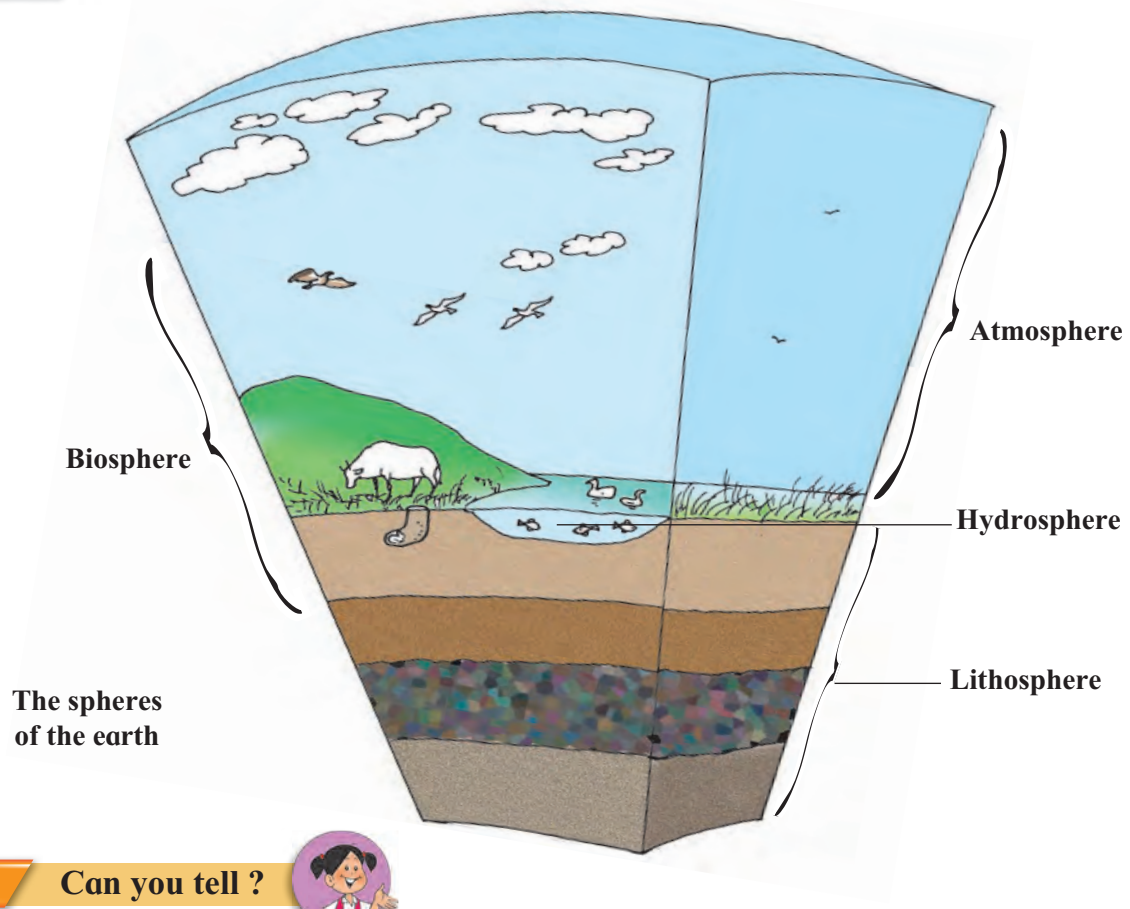
3. The Earth and its Living World



The spheres of the earth

Can you tell ?

(1) Where do you get water from ?

(2) Where do we lay the foundation of buildings ?

(3) What need do we meet through breathing ?

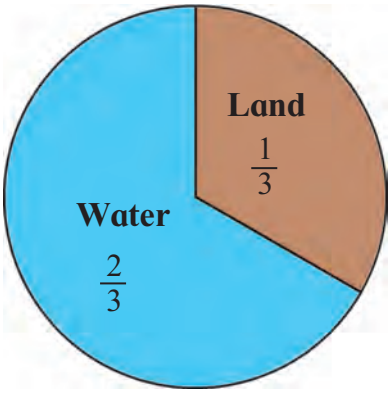
(4) From where does the earth get light and heat ?

