CONTENTS

GEOGRAPHY PACK 1

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THE WATER CYCLE

1

This is a cycle that involves the continuous circulation of water around the Earth. Of the many processes involved in the hydrologic cycle, the most important are:

- evaporation,
- transpiration,
- condensation,
- precipitation,
- runoff.

Although the total amount of water within the cycle remains essentially constant, its distribution among the various processes is continually changing.

Evaporation, one of the major processes in the cycle, is the transfer of water from the surface of the Earth to the atmosphere. By evaporation, water in the liquid state is transferred to the vapour state. The main factors affecting evaporation are:

- temperature,
- humidity,
- wind speed,
- solar radiation.

The principal source of water vapour is the oceans, but evaporation also occurs in soils, snow, and ice. Evaporation from snow and ice, the direct conversion from solid to vapour, is known as sublimation. Transpiration is the evaporation of water through minute pores in the leaves of plants. Transpiration and the evaporation from all water, soils, snow, ice, vegetation, and other surfaces taken together are called total evaporation.

Water vapour is the primary form of atmospheric moisture. Although its storage in the atmosphere is comparatively small, water vapour is extremely important in forming the moisture supply for dew, frost, fog, clouds, and precipitation. Practically all water vapour in the atmosphere is confined to the troposphere (the region 10 to 13 km in altitude).

The transition process from the vapour state to the liquid state is called condensation. By condensation, water vapour in the atmosphere is released to form precipitation.

Questions...

1. Find definitions for the words listed above which are marked by a black spot.

THE WATER CYCLE

2

Precipitation that falls to the Earth is distributed in four main ways:

- some is returned to the atmosphere by evaporation,
- some may be intercepted by vegetation and then evaporated from the surface of leaves,
- some soaks into the soil,
- the remainder flows directly as surface runoff into the sea.

Some of the infiltrated precipitation may later soak into streams as groundwater runoff. Most groundwater is derived from precipitation that has soaked through the soil. Groundwater flow rates, compared with those of surface water, are very slow and variable, ranging from a few millimetres to a few metres a day.

Ice also plays a role in the hydrologic cycle. Ice and snow on the Earth's surface occur in various forms such as frost, sea ice, and glacier ice. When soil moisture freezes, ice also occurs beneath the Earth's surface, forming permafrost in tundra climates. About 18,000 years ago glaciers and ice caps covered approximately one-third of the Earth's land surface. Today, about 12% of the land surface remains covered by ice masses.

Questions...

1. Draw an illustration below to show how the water cycle works.

RIVERS

3

A river is any natural stream of water that flows in a channel with more or less defined banks.

Rivers constitute a fundamental link in the hydrologic cycle, and play a major role in shaping the surface features of the Earth. Even apparently arid desert regions are greatly influenced by river action when periodic floodwaters surge down usually dry watercourses.

Throughout history, rivers have provided one of the most important means of entry and passage:

- for explorers,
- for traders,
- for conquerors,
- for settlers.

Rivers assumed great importance, for example, in Europe after the fall of the Roman Empire and the decay of its road system. Rivers in medieval Europe supplied the water that sustained the growth of cities and were widely used as sources of power. Western European history records the rise of more than a dozen national capitals on sizable rivers. In modern history, both in North America and northern Asia, natural waterways dictated in large part the lines of exploration, conquest, and settlement.

River flow is sustained by the difference between water input and output. Rivers are nourished by overland runoff, by groundwater seepages, and by meltwater released along the edges of snowfields and glaciers. Direct rainfall also contributes to river flow, but generally in very small amounts. Losses of river water result from soakage into layers of porous and permeable rock, gravel, or sand, evaporation, and ultimately outflow into the ocean.

Questions...

1. Select one of the categories:
   - explorers,
   - traders,
   - conquerors,
   - settlers.

Write a summary of the the life of one famous person in history showing how rivers helped them to achieve their goals. Include other geographical factors in their journey.

