions from students.
- List the main reasons for and effects of the Indus Water Treaty.

Homework:

- Read pages 23–33 of the textbook.
- Attempt questions on pages 28 and 34.
- Draw diagrams of various methods of irrigation.

LESSON PLAN

Topic: Farming/Animal and poultry

Time: 40 minutes

Learning outcomes:

By the end of the lesson students should be able to:

- differentiate between the two main cultivation seasons and the types of crops grown in each season
- describe the cultivation processes of these crops
- demonstrate an understanding of livestock farming and the uses of this type of farming

Resources: textbook, maps of Pakistan showing the main growing regions of different crops, a blank outline map of Pakistan for each student, specimens of wheat, cotton, and other plant crops or their final products, slide show to sum up the main ideas

Introduction: 5 minutes

Open discussion of the seasons in Pakistan such as warm and wet, cold and dry

Explanation: 30 minutes

Prior reading of pages 35–44 of the textbook is required.

- The teacher should introduce the two cultivation seasons and list the crops grown in each of these seasons.
- The calendar shown on page 35 can be made in the form of a chart and displayed in the classroom.
- Show students the samples of plants or plant products and discuss the cultivation processes and requirements of these crops.
- Students should mark the cultivation regions for each crop on the blank outline map.
- Explain the differences between livestock farming and arable farming.
- Discuss the various animals that are raised and how they fulfil specific needs of the economy.

Recapitulation: 5 minutes

- A slide show can be prepared illustrating all the important features of the lesson—students can be questioned on the slides at random to assess their understanding.

Homework:

- Read pages 35 to 44 of the textbook.
- Students can collect specimens of pulses or other crops or their products and bring them to class. These will be displayed in the class.
- Attempt questions on pages 42 and 45.

LESSON PLAN

Topic: Agricultural problems

Time: 40 minutes

Learning outcomes:

By the end of the lesson students should be able to:

- list the natural and human factors that contribute towards agricultural problems in Pakistan and differentiate between them
- demonstrate an understanding of the causes and effects of these problems

Resources: textbook

Introduction: 5 minutes

Open discussion of the possible problems for agricultural activities; list these problems

Explanation: 30 minutes

Prior reading of pages 46–48 of the textbook is required.

- Discussion of the causes of the problems identified, drawing on previous knowledge
- Classify the causes as natural or man-made (human) factors.

Recapitulation: 5 minutes

- Mind map 'Problems of Agriculture' and list all the causes.

Homework:

- Read pages 46 to 48 of the textbook.
- Attempt question on page 49.

LESSON PLAN

Topic: Minerals and mining/Energy and electricity

Time: 40 minutes

Learning outcomes:

By the end of the lesson students should be able to:

- list the various minerals found in Pakistan
- identify the metallic and non-metallic minerals found in Pakistan
- locate on a map of Pakistan the areas where these minerals occur
- identify the sources of electricity and describe how it is used in Pakistan

Resources: textbook, a short documentary film clip on the mineral resources of Pakistan

Introduction: 5 minutes

Show the students a short documentary showing the excavation of mineral resources to arouse interest in the topic.

Explanation: 30 minutes

Prior reading of pages 50–62 of the textbook is required.

- The topic can be taught through discussion of the mineral resources after listing them on the board. Students can be asked to suggest uses for these minerals.
- Graphic representations such as those on pages 40, 42, 47, and 48 should be integrated in the explanation to assist understanding.
- Information on the uses of the mineral resources they have studied in the lesson up to this point can be displayed in the form of a flowchart.
- A graphic representation of ‘The main sources of energy in Pakistan’ can be used to explain the various sources and their contributions to the total energy consumption of the country.
- A short discussion can be conducted to identify the best sources of energy for Pakistan

Recapitulation: 5 minutes

- A short quiz to assess learning and understanding

Homework:

- Read pages 50 to 62 of the textbook.
- Attempt questions on pages 57 and 63.

