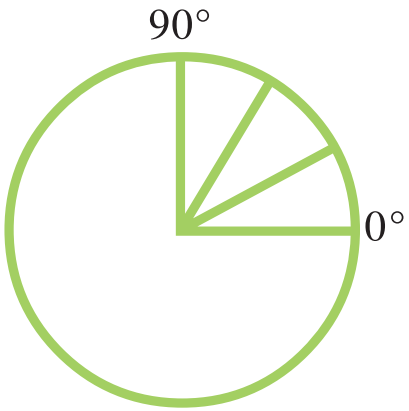
5 LOCATION AND TIME

5.1 Globe of the Earth



5.2 Circle and Angles

The Equator is the middle latitude or the 0° latitude which divides the earth into Northern and Southern Hemisphere.

The part of the Earth that lies to the north of the 0˚ (Equator) latitude is called the Northern Hemisphere and the part that lies to its south is known as the Southern Hemisphere.

How many latitudes pass through our village or city? How can we find out?

What are these vertical and horizontal lines on the globe of the Earth? They are imaginary lines and are not drawn on the surface of the Earth. The horizontal lines are called Latitudes and the vertical lines are known as Longitudes. What are latitudes and degrees of latitudes?

Let us learn through an activity.

Measure the angles of different places in the classroom with the help of a protractor, pencil and paper. Draw a circle on a paper and write down the angles of the circle at 10˚, 90˚, 30˚, 60˚.`

Latitude is an angle which ranges from 0˚ at the Equator to 90˚(North or South) at the poles.

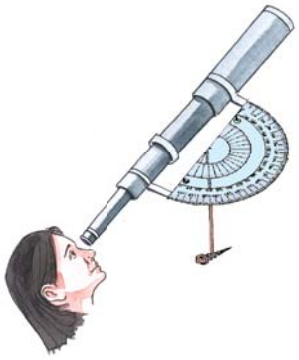
Lines of Latitude, run east-west as circles parallel to the equator.

Draw a circle and mark a line of latitude. With the help of a map, mention the various countries through which that latitude passes. Draw latitudes at 23.5˚ North and South and write the names of the countries through which they pass.

5.3 Pole Star

Do and Learn:

Among the uncountable stars in the sky, there is one bright star, usually seen in the north, called the North Star (Pole Star).



- Take a big protractor.
- Make a hole in the center and tie a thread. Hang a nail from it.
- As shown in the picture, using glue stick the lid of an unused ball pen on it.
- Take it to a place from where you can see the night sky clearly.
- Take it to the terrace and view the North Star through the cap of the pen.
- As you adjust it to view the star, the angle at which the nail stops is the latitude of your city.

5.4 Finding out the latitude

1. Look at the moon and write the angle.
2. Look at the North Star and write the angle.
3. Look at the other stars and planets that you know and write their names.

The names of a few countries are mentioned below. In what direction do they lie from the 0° latitude (North or South)? Take an atlas and a globe and locate these countries: Kenya, Mongolia, Chile, South Africa, Egypt, Russia and Canada.