RIVERS

4

The shape of a river system provides evidence of the geologic and topographical factors that have been involved in its formation and development. A river pattern characterized by sharp right-angled bends, for instance, is one that is following the joints in the underlying bedrock. Sometimes there may be few tributary streams, strongly suggesting that, as in the case of limestone, the bedrock is permeable and drainage is going underground. Rivers, especially those in humid regions, can be considered as branching systems of many tributaries.

The ability of a river to alter the landscape is demonstrated most clearly in the channel it cuts. A river may erode its channel by dissolving the rock over which it flows. Most riverine erosion is caused by abrasion. Particles transported by the flowing water, which range in size from silt to small boulders, collide with the riverbed and break off other pieces; the cumulative action of these particles can be likened to a file gradually smoothing a surface. The effectiveness of abrasion depends on the rate of water flow and the amount of the load that a river carries.

The net effect of channel erosion is to carve a valley. Channel erosion tends to cut downward, but few river valleys remain steep-sided. The form of a river valley is significantly affected over time by other processes such as weathering as well as by the cumulative effect of erosion by tributary channels and the widening of the main channel. Small steep-sided valleys, commonly called canyons and gorges, usually occur in upland areas. In river valleys in lowland areas, where the channel extends across a floodplain, no direct contact generally occurs between the channel and the valley sides.

The tendency of a river to curve and to develop broad looping curves is called meandering. A river heavily loaded with sediment may deposit the material at a rate that causes the channel to break up into several smaller channels. These channels typically diverge and converge, forming a braided pattern.

Questions...

1. Select a river in the UK and:
   - find out where its source is,
   - name the main towns and cities which are built near it,
   - find out how the river affects people who live near it,
   - find out how it is used for the economic well-being of the nation.

VALLEYS

5

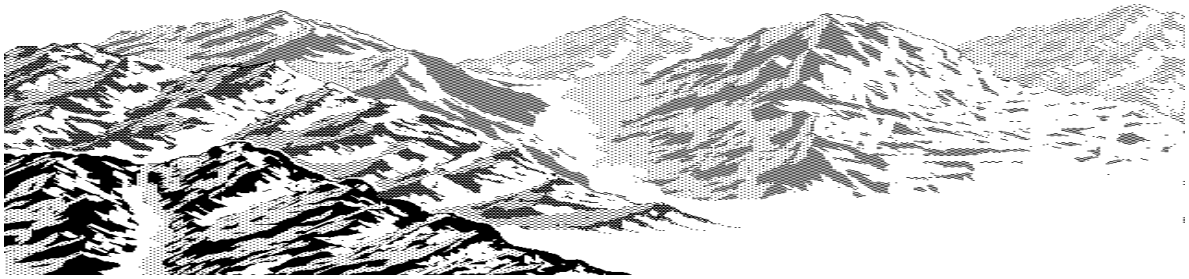
There are two main types of valleys:

- valleys formed by the flow of rivers are typically V-shaped,
- those formerly occupied by glaciers are characteristically U-shaped.

Valley evolution is mainly controlled by climate and rock type; most valleys are in balance with the stream regime flowing through them. Formerly, all valleys were thought to be great chasms in the Earth opened up by cataclysmic tectonic events. Depressions formed in this way are not true valleys, although they are often called such; examples are Death Valley and the Great Valley of California.

Very narrow, deep valleys cut in resistant rock and having steep, almost vertical sides are called canyons. They may reach depths of several thousand feet. Smaller valleys of similar appearance are called gorges. Both types are commonly cut in flat-lying strata but may occur in other geological situations.

Human habitation in valleys is very common because they afford better weather conditions and usually have better soil and water provision than hill and peak regions. There are some people who, through necessity, live in mountainous regions, but generally there is a clear preference for valleys over peaks.



Questions...

1. What is a valley?
2. What is the difference between a valley and a canyon?
3. Why do people generally prefer to live in valley regions rather than in hilly or mountainous regions?