LESSON PLAN

Topic: Industries: an introduction/From agriculture to industry

Time: 40 minutes

Learning outcomes:

By the end of the lesson students should be able to:

- explain the significance of industrialisation in boosting the economic development of the country
- identify the industrial processes that rely on agricultural output
- identify major and minor manufacturing industries

Resources: textbook, chart paper, markers, adhesive material such as sticky tape

Introduction: 5 minutes

Open discussion of why a country should not rely completely on an agricultural economy

Explanation: 40 minutes

Prior reading of pages 64–85 of the textbook is required.

- Divide the class into groups of four. Each group should be given a specific topic to discuss. Students can also do research on these topics using the Internet or the library.
- Students will produce posters showing the results of their research to present to the whole class. One person from each group will be the presenter.
- Each group will be given 2–3 minutes to present their work. The teacher should supply any information that is left out.
- Encourage creativity in displaying their conclusions visually.

Note: this lesson can be completed as two separate sessions.

Recapitulation: 5 minutes

- All the points discussed by the groups can be summed up using their charts. Students can record this information in their notebooks.

Homework:

- Read pages 64 to 85 of the textbook.
- Attempt questions on pages 70, 78, 83, and 86.

LESSON PLAN

Topic: Transport and communication

Time: 40 minutes

Learning outcomes:

By the end of the lesson students should be able to:

- explain the importance of good transport and communications for a country
- describe various types of transport system

Resources: textbook

Introduction: 5 minutes

Open discussion of why people need to move from one place to another.

Explanation: 30 minutes

Prior reading of pages 87–91 of the textbook is required.

- Discuss the importance of transport systems in the industrialised countries, and especially in Pakistan.
- List all the modes of transport and highlight their advantages and disadvantages.
- Student discussion of how developments in transport and communication systems have brought improvement to people's lives.

Recapitulation: 5 minutes

- Short quiz to assess understanding and learning

Homework:

- Read pages 87 to 91 of the textbook.
- Attempt questions on page 92.

LESSON PLAN

Topic: Population/Global issues

Time: 40 minutes

Learning outcomes:

By the end of the lesson students should be able to:

- explain the population explosion and the factors that lead to the unequal distribution of population in Pakistan
- describe the population explosion in different parts of the world
- explain the reasons for, and the ways to solve, the problem of population explosion

Resources: textbook, Internet, library, charts, markers, and sticky tape

Introduction: 5 minutes

Use the graph showing the population explosion in Pakistan on page 94 of the textbook to trigger student discussion of this topic.

Explanation: 40 minutes

Prior reading of pages 93–98 and 105–111 of the textbook is required.

- The teacher should build up the lesson on students' observations and their understanding.
- The graphs showing population explosion and the annual increase in population can also be explained and discussed.
- The class should be divided into groups for cooperative learning through group discussion.
- After group discussion, each group's main points should be presented as a poster and displayed in the classroom.
- In a plenary session one person from each group should present the group's views.
- The teacher can add any necessary additional information.

Recapitulation: 5 minutes

- All the points shared by the groups can be reviewed through an open discussion.

Homework:

- Read pages 93 to 98 and 105 to 111.
- Attempt questions on pages 99 and 112.

LESSON PLAN

Topic: Trade and aid

Time: 40 minutes

Learning outcomes:

By the end of the lesson students should be able to:

- explain what is meant by balance of payments

Resources: textbook

Introduction: 5 minutes

Introduce the analogy that just like domestic households, countries also earn income and incur expenses.

Explanation: 30 minutes

Prior reading of pages 100–103 of the textbook is required.

- Explain all the terms related to balance of payments.
- Explain the figures on pages 100, 101, and 103.
- Students should explain these terms in their own words in their notebooks.