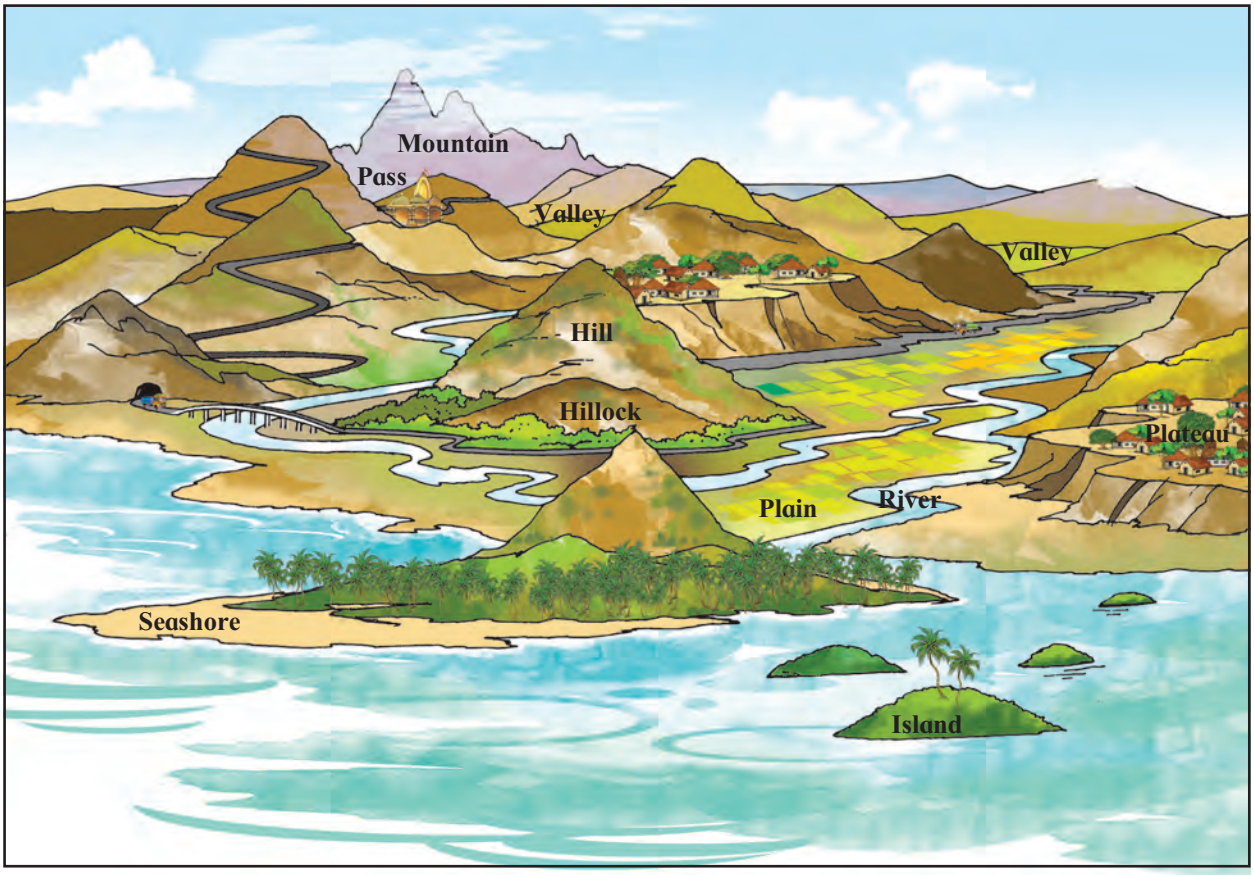
On the surface of the earth, we find land in some places and water in others. The earth is surrounded by the atmosphere. There are living things on land, in water and in the air. The sun is the cause of many natural processes on the earth. Water, land and air constitute envelopes of the earth, namely, the hydrosphere, lithosphere and atmosphere. The biosphere spreads in all the other three spheres.

The lithosphere and the hydrosphere

The earth's crust is hard. It is mainly made of rock.

When we travel in hilly regions, we see layers of soil and rock along road-cuts. We see grassy expanses of land in some places and only sand in others. The land is covered with crops in some places and with forests in others. Sometimes we get to see the deeper layers of soil into which tree roots spread. At others we see rocks split apart by the





Various landforms

tree roots. There are gentle mountain slopes as well as sheer cliffs of rock. All these land features are a part of the earth's lithosphere. Much of the earth's surface is occupied by water. The lithosphere extends under this water too.