COASTLINES

6

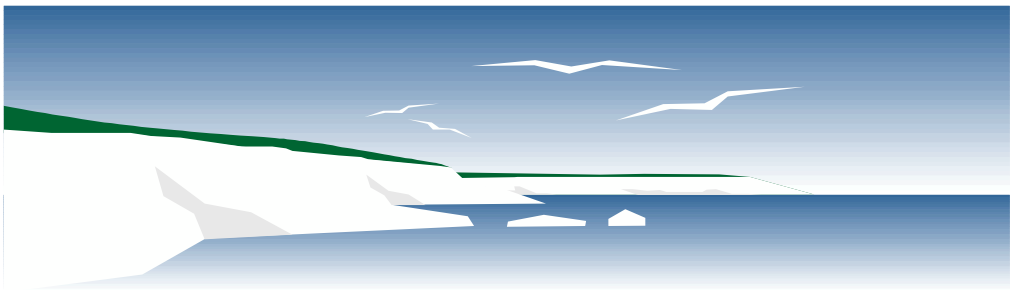
The coastlines of the world's continents measure about 312,000 km (193,000 miles). They have undergone shifts in position over geologic time because of substantial changes in the relative levels of land and sea.

Changes in sea level have also played an important role in shaping the coasts. Glacial ice descending from coastal mountains in Alaska, Norway, and certain other areas excavated deep U-shaped depressions in times of lowered sea level. When the glacial ice melted and the level of the sea rose again, these steep-sided valleys were inundated, forming fjords. Estuaries, formed by the flooding of coastal river valleys, also are found in regions where the sea level has risen significantly.

Other factors that are instrumental in molding the topography of coasts are:

- destructive erosional processes (e.g., wave action and chemical weathering),
- deposition of rock debris by currents,
- tectonic activity that causes an uplifting or sinking of the Earth's crust.

The configuration and distinctive landforms of any given coast result largely from the interaction of these processes and their relative intensity, though the type and structure of the rock material underlying the area also have a bearing. For example, coastal terrains of massive sedimentary rock that have been uplifted by tectonic forces and subjected to intense wave erosion are characterized by steep cliffs extending out into the water. These nearly vertical sea cliffs generally alternate with irregularly shaped bays and narrow inlets. By contrast, wide sandy beaches and relatively smooth plains of unconsolidated sediment prevail in areas of crustal subsidence where deposition is intense. Such coasts are characterized by sandbars paralleling the shoreline, as well as by tidal flats.



Questions...

1. How are coastlines shaped?
2. Why are some coastlines sheer cliff faces?
3. How do people influence the shape of coastlines?

WEATHERING

7

This is the disintegration or alteration of rock in its natural or original position at or near the Earth's surface through physical, chemical, and biological processes induced or modified by wind, water, and climate.

During the weathering process the relocation of disintegrated or altered material occurs within the immediate vicinity of the rock exposure, but the rock mass remains in place. Weathering is distinguished from erosion by the fact that the latter usually includes the transportation of the disintegrated rock and soil away from the site of the degradation.

Weathering involves physical, chemical, and biological processes acting separately or, more often, together to achieve the disintegration and decay of rock material. Physical weathering causes the disintegration of rock by mechanical processes and therefore depends on the application of force. Disintegration involves the breakdown of rock into its constituent minerals or particles with no decay of any rock-forming minerals. The principal sources of physical weathering are:

- thermal expansion and contraction of rock,
- pressure release upon rock by erosion of overlaying materials,
- the alternate freezing and thawing of water between cracks and fissures within rock,
- crystal growth within rock,
- the growth of plants and living organisms in rock.

Several factors control the type of weathering and the rate at which rock weathers. The mineralogical composition of a rock will determine the rate of alteration or disintegration. The texture of the rock will affect the type of weathering that is most likely to occur. Fine-grain rock will usually be more susceptible to chemical alteration but less susceptible to physical disintegration. The pattern of joints, fractures, and fissures within rock may provide an avenue for water to penetrate. Climate will also control the type and rate of weathering by affecting the likelihood of freeze-thaw cycles and chemical reactions. Chemical weathering is more likely to occur and to be more effective in humid tropical climates, and disintegration of rock from freeze-thaw cycles is more likely to take place and to be more effective in sub-Arctic climates.

Questions...

1. What is weathering?
2. What qualities should rocks have in order to be able to resist weathering?
3. Which conditions promote weathering?