Recapitulation: 5 minutes

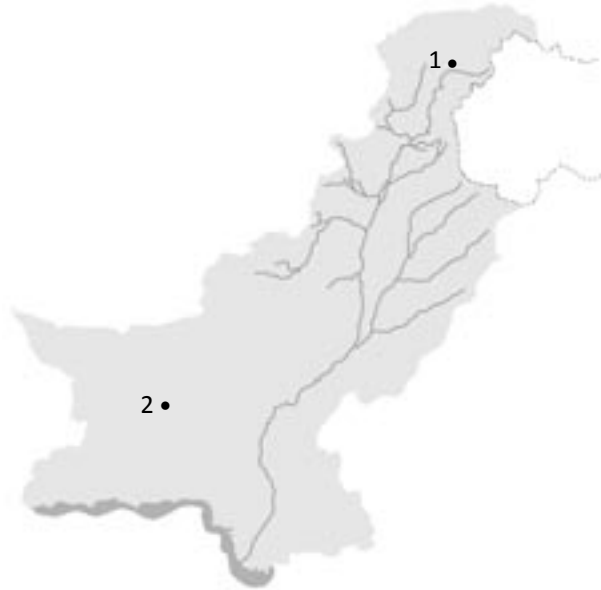
- Short quiz to review understanding.

Homework:

- Read pages 100 to 103 of the textbook.
- Attempt questions on page 104.

ASSESSMENT FOR UNITS 1–4

(Pages 1 to 17)



1. On the outline map of Pakistan:
 - a. identify the physical regions marked as 1. and 2.
 - b. name the eastern tributaries of the Indus system.
 - c. describe the physical features of the region you have named.
 - d. Explain how people have adapted themselves to live in the area marked as j.
2. Identify the following from the descriptions.
 - a. the second highest peak in the world, found in Pakistan
 - b. the pass which is 4700 metres above sea level and connects Gilgit to China
 - c. the plateau that has small streams and receives 400 mm of rainfall annually
 - d. the mountains that exist south of the Potowar Plateau.
 - e. the pass that connects Pakistan with Afghanistan
 - f. the mountains found alongside the Sulaiman Range
3. Write short answers.
 - a. Name the south-eastern deserts of Pakistan.
 - b. Name the doab which is in the Thal Desert.

- c. What is meant by reclamation?
- d. Name the area where the River Indus joins the River Kabul.
- e. Name the mountains bordering the North-western region of Pakistan.
- f. Name the ancient system of irrigation used in Balochistan.

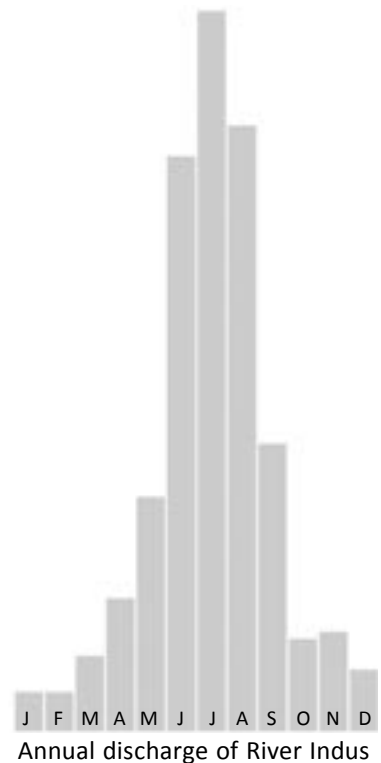
Answers

- 1. a. 1. Northern mountains 2. Balochistan plateau
 - b. Indus, Jhelum, Chenab, Ravi, and Sutlej
 - c. Himalayas, Karakorums, and the Hindu Kush are perhaps the most famous mountain ranges in the world. Most of the peaks are over 4,500m high; four of them rise above 8000m; K2 is the highest; the area contains important passes such as the Khunjerab Pass.
 - d. Very few people live here because of the harsh climate and difficult terrain. People grow barley as it can survive the cold weather; they also grow fruits such as apricots which they trade with the people of the south.
- 2. a. K2
 - b. Khunjerab Pass
 - c. Potowar Plateau
 - d. Salt Range
 - e. Khyber Pass
 - f. Central Brahui Range
- 3. a. Nara, Cholistan
 - b. Sindh Sagar Doab
 - c. turning infertile land into land that can grow crops
 - d. Attock
 - e. Hindu Kush
 - f. Karez