About a third of the surface of the earth consists of land. A vast continuous stretch of land is called a continent. The land on earth is divided into seven continents. They are Asia, Europe, Africa, North America, South America, Antarctica and Australia. Asia is the largest continent and Australia the smallest.

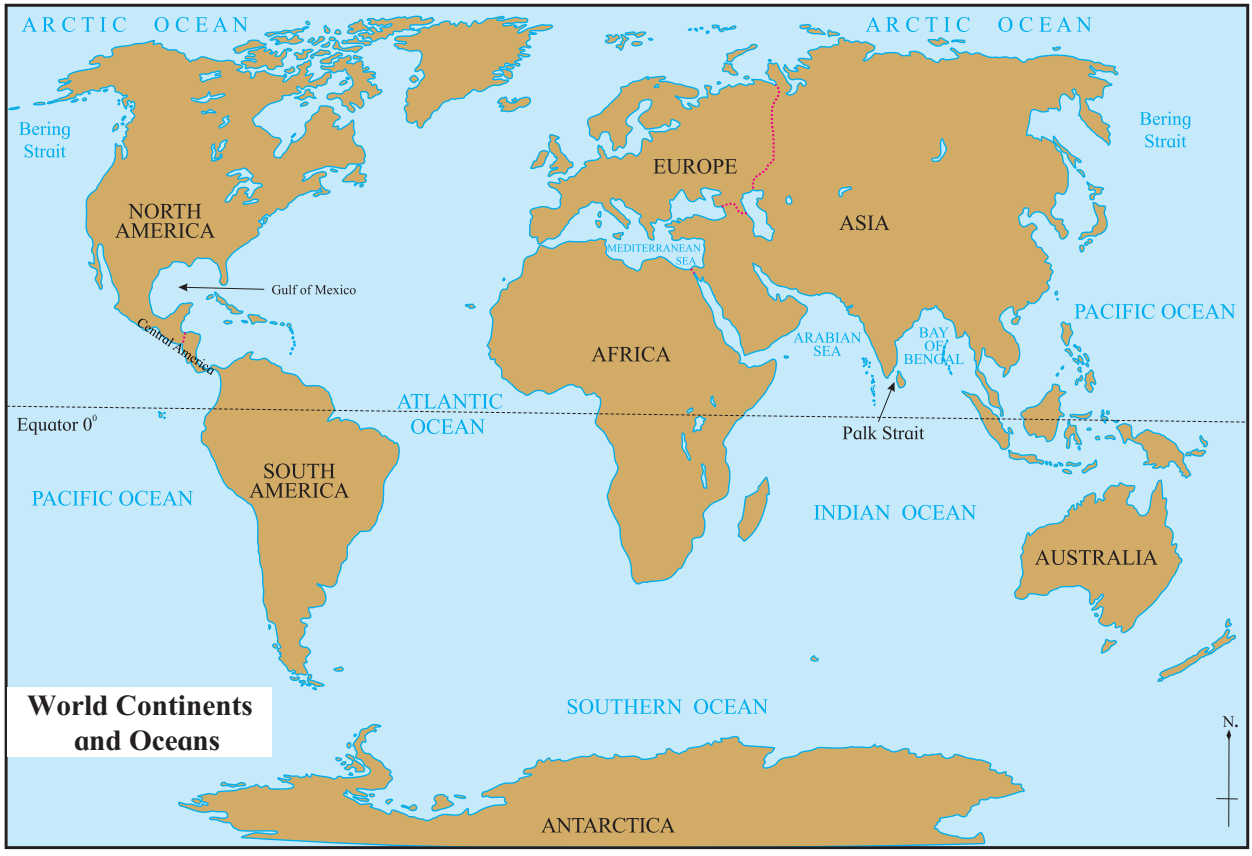
The land is not even in all places. The unevenness gives different shapes to the land in different places. They are called landforms. In the picture above you can see some landforms like the plain, hill, mountain, etc.