SOIL EROSION

8

Soil erosion has long been recognized as a major conservation problem but erosion as such is not unnatural but a normal process leading to both soil development and maintenance. Soils exist only because of past erosion and deposition. The conservation problem involved in soil erosion is the accelerated erosion that occurs when soil cover in the form of living or dead plant material is removed. In such cases the soil then erodes at a rate faster than it can be replaced by normal deposition of particles on the soil surface or by the breakdown of rocks and minerals. In severe cases, erosion leads to the formation of deep gullies that cut into the soil and then spread and grow until all the soil is removed from the sloping ground. Under severe wind action, the finer particles of surface soil are blown away and form drifts and dunes, leaving only the coarser sands and gravels on the soil surface.

Although measures to stop soil erosion are now used in most industrialized countries, the problem remains a major one. It is particularly severe in the tropics, where high rainfall and steeply sloping ground favour the rapid loss of any soil exposed by agriculture, and around the edges of the world's deserts, where destruction of natural plant cover by cultivation or livestock grazing causes soil loss through wind action and the spread of desert-like conditions.

To prevent wind erosion:

- shelter belts of trees have been planted to break the force of the wind,
- the practice of covering soils with plant litter (mulch) when they are not actually covered with growing plants also helps to hold them in place,
- cultivating at right angles to the direction of the wind further serves to prevent wind erosion.

Water erosion on sloping ground may be prevented by terracing on steep slopes or by contour cultivation on gentler slopes. In the latter a slope is plowed along horizontal lines of equal elevation. Strip-cropping, in which a close-growing crop is alternated with one that leaves a considerable amount of exposed ground, is another technique for reducing water erosion; the soil washed from the bare areas is held by the closer growing vegetation. In the tropics maintaining a tree shelter over the ground serves as a means for breaking the force of raindrops, thus reducing their erosive power, and also to screen out direct sunlight. In addition to causing damage to certain crops, sunlight can accelerate the breakdown of organic materials in the soil at a rate that is faster than is desirable.

Questions...

1. What is soil erosion?
2. How do people try to prevent soil erosion?
3. Why is it important to try to prevent soil erosion?
4. In what conditions does soil erosion occur most?

WEATHER

9

Weather occurs in the troposphere, the lowest region of the atmosphere that extends from the Earth's surface to 6-8 km (4-5 miles) at the poles and to about 17 km (11 miles) at the Equator. Although weather is largely confined to the troposphere, phenomena of the higher regions of the atmosphere such as jet streams and upper-air waves significantly affect sea-level atmospheric- pressure patterns.

Geographic features, most notably mountains and large bodies of water (e.g., lakes and oceans), also affect weather. One manifestation of such weather-affecting interactions between the ocean and the atmosphere is what scientists call the El Niño effect. It is believed that it is responsible not only for unusual weather events in the equatorial Pacific region (e.g., the exceedingly severe drought in Australia and the torrential rains in western South America in 1982-83) but also for those that periodically occur in the mid-latitudes (as, for example, the record-high summer temperatures in western Europe and unusually heavy spring rains in the central United States in 1982-83). The El Niño phenomenon appears to influence mid-latitude weather conditions by modulating the position and intensity of the polar-front jet stream.

Generally speaking, the changeability of weather varies widely in different parts of the world. It is most pronounced in the mid-latitude belts of the westerly winds, where a continuous procession of travelling high and low-pressure centres produces a constantly shifting weather pattern. In tropical regions, by contrast, weather varies little from day to day or from month to month.

Questions...

1. Find out about and write a paragraph on the following types of weather:
   - storm,
   - squall,
   - blizzard,
   - hurricane,
   - tornado,
   - whirlwind.