ASSESSMENT FOR UNITS 5 AND 6

(Pages 18 to 28)

1. Define the following terms:
 - a. alluvial
 - b. estuary
 - c. embankment
 - d. doab
 - e. GDP
2. Give short answers for the following questions:
 - a. Name the months in which the most rain falls in Pakistan.
 - b. Name the types of rainfall that occur in the months you have named above.
 - c. What three factors must be kept in mind when growing crops?
 - d. Which areas in Pakistan have the most fertile soil, suitable for crop cultivation?
 - e. Name the major dams built across the River Indus and the rivers on which they are built.
 - f. What led to the massive clearance of forests in Pakistan?
3. Study the graph which shows the annual discharge of the River Indus.
 - a. Which month(s) show(s) the highest discharge?
 - b. Give reasons for the higher discharge in the month(s) named.
 - c. How would the high discharge affect the farmers living in or near the region?



Answers

1.
 - a. fertile soil brought down by the river
 - b. area where the river joins the sea
 - c. barriers of mud or cement built up along the banks of a river to prevent flooding
 - d. the land between rivers
 - e. Gross Domestic Product is the total amount of money produced in a country.
2.
 - a. July/September
 - b. monsoon
 - c. temperature, rain (convectional), soil type
 - d. East of Pakistan, along the Indus Valley
 - e. Tarbela Dam – Indus; Mangla Dam – Jhelum
 - f. Forests have been cleared for fuel, or building, or to make room for settlements and the planting of crops.
3.
 - a. June–September
 - b. melting of snow and glaciers and monsoon rainfall
 - c. It can flood. Millions of tons of silt and mud sinks down to the riverbed, making it shallow. This type of soil is very suitable for crop cultivation and agriculture; if this silt and mud was deposited on the surrounding countryside, it would make the soil fertile.

ASSESSMENT FOR UNITS 7 AND 8

(Pages 29 to 42)

1. a. Indicate on the table below whether the following crops are produced in the *Rabi* season or the *Kharif* season.

Crop	<i>Rabi</i>	<i>Kharif</i>
rice		
sugar cane		
barley		
pulses		
wheat		
cotton		
tobacco		

- b. Explain the differences between the two growing seasons, *Rabi* and *Kharif*.
2. Give the uses of millet and maize.
3. Identify each crop from its description:

Description	Crop
It likes to grow with its feet in water.	
It is often attacked by boll-weevils.	
It is a greedy plant that needs sixteen sessions of irrigation.	
It provides fats that are needed for our health and for energy.	
It is an important substitute for meat.	

4. Give detailed answers for the following:
- Describe the cultivation process of wheat.
 - Explain how the Indus Water Treaty of 1960 has helped Pakistan to resolve its water crisis.
 - The system of irrigation in Pakistan has facilitated crop cultivation throughout the year. In what ways has this become a hazard for the cultivable land?
 - Draw a clearly-labelled diagram to explain how *karez* works.
 - Why is rice grown from June–September?

Answers

1.

i

Crops	Rabi	Kharif
rice		√
sugar cane		√
barley	√	
pulses	√	
wheat	√	
cotton		√
tobacco		√

ii *Rabi*—crops planted from October–December immediately after the wet season, and harvested in April–May.

Kharif—crops planted just before the wet season from April–June, and harvested from October–December. These plants need more water and heat.