Things to know

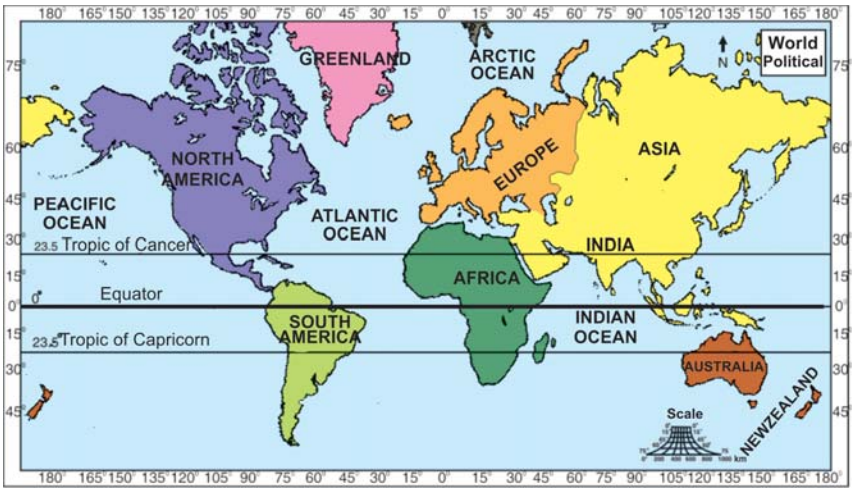
GPS Mobile Phones and Google

The exact latitude and longitude of a place can be known with the help of Global Positioning System in phones and satellites in space. Using the internet, you can get information about the latitude and longitude of your village or city by simply clicking on the 'My Location' option in your phone.

Longitudes and longitudinal coordinates of a place

The vertical imaginary lines drawn on a globe that run in the north-south direction are known as longitudes.

Find the following from the given map: (a) Through which country does the 0° longitude pass? (b) How many longitudes are present in the eastern and western hemispheres respectively?



5.5 World Map

Major Longitudes

(1) Prime Meridian(Greenwich)

The 0˚ longitude that passes through Greenwich in England is known as 'Prime Meridian'. It divides the earth into two vertical halves - eastern hemisphere and western hemisphere. It has longitudes extending upto 180˚ on both eastern and western sides. Since it passes through Greenwich, it is generally referred to as the Prime Meridian as well.

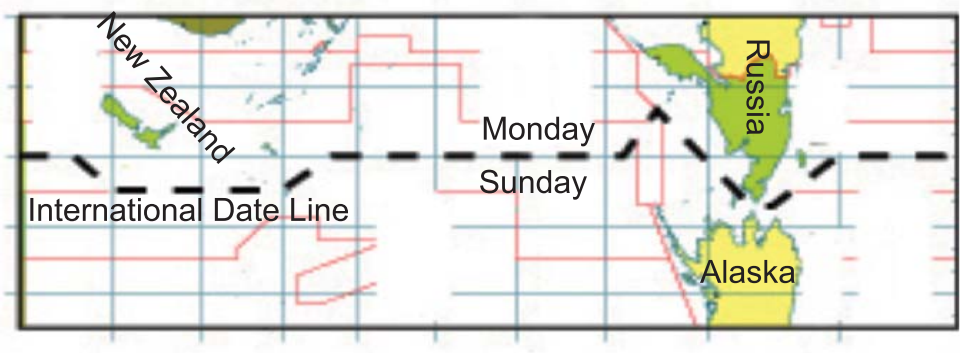
Eastern Countries	Western Countries

(2) International Date Line

There is only one 180˚ longitude which is known as the International Date Line. When one crosses this line, the day and date changes. The International Date Line passes through the Pacific Ocean and separates two calendar dates. It is not exactly 180˚ at all places since the line crisscrosses across several time zones. This is because if it is drawn straight, then the line has to pass through many islands and due to this they might have two days and two dates on the same island. This might create confusion. Therefore, the line, when it passes over land, is shifted towards water bodies and so it is not straight but zigzag.

Activity

- ***The Eastern Hemisphere is to the east of the 0˚ longitude and the Western Hemisphere is to its west. Keeping this in mind, using a map find out the longitudinal coordinates of India. Also, fill up the table for the other countries.***



5.6 International Date Line

Country	Longitudinal coordinates	Country	Longitudinal coordinates
India	68° E to 97° E	*Pakistan*	
Egypt		*Canada*	
Russia		*USA*	
Australia		*Mexico*	

The sun is the biggest clock of the earth. The time at any place is decided by the position of the sun in the sky and its longitude. The earth completes one rotation in 24 hours. There are 360 longitudes in all (180 to the east of the Prime Meridian and 180 to its west). In this way, 15 longitudes pass by the sun in one hour. One longitude