Two-thirds of the earth's surface is covered with water. Most of this water is in the oceans. Ocean water is salty. There are five oceans, namely, the Atlantic, Pacific, Arctic, the Southern Ocean and the Indian Ocean. The land along the margins of an ocean is called the coastal region. Water bodies of different shapes and sizes are formed along the coast, for example, sea, bay, strait, gulf, creek, etc. These water bodies are part of the ocean.

Surface water

There are many streams of water flowing over the land. This water is not salty but fresh. These streams of water may be rills, brooks, streams or rivers. Rills are the smallest and rivers, the biggest.

Rills, brooks, streams join each other to form rivers. Rivers which join to make



World Continents and Oceans

a bigger river are called its tributaries. In some places, a river cascades down a sudden drop. This forms a 'waterfall'. All rivers eventually flow into the ocean.

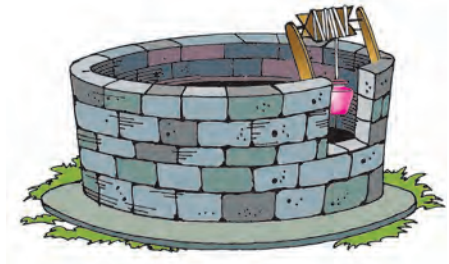
Lakes : A water body formed by water collecting naturally in a low-lying area of land is called a lake.

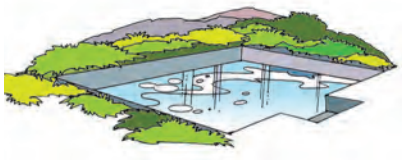
Water in the form of ice : Water particles in the clouds freeze and in cold regions, they come down in the form of snow. When layers of snow pile up on the ground, they form ice. When such layers of ice pile up in a low-lying area, they become enormous in size. This huge mass slips down a slope at a very slow speed. This is called a glacier.

There are also huge blocks of ice floating in the sea. They are called icebergs.

Groundwater : Besides these water bodies on the earth's surface, there is a lot of water stored in the underground layers of rock. It is called groundwater. We reach it by means of dug wells and bore wells. Many lakes and wells get water from underground springs.

The water or ice that occupies the earth's surface, groundwater and the water vapour in the atmosphere together form the earth's hydrosphere.





The atmosphere

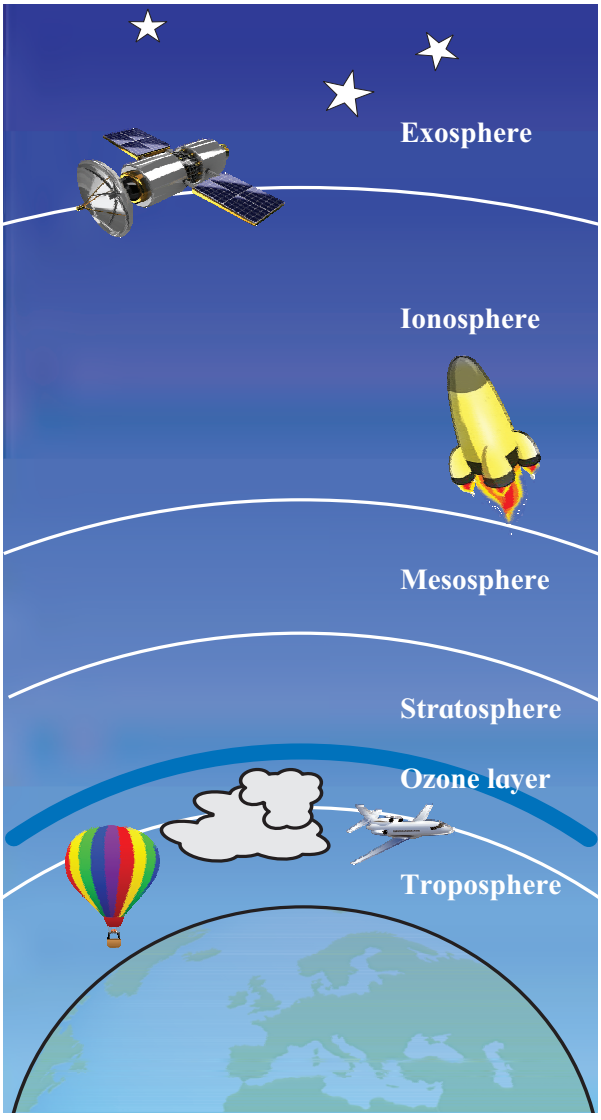
The envelope of air around the earth is called the atmosphere. As we go higher from the surface of the earth, the air in the atmosphere becomes rarer. The air consists of a mixture of gases, namely, nitrogen, oxygen, water vapour and carbon dioxide. There are some other gases too in the air in very small quantities.