2. maize—used for animal fodder, as corn oil

millet—eaten as porridge, flat cakes, animal fodder, especially for poultry

3. rice, cotton, sugar cane, oilseeds, pulses

4. a. It is planted in October–November; grows well in winter months and harvested in April–May. It is mostly grown under natural rainfall conditions and additional water is provided through irrigation. Strong winds that blow in May and June help in the threshing and winnowing of the grain.

b. After Partition, Pakistan had to give up the headworks of the main tributaries that join the Indus River. It could be dangerous as India could build dams and divert most of the water for its own use. Finally, in 1960, the World Bank helped resolve the issue. The rivers such as the Indus, Jhelum, and Chenab came under the control of Pakistan, while the rivers Ravi, Beas, and Sutlej were given to India. Parts of Pakistan that were irrigated by the Ravi, Beas, and Sutlej are now provided with water from the Indus, Jhelum, and Chenab through a network of canals. Pakistan has built dams and barrages to hold back the water during floods.

c. There are two problems:

i. water-logging: the water in unlined canals can soak into the surrounding soil and make it water-logged. The roots of plants must have air or they will die.

ii. salt: when the water evaporates, the salts are left behind. This forms a white deposit on the surface of the soil; over the years, the salt build-up in the soil can become strong enough to poison plants.

- d. Students should draw the diagram and explain it. Make sure the following labels are on the diagram: irrigated fields, wells to help digging of tunnel and to keep tunnel open; well to find water table; bedrock; porous rock; water table.
- e. Rice needs a great deal of water (at least 1200mm per year) and it is in this period that Pakistan receives a high amount of rainfall due to the monsoons.

ASSESSMENT FOR UNITS 9 AND 10

(Pages 43 to 49)

1. Answer the following questions.
 - a. Although cattle are a rich source of milk in Pakistan, why are they only reared on a small scale?
 - b. Why is the government trying to discourage the widespread breeding of goats and sheep?
2. Put the following agricultural problems in the correct columns:

Problem	Natural	Human
upper layer of soil eroded		
farm size 10 to 12 metres		
little rainfall		
poor soil		
locust attack		
lack of funds		
lack of education		
superstition		

Answers

1. a. Cattle require a good, steady supply of food in the form of grass or other green plants. Also they are of poor quality because of inter-breeding.
 - b. Goats and sheep thrive on tough grass and are destructive because they can turn fairly fertile land into a desert by eating every green thing in their path.

2.

Problem	Natural	Human
upper layer of soil eroded	√	
farm size 10 to 12 metres		√
little rainfall	√	
poor soil	√	
locust attack	√	
lack of funds		√
lack of education		√
superstition		√

ASSESSMENT FOR UNITS 11 AND 12

(Pages 50 to 63)

1. Write short answers for the following questions:
 - a. How is natural gas obtained?
 - b. What problems does Pakistan face in exploring its natural reserves of mineral resources?
 - c. List the sources of energy. Which of these sources is ideal for Pakistan? Give reasons to support your answer.
2. List the uses of the following materials:
 - a. rock salt
 - b. gypsum
 - c. limestone
 - d. marble
 - e. kaolin
3. Fill in the blanks so that the sentences below are true.
 - a. _____ is an advantage of using nuclear energy, while _____ is a disadvantage.
 - b. The government has set up huge hydel stations in three locations which are _____, _____, and _____.
 - c. Electricity is produced by a machine called a _____.
 - d. Natural gas fulfils _____ of Pakistan's energy needs.
 - e. Rocks that contain metals are called _____.
4. Identify the minerals described below:
 - a. Reserves of this mineral are found in the Zhob valley.
 - b. It is found in the Salt Range.
 - c. Concentrated deposits are found in the Potowar Plateau areas.
 - d. It is found in Khewra, Dandot, and Dand Khel.