WEATHER

10

Weather has a tremendous influence on human settlement patterns, food production, and personal comfort. Extremes of temperature and humidity cause discomfort and may lead to:

- the transmission of disease;
- heavy rain can cause flooding, displacing people and interrupting economic activities;
- thunderstorms, tornadoes, hail, and sleet storms may damage or destroy crops, buildings, and transportation routes and vehicles,
- storms may even kill or injure people and livestock,
- at sea and along coastal areas, tropical cyclones (hurricanes, typhoons) can cause great damage to ships, buildings, trees, crops, roads, and railways, and they may interrupt air service and communications,
- Heavy snowfall and icy conditions can impede transportation and increase the frequency of accidents,
- the long absence of rainfall, by contrast, can cause droughts and severe dust storms when winds blow over parched farmland, as with the 'dustbowl' conditions of the US plains states in the 1930s.

The variability of weather phenomena has resulted in a long-standing human concern with forecasts and predictions of future weather conditions. Since the mid-19th century, scientific weather forecasting has evolved, using the precise measurement of air pressure, temperature, humidity, and wind direction and speed to predict changing weather. The development of radar has enabled meteorologists to track the movement of cyclones and anticyclones (depressions and highs) and their associated fronts and storms. The use of advanced radar and computers in the second half of the 20th century has enabled weather patterns to be tracked worldwide. These developments have improved the accuracy of local forecasts and have led to extended and long-range forecasts, although the high variability of weather in the mid-latitudes makes these longer-range forecasts less accurate.

Questions...

1. How can the weather affect:
   - shipping and fishing,
   - buildings,
   - crops and trees,
   - travel and communication?

CLIMATE

11

This is the condition of the atmosphere at a particular location over a long period of time; it is the long-term summation of the atmospheric elements (and their variations) that, over short time periods, constitute weather. These elements are:

- solar radiation,
- temperature,
- humidity,
- precipitation (type, frequency, and amount),
- atmospheric pressure,
- wind (speed and direction).

The idea of climate has broadened greatly in recent years. To the general public the word retains the meaning of expected or habitual weather, which is heavily dependent on place and time of year. Climate is now perceived as part of a larger system that includes not only the atmosphere but also:

- the hydrosphere (all liquid and frozen surface waters),
- the lithosphere (all solid land surfaces, including the ocean floors),
- the biosphere (all living things),
- such extraterrestrial factors as the Sun.

These interconnected subsystems are governed by known physical laws, but each nonetheless behaves in a complex, unpredictable manner. Therefore, it is not surprising that the climatic system is also characterized by complexity and variability. Distinct rhythms (such as the seasons) or certain prevailing conditions may be evident, but within these constraints any number of variations may occur. Descriptions of climate therefore should include not only the average values of such elements as temperature and atmospheric pressure but also measurements of variability, such as frequency of occurrence and extreme ranges.

Large-scale fluctuations that result in new and apparently lasting conditions are known as climatic changes. Such changes may take place over millennia or even over millions of years. Evidence of such changes and of past climates is obviously limited.

Questions...

1. What is the difference between weather and climate?
2. Why is it important to study climate?
3. How do long term climate changes affect people?

WEATHER FORECASTING

12

The invention in the 17th century of the thermometer and the barometer, along with improvements of the hygrometer, permitted the measurement of the three basic elements of the atmosphere. Correlations were made between such measurements and those of other aspects of local weather, such as wind speed and precipitation. Initially, however, the number of observations were too small and the variety in observational techniques too great to allow accurate patterns of atmospheric conditions to be developed. Furthermore, the study of such patterns depends on a rapid exchange of data between many observing stations over a large area, and this was impossible before the development of the electric telegraph in the late 1830s. From this time on, networks of weather stations on land increased rapidly, although the development of oceanic stations lagged behind for many decades.

National and international organizations were established by the late 19th century to standardize the recording of weather and to oversee the first attempts at forecasting, initially largely for ocean shipping. In recent years, advances in observational apparatus and techniques, most notably the use of radiosondes carried by weather balloons, radar, and Earth-orbiting satellites and high-altitude aircraft equipped with special sensors, have helped to revolutionize weather forecasting. Another major breakthrough has been the generation of numerical weather prediction (NWP) models, made possible by the development of electronic digital computers. These NWP models consist of mathematical representations of the laws of motion, mass, heat, and moisture which enable weather forecasters to approximate relations for solution on a three-dimensional grid mesh and integrate them forward in time. This grid mesh corresponds to the area for which future weather is to be calculated; it can represent a specific region, such as Northern Europe, or the entire Earth. The integration of such atmospheric models with high-speed super-computers has made it possible to predict temperature anomalies and pressure fields and, to a lesser degree, precipitation about five to seven days in advance.

