# The Earth and Its People

Mapping the world

The Earth is round. It is a sphere, like a ball, but it is slightly flattened at the North and South Poles. This is the result of the fact that the Earth spins fast. Even the equator is not an exact circle, it is slightly oval.

Imagine that you are looking at our planet from space. You can easily recognise the shapes of the oceans and continents. However, mapping the earth presents a problem to map-makers. They need to draw an accurate picture of its round surface on a flat piece of paper. Systems of projection are invented to solve the problem.

One way is to use a number of imaginary lines that divide the world into sections. The lines are called latitude and longitude. These lines form a grid, making it easier to see distances between places, and to find where one place is in relation to another.

The lines of latitude go around the earth from east to west. They are measured according to their angle from the very centre of the earth.

They are parallel to the Equator which is at 0ø (0 degrees). This is the line that is most often close to the sun. The North and South Poles are at 90ø. These are the points that are most often far from the sun. All the other places on earth can be measured in degrees north or south of the Equator. They are all between 0ø and 90ø.

Lines of longitude (meridians) run from the North Pole to the South Pole. They are measured in degrees east or west of Greenwich in England.

The problem with map projections is that they cannot show the earth accurately; this is only possible on a globe. For example, in Mercator's map projection the world is seen as a rectangle: the lines of longitude (meridians) are parallel rather than meeting at the Poles, the lines of latitude intersect the meridians at right angles. This means that places near the Poles, such as Greenland, seem much larger. Many map projections show eastern Russia on the right and Alaska on the left of the map. It is also possible to show Australia at the centre.

The structure of the earth

The earth is one of the nine planets in the solar system which revolve around the sun. The earth is solid and rocky and it is 150 million km from the sun. The nearest body in space to the earth is the moon. It is 384 000 km from the earth.

Scientists believe that 4,500 million years ago the earth's surface was covered by molten rock. This is rock which is so hot that it melts. As the rock cooled and hardened, the heavier materials sank towards the centre of the earth, while the lighter materials stayed near the surface. The rock released steam which condensed and became the seas.

The earth is still cooling very slowly. It has three main layers -- the core, the mantle and the crust. The crust is made up of several rigid but slowly moving plates on which the continents sit. Scientists believe that there was originally only one large land mass. Gradually this split up and the continents drifted to where they are today. The continents split up because at the edges of the plates new material came up from the earth's mantle and forced the plates apart. The main mountain ranges in the world are found where the plates met.

Today the continents are still moving apart and together (continental drift). It is also possible for the continents to move up and down (isostacy).

Earthquakes and volcanoes

Earthquakes and volcanic eruptions often happen at the edges of the plates in the earth's crust. When one plate moves against another, a violent shaking of the ground may occur. This is an earthquake.

Like the waves which spread out from the centre when you throw a stone into a pond, the vibrations of an earthquake spread out from a centre called the focus. The surface of the earth above the focus is the epicentre. If an earthquake is very strong it can cause landslides and floods.

Volcanoes are openings in the earth's crust out of which molten rock (called lava), rocks, ashes, dust and gases come from the inside of the earth. The lava, rocks and ashes sometimes form a mountain shaped like a cone. Sometimes the lava comes up through long cracks and flows over large areas to make a flat area called a plateau. Many volcanoes do not erupt for long periods. These are called dormant volcanoes. In volcanic regions there are also many geysers which produce steam and hot water.

Earthquakes and volcanic eruptions occur mainly in certain areas of the earth. These areas are often at the edges of the plates on the earth's crust. For example, the largest belt is called the 'Fiery Girdle' and goes around the shores of the Pacific Ocean. A second belt follows the ridge in the middle of the Atlantic. A third belt runs from the Mediterranean to the Himalayas.

How the landscape is formed?

The earth's landscape is formed by processes called weathering and erosion which begin as soon as the land forms. Weathering and erosion mean that the land is worn away by changes in temperature or by wind, water or ice.

In cold areas such as mountain tops, rainwater collects in the cracks in rocks. When it freezes the water expands and makes the rock break up. In hot deserts, the surfaces of rocks expand during the day and contract at night when the temperature falls. This change gradually weakens the rock and makes the outer layers destroy. Tree roots and burrowing animals also make rocks split apart.

Water can alter the minerals in some rocks. For example, water dissolves chalk and limestone rocks to make limestone caves.

A river is one of the main agents of erosion. As a river flows down, it gathers more and more material such as stones and sediment and deposits it in the lowland areas. This is how river deltas are formed. A glacier, which is a river of ice, destroys more of the earth's surface than a river. Much of the earth's surface was shaped by glaciers in the past, and the same process continues in cold mountain regions and around the poles.

The wind is another important agent of erosion. For example, in the deserts, the wind blows sand away and deposits it to make dunes. The sea can both wear land away and build it up. Bays, cliffs and caves result from the sea wearing away the land. Beaches and sand bars are examples of how the sea builds up the land. The action of the wind often builds sand up into ridges called dunes.

The seasons

The earth revolves around the sun which is at the centre of the solar system. This process takes one year. At the same time, the earth spins on its axis once every 24 hours. The earth's rotation produces light and darkness -- day and night.

The revolution of the earth around the sun and the angle at which the earth is tilted causes the seasons. These are spring, summer, autumn and winter. When the North Pole is tilted towards the sun, the northern hemisphere has its summer and the southern hemisphere has its winter. It is summer in the southern hemisphere when the South Pole is tilted to the sun.

The earth revolves around the sun once every 3652 days. This makes a full year. To make things simpler for ourselves, we count 365 days in a normal year. Every fourth year we add a day. This is a leap year. There are 366 days in a leap year.

Time is measured by the earth's rotation and is linked to lines of longitude. It is always the same time at all the places which are along a meridian. For example, if it is noon in Greenwich, England, then it is also noon in France, Ghana and all the countries through which the 0ø line of longitude passes. This line is called the Prime Meridian. Time throughout the world is calculated from this line.

There are 24 time zones in the world each with their own time. The date changes near the 180th meridian. This lies almost completely in the Pacific Ocean and not many people cross it. It is known as the International Date Line.

Weather and climate

The surface of the earth is surrounded by the air which is called the atmosphere. The main gases in the air are nitrogen and oxygen. The gases in the air allow plants, animals and humans to live.

The lowest layer of the atmosphere consists of many masses of air which are always moving. Air masses determine the world's weather. A front develops where two different types of air mass meet. For example, a cold front is where a mass of cold air moves into a warm air area. A warm front is where warm air pushes into a cold air area.

Weather means the day-to-day conditions of the atmosphere -- temperature, air pressure, wind, clouds and humidity. Humidity is the amount of water vapour which the air contains. Climate is like a yearly average or summary of weather conditions. The three main types of climate are tropical, temperate and polar. A tropical climate is very hot and is found around the Equator. Temperate climates are less hot and are found north and south of the tropics. Polar climates are the coldest and are found in the far north and south. The nearness of a place to the sea affects its climate. The sea stores warmth from the sun. This means that places near the sea have even temperatures. Areas far from the sea are hotter in summer and colder in winter. This type of. climate is called continental.

Height above the sea also affects climate. For every 300 metres above sea level the temperature falls by about 3øC. This means that mountains like Mount Kilimanjaro in Africa have snow on their peaks even though they are very near the Equator.