Answers

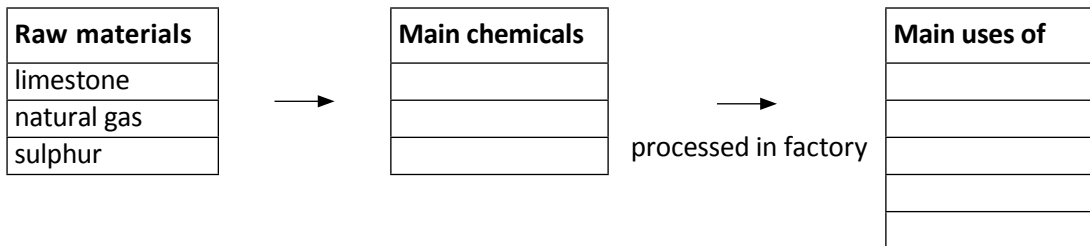
1. a. Once the gas has been located, and the pipes put down the holes to reach it, gas is fairly easy to obtain. It can be sent along pipelines easily and cheaply.

- b. remote regions with poor communications; not enough skilled workers; expensive mining, and transport equipment
 - c. nuclear, solar, wind, hydel, thermal. Hydel is ideal as Pakistan has natural sites to build dams and sufficient rainfall.
- 2.
- a. rock salt: cooking, preserving food, fertilizer, and other chemicals
 - b. gypsum: building, in plaster of Paris, cement
 - c. limestone: cement, glass, and chemical industry
 - d. marble: flooring, monuments, and statues
 - e. kaolin: chinaware, pottery, rubber, in paint and paper making
- 3.
- a. low running costs, chances of radiation
 - b. Tarbela, Mangla, and Warsak
 - c. dynamo or generator
 - d. 40 per cent
 - e. ore
- 4.
- a. chromite
 - b. rock salt
 - c. oil
 - d. gypsum

ASSESSMENT FOR UNITS 13–16

(Pages 64 to 86)

1. Complete the flow chart.

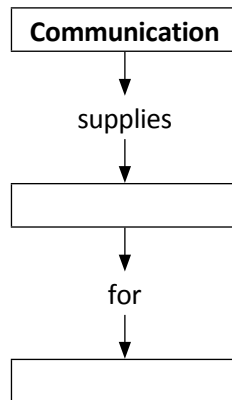
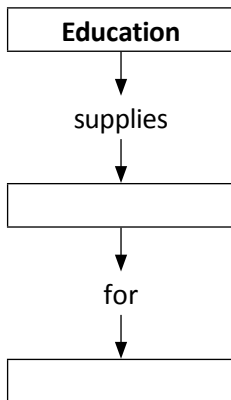
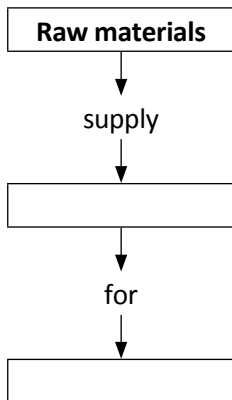


2. List four uses of

Cement

Sugar cane	
juice	waste

3. Pakistan needs an industrial economy to make it strong. Complete the following flowchart to demonstrate what is required to achieve this.