Public weather forecasts beyond 12 hours are virtually all based on highly complex mathematical models. For predictions of a shorter period, a method known as “nowcasting” is frequently employed. In this technique, satellite and radar observations of local atmospheric conditions are processed by computers in order to project the details of future weather within a limited area.

Questions...

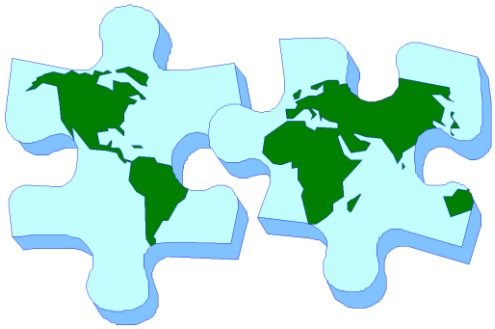
1. Trace the history of weather forecasting.
2. Which instruments are used in forecasting weather?
3. How has the use of computers changed the way in which weather is now studied?

POPULATION - INTRODUCTION

The study of populations is called demography. The study of populations is very important because of the rapidly increasing world population. The implications of this rapid increase will affect all aspects of human life, the ecology of the planet, and even the future of the Earth. The most important part of the study of populations is counting how many people there are. This is usually done by a conducting a Census. Some of these are very small and limited whilst others attempt to find out about the population of a whole country. In the UK there is a complete and full Census every ten years with the next one due in 2001.

The Census gives us many vital statistics about the population including:

- The crude birth rate. This show us the ratio between the number of births each year and the population as a whole.
- The crude death rate shows the number of the deaths each year compared with a population as a whole.
- The sex ratio measures of the relative numbers of males and females in the population. The sex ratio is a very important part of the Census because it allows a calculation to be made about the fertility rate in the population.



Questions...

1. What is demography?
2. Why is it considered important to study population trends?
3. What can be learned from:
   - crude birth rates data,
   - crude death rates data,
   - the sex ratio of a population?

DISTRIBUTION OF POPULATION

14

The distribution of the population within a country has many implications. For example, in the UK populations in Roman times generally lived in the South of the country. In the 17th and 18 centuries people started moving into towns and the industrial revolution meant that large numbers of people were for the first time concentrated in small spaces. Industries like coal mining, textile mills, and the ports attracted many people looking for work and large towns grew up around them. Today the population of the UK is spread out and this means an increase in the number of roads which needed to be built, the wider distribution of resources, and the infrastructure required to support a population which is widely distributed. There is still a larger concentration of people living in the south of England than elsewhere in the UK.

There are many reasons why people settle in particular places including:

- the type of work available,
- the amount of work available,
- the climate,
- the provision of services,
- traditional family ties.

In some countries religion is one reason why people may live in the particular place. Some areas are avoided because of disease or war.

In all countries the number of people varies from generation to generation. The study of the way the population of the UK has developed since Roman times is a good example of this. Although it is true that the population of all countries has increased, there are times in history when there have been mass migrations from particular countries. The study of Ireland is a good example of this. Because of economic factors many people migrated from Ireland in the 19th century. In 1846 more than a hundred thousand people left Ireland, and in 1847 more than two hundred thousand people emigrated. This was mainly due to the failure of the potato harvests which were the staple diet of the people. In one period lasting 15 years more than two million people left Ireland.

On the other hand some countries have seen huge immigration. The USA is a good example of this. In the last three hundred years the USA has seen immigration from almost all European countries, South America, and Asian countries.

Questions...

1. Trace the trends of immigration into and emigration out of the UK in the last 100 years.
2. What kind of events lead to mass migration or population movements?

REASONS FOR POPULATION INCREASES

The population of the UK today is about 58.9 million. People often think that the UK has always been highly populated, but this is not the case. In 1800 the population was about 11 million. By 1900 a population was about 34 million and in 1950 the population was about 50 million. Since 1950 the population of the UK has gone up by less than 10 million. Many European countries have not seen a huge population explosion because the birth rates in all European and other industrialised countries have been falling.