The layers of the atmosphere are named as the troposphere, stratosphere, mesosphere, ionosphere and exosphere. The layer that extends from the earth's surface to a height of about 13 km is called the **troposphere**. The conditions in the troposphere change continuously. They affect the living world to a great extent.

The surface of the earth gets heated due to the heat it receives from the sun. Hence, the air nearest the surface is the hottest. As we go higher in the troposphere, it becomes cooler.

Almost all the water vapour in the atmosphere is contained in the troposphere. That is why, all weather-related phenomena such as formation of clouds, rain, fog, winds and storms take place in the troposphere. The air on high mountains is rarer than the air near the earth's surface. Aeroplanes fly in the higher parts of the troposphere. There, the air is very rare. Therefore, arrangements have to be made to ensure that passengers get enough air for breathing.

Beyond the troposphere, up to a height of about 50 km from the earth is the layer called the **stratosphere**. In the lower part of the stratosphere, there is a layer of a gas called ozone. Ultraviolet rays coming from the sun are harmful for living things. But the ozone layer absorbs them and protects the living world from those rays.



The earth's atmosphere

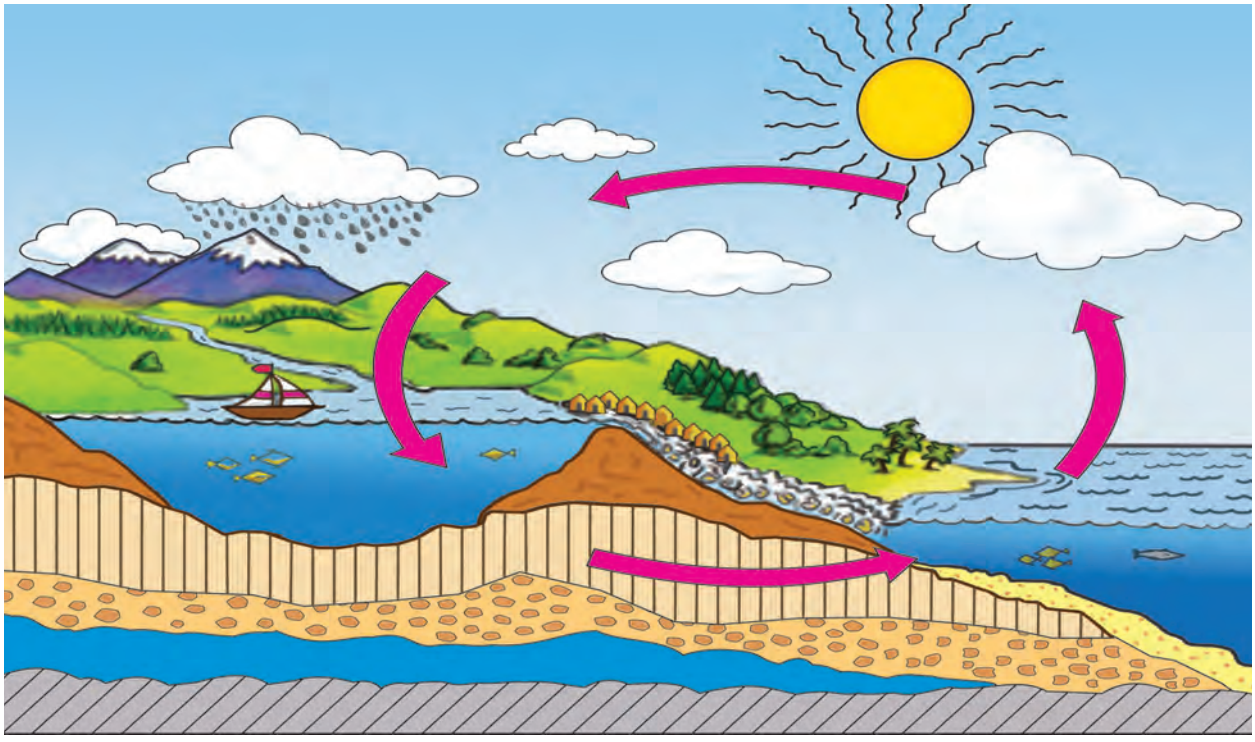
Use your brain power!