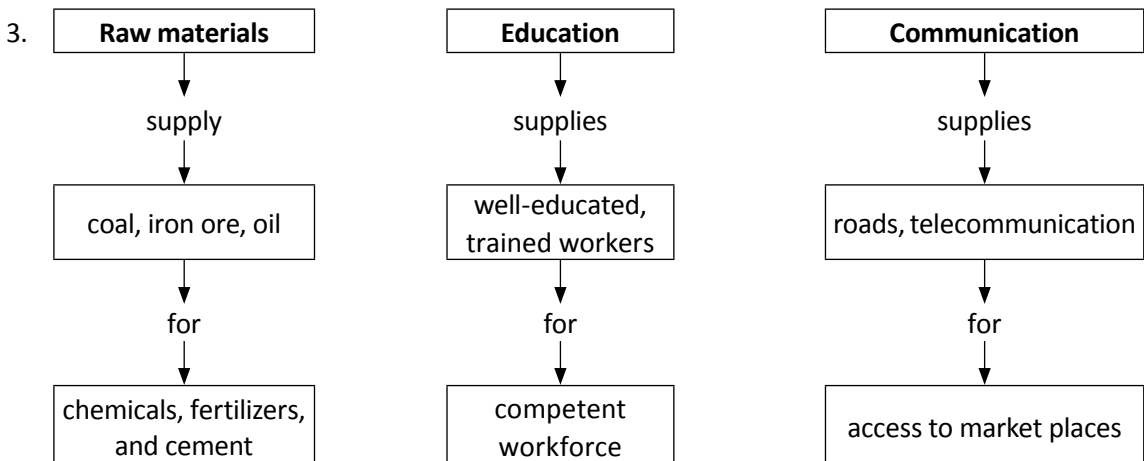
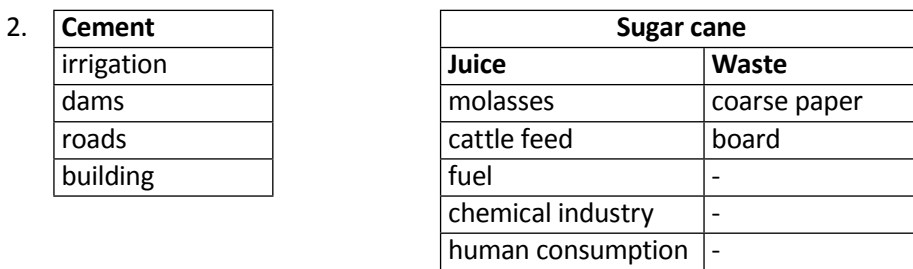
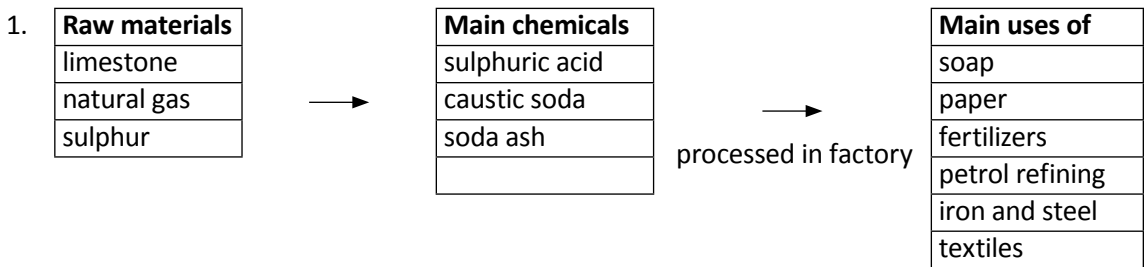


4. Answer the following questions.

- a. Describe the four processes which take place in the cotton industry.
- b. Describe how rayon is made.
- c. Explain the importance of fertilizers for agriculture.
- d. What are cottage industries? Give examples.

5. Write short notes on the following industries to explain their importance for Pakistan.
- The leather industry
 - The wool industry
 - The vegetable ghee industry
 - The iron and steel industry