The population of the world as a whole has been dramatically increasing. In 1800 of the world population was less than one billion. By 1900 it had risen to more than 1.5 billion. In 1950 the world population was about 2.5 billion. In 1980 it was about 4.5 billion. Today, the world population is about 6 billion. There are many factors which are responsible for this huge increase:

- The level of medical knowledge today means that many people who would have died from illness and disease in the past can now be treated effectively.
- The levels of hygiene are now much higher and this prevents the spread of diseases and infections. In the past there are examples of epidemics caused by poor hygiene.
- There has been a fall in the infant mortality rate which means that more babies live whereas in the past a greater number of babies would be expected to die in infancy.
- Population growth is also encouraged by the standard of living. If people are economically more stable then they are more likely to marry and start families, and have more children because they can afford to bring them up.
- There are often social and cultural factors which also encourage population growth. Some people do not use contraceptives because of religious reasons. In other cultures big families are encouraged and are a sign of well-being and prosperity.

Questions...

1. Why is the world's population increasing so quickly?
2. Is it inevitable that the population will continue to expand rapidly?
3. How can the world population be stabilised? Draw up a strategy.

PROBLEMS OF POPULATION INCREASES

16

The rapid rise in world population has caused a number of problems.

- One of these is the **shortage of land**. The amount of land which can be used is very limited and often cannot cope with the huge increase in the number of people who want to use it. In the UK there are classic examples of problems which arise from the shortage of land with more and more green belt land being used for housing and business premises although many people think that it should be used for other purposes or kept as countryside.
- **Unemployment** is an increasing problem associated with over population. In many industrialised countries there have been periods where large numbers of people have been unemployed. The implications of unemployment are many including the creation of an underclass; people who cannot afford to participate effectively in the society.
- Many people have predicted that **food shortages** will begin to occur as the number of people in the world increases. However, this has not happened yet because scientists have managed to produce higher yielding crops and better fertilisers which have kept productivity up.
- Increased population numbers means that there is likely to be **a greater pressure on public services** like hospitals and schools. The national health service in the UK is a good example, where people often have to wait for more than one year for routine operations. The problems in developing countries are far worse because they often do not have effective health systems in the first place, and have huge populations to deal with.

Questions...

1. What are the main problems associated with population increase?
2. How have scientific developments managed to avoid food shortages?

SETTLEMENTS - VILLAGES

Settlements can be classified in two main ways: rural settlements and urban settlements. Most people in the West live in urban settlements while many people in developing countries live in rural settlements.

Rural settlements can be divided into two types: compact settlements and dispersed settlements.

Compact settlements are the types which are based around a Village. British villages are typical examples of compact settlements. There is a definite cluster of buildings which might include the post office, a church, and some shops. Houses are spread around the centre. Some villages have a centre which is dominated by a main road or crossroads.

Dispersed settlements do not have a definite centre but are often characterised by a number of buildings spread around a given area. These settlements may be remote and isolated. Some small villages in Wales and Scotland are typical of dispersed settlements.

The type of settlement is often determined by economic considerations. Villagers in southern England in the past, for example, tended to work more cooperatively, sharing tools and equipment, and so needed a centre. They tended to live in compact settlements. Northern farmers, however, were more likely to live in dispersed settlements because they needed to have more land if they were sheep farmers or involved in herding type farming.

Questions...

1. What does '**settlement**' mean?
2. Write a paragraph about both:
   - a compact settlement,
   - a dispersed settlement.

Think of real examples of both of these in your area.

SETTLEMENTS - TOWNS

Urban settlements tend to be very large in comparison to rural settlements although some towns can be quite small. It is difficult to apply general principles to urban settlements because many of them have grown up over a number of centuries and vary greatly in the terms of their size, age, siting, and functions.