(1) In which layer of the atmosphere do we see the rainbow?

(2) Mountaineers carry oxygen in cylinders when they climb mountains that are more than 5000 m high. What could be the reason for that?

A new word

Condensation : the process of vapour turning into water on cooling.



The water cycle

How does it rain?

Water on the earth evaporates continuously due to the heat of the sun. Water that has percolated into the soil also evaporates due to the heat and enters the atmosphere. As water vapour is lighter than air, it rises high up into the atmosphere. As it goes higher, it cools and condenses forming very fine droplets of water. The droplets are so small and light that they float in the atmosphere forming clouds. These small droplets join together and form bigger drops which are heavy. They cannot float. Such drops of water fall down on the earth in the form of rain.

This rainwater flows into rills, streams, rivers and finally into the sea. Ice in the snow-covered regions also melts due to the heat of the sun to finally flow into rivers.

These processes of evaporation, condensation and rainfall go on in a continuous cycle. This is known as the **water cycle** in nature.

The biosphere

Can you tell?

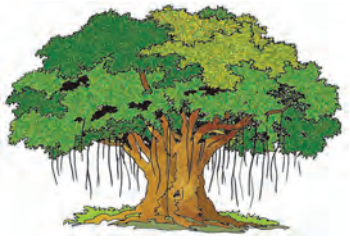
Make as long a list as you can of all the living things you see in the lithosphere, hydrosphere and atmosphere.

There are innumerable kinds of living things on the earth. The various regions of the earth differ in many ways. Some regions are always covered with ice while others have a hot climate. There are mountains in some places and plains in others. Some places have a lot of rainfall while others are dry deserts. There are salty seas and oceans and also freshwater lakes. The ocean is shallow near the coast but away from the coastline, the ocean can be several kilometres deep.

We see a great variety in the living things that inhabit these different regions.

The polar bear is seen only in the snowbound polar regions. Zebras are found in Africa and kangaroos are found only in Australia. These animals are not found in any other regions. Elephants and lions are found in regions of hot climate. Plants in all these different regions also show a great variety. This variety is characteristic of those different regions.

Many different kinds of plants, animals and micro-organisms are found everywhere on the earth – on land, in water and in the air. Living things exist in the lithosphere, hydrosphere and atmosphere. They also interact with these spheres. This living world constitutes the biosphere.



Always remember –

All animals, plants and micro-organisms are dependent on one another. They are also dependent on the spheres of the earth. The biosphere is where they take birth, live and die.

What we have learnt –

- The earth's crust and a small hard portion of the layer under it is called the lithosphere.
- About one-third of the earth's surface is occupied by land while about two-thirds is covered with water.
- Surface water, ice on the land, groundwater and the water vapour present in the air together form the hydrosphere.
- The envelope of air around the earth is called the atmosphere.
- The water cycle on earth goes on continuously.
- The ozone gas in the stratosphere absorbs the harmful ultraviolet rays coming from the sun and protects the living things from them.
- Living things occupy parts of the lithosphere, hydrosphere as well as the atmosphere. Living things and all the parts they occupy are together called the biosphere.

Exercises

1. What's the solution ?

Dark patches appear on the skin after exposure to the sun.

2. Use your brain power !

(a) Why are micro-organisms important ?

(b) Think about all the foodstuffs obtained from the sea. Find more information and write ten lines about them.

3. Answer the following questions.

(a) What are clouds made of?

(b) What is meant by 'biosphere' ?

(c) Make a list of the landforms you see in your surroundings and give a description of any two of them.

4. In the following sentences, underline the words that refer to landforms.

(a) Anil lives at the foot of a hill.

(b) Ria lives in the plateau region.

5. Write a note about the following.

(a) Evaporation (b) Condensation

(c) The water cycle

6. Give two examples of each.

(a) Weather-related events

(b) Sources of water

7. Draw a labelled diagram showing the water cycle.

Activity

Find out more information about the different layers of the atmosphere.

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