Answers



4.
 - a. ginning—the seed is removed from the raw cotton; spinning—the cotton fibre is turned into yarn; weaving—the yarn is woven into cloth; garment making—the cloth is stitched into clothes.
 - b. Softwood trees are finely chipped, the chips are dissolved in special chemicals and this produces a thick solution. The solution is forced through a nozzle from which it emerges as a thin thread. This thread is hardened by passing it through a tank of chemical. It emerges as a fine thread—rayon or artificial silk.
 - c. Our soil lacks organic matter and requires large amounts of fertilizer in order to produce a decent crop yield. Animal dung is used on a small scale, but for large-scale farming activity, chemical fertilizers are used.
 - d. Cottage industries are small-scale industries which are run from people's homes. They make embroidered articles, fancy needlework, slippers, carved wooden objects, decorative brassware, and rugs and carpets.
5.
 - a. The leather industry: leather products are the fifth-largest export item of Pakistan; leather is mainly provided by sheep, buffaloes, goats, and cows. Industries associated with leather are tanning, manufacturing of leather goods such as jackets, suitcases, and bags.
 - b. The wool industry: most Pakistani wool is coarse and harsh and is suitable only for coarse clothing and blankets used in the northern and colder parts of the country. The quality of wool is very suitable for carpet making. In terms of money, carpets are Pakistan's fifth-largest export.
 - c. The vegetable ghee industry: Pakistan is unable to produce enough ghee from cattle for the entire population. Vegetable substitutes have been developed for cooking, especially for use in the towns and cities. The industry is widespread where there are large population centres.
 - d. The iron and steel industry: Iron ore is mostly found in areas where it is difficult to set up mining centres. Some iron is mined in the Kalabagh region, which has considerable reserves, but the quality of the ore is rather poor. The centre of the industry is Karachi where both local and imported ores are used to produce steel. Pakistan Steel can produce one million tons of iron and steel a year. Producing steel for railways, bridges, building, and machinery is cheaper than importing finished products. Karachi and Taxila are centres for the manufacture of industrial machinery, cranes, road-making machines, and steam boilers.

ASSESSMENT FOR UNITS 17–20

(Pages 87 to 112)

1. List Pakistan's industries and show how much each contributes to the country's GDP.

Industry	Percentage contribution to GDP

2. Answer the following questions.
- Explain why the railway system has not been able to meet the country's transportation needs.
 - How has the rise in the country's population affected the road transport system?
 - Although it is the most efficient means of transport, why is air transport still not suitable in many instances?
 - Explain how a rise in imports can improve the country's balance of payments.
3. Explain what is meant by the term *population explosion*.
4. List the languages spoken in Pakistan. Which languages are most commonly spoken in Pakistan, and why?
5. Explain why there is an increasing trend toward urbanisation in Pakistan. How does this affect the management of resources?
6. What are the global effects of over-population? Can you suggest any possible solutions to this problem?

Answers

- 1.
- | Industry | Percentage contribution to GDP |
|---------------|--------------------------------|
| manufacturing | 18.9% |
| mining | 2.5% |
| building | 2.7% |
| electricity | 1.7% |
2. a. The present system is not efficient. Railway engines and bogies are insufficient. The total length of railway track needs to be extended. The quality of service needs to be improved. The population of Pakistan has increased manifolds and the Railways dept. has failed to keep pace with the growth.

- b. The total length of roads has increased four times. There has been an increase in the number of motor vehicles. The road system accounts for 60% of all passenger and freight traffic in the country. The government is improving dozens of major roads and motorways.
 - c. air travel is very expensive; during bad weather the chances of accidents increases; airports need large runways to operate
 - d. The balance of payments is the difference between the amount of money a country earns from its exports and the amount of money it spends on importing goods from other countries. If a country has to import more than its exports, then it cannot afford to carry out many development projects. It has to borrow money from other countries which has to be paid back with interest.
3. The term population explosion refers to the rapidly increasing population of the world.
4. Punjabi, Hindko, Baluchi, Urdu, Sindhi, Siraiki, Pushto, English
Urdu—as it is commonly spoken and understood by everyone—it is the national language
Punjabi—it is spoken in the most densely-populated province
English—it is the business language of Pakistan
5. More and more people move towards urban centres for better opportunities. However when this happens, it becomes difficult to find jobs, suitable housing, food and education. It becomes difficult to maintain high standards of hygiene and health care and law and order.
6. Effects - shortage of land; problem of housing; increase in population; deteriorating educational standards, unemployment, health-care facilities also worsen.
Solutions: education, suitable legislation