The position of a town in relation to its environment is called a site. Many modern towns may not have their site in the same place today as in the past because they have spread out so much since they were originally formed. Many British towns can be traced originally to being defensive sites. This means they were designed to defend against attack. Durham is a classic example of a defensive site. Some towns developed because they were usefully placed on main routes. Other towns were originally near river crossings. Norwich is a good example of this. Some towns are resources based. This means that there is a natural resource which can be the source of employment. Some towns are based on the coast for obvious fishing or harbour services. A good example would be Liverpool or Southampton.

Towns have many functions.

- Defensive functions are not really important today.
- Industry on the other hand is one of the main functions of the town.
- Administration is also a function. Many government services are fulfilled locally and towns tend to be the base from where such administration takes place. All towns and cities in the UK have their own local councils.
- Cultural functions like Stratford on Avon and Shakespeare, or the Lake District and Wordsworth.
- Recreational functions. This can be seen especially in seaside towns.
- Trade and commerce is very important and many towns and cities become commercial centres, like London, Tokyo, and New York.

Questions...

1. How do towns differ from villages?
2. What are the differences between a town and a city?
3. What are the main features of your town or city? Trace its history.

RESOURCES

Resources can be any product, by-product, or supply which can be utilised by people. Resources are, however, limited in many cases and there is always competition to deciding how they should be used.

- Industrial resources are the most obvious ones and include commerce and trade, means of communication, factories which make products which we all need, vehicles, etc.
- Agricultural resources include the land, the climate, and produce which is grown.
- Recreational resources are increasingly important today as people have more leisure time to enjoy themselves. These include parks, resorts, and holiday destinations.
- Scientific and educational resources include colleges, libraries, the environment, species of animals and birds, and places of scientific interest.

The most clearly recognizable renewable resources are those consisting of, or produced by, living things:

- agricultural crops,
- animal forage,
- forest crops,
- wild and domestic animals.

Some resources are not renewable and so must be used very carefully in order not to waste them. These resources include:

- coal,
- oil,
- natural gas.

Questions...

1. What are resources?
2. Write a short paragraph on each type of resource listed above, giving examples from your own area, (where applicable).
3. Why are resources often limited? How are decisions made about how scarce resources are used?

RESOURCES CASE STUDY - WATER

One of the most valuable resources is water. In itself water is not a scarce resource but because of the way people are concentrated in towns and cities often it is scarce. It also depends on how effectively water is collected. In many parts of the world water is considered very valuable. In California, for example, water is often rationed because a large number of people means that the supplies are not always adequate. In the UK water is not in shortage but sometimes it has been rationed because of high demand for water and a lack of rainfall. The amount of rainfall in the UK varies. In the south where there is greatest demand the rainfall is lowest, whereas in the north of England and Scotland where the population is lower the rainfall is greater than in the south. Western Britain has more rainfall than the East.

The main demand for water in Britain comes from industry; as a much as 80 percent of water is taken by industry. The rest is taken by domestic users and used in farming. Water is increasingly used in recreational and sports activities as well. In the UK water demand is rising by about three percent every year.

OVERUSE OF WATER - A DANGER TO US ALL!

Human use of natural waters, particularly of freshwater resources, has increased steadily over the centuries. It is unlikely that this trend will change given the continued growth of population and the ever-widening utilization of water for agricultural, industrial, and recreational purposes. This situation has given rise to growing concern over the availability of adequate water supplies to accommodate the future needs of society. Surface-water resources are already being used to their maximum capacity in various regions of the world, as, for example, in the southwestern United States.

Quantity of water is not the only concern. Overuse has resulted in the progressive deterioration of water quality. Seepage of mineral fertilizers (phosphates and nitrates), pesticides, and herbicides into surface and subsurface waters has not only rendered them unfit for human consumption but also disrupted aquatic ecosystems. Lakes and rivers also have been contaminated by the improper disposal of sewage, the discharge of untreated industrial wastes and the release of heated waste water from nuclear-power plants and other industrial facilities, which results in thermal pollution and its related problems.

Questions...

1. Write your own report on a resource. Some suggestions for topics include:
   - fossil fuels,
   - wind power,
   - nuclear power,
   - agricultural land,
   - National Parks,
   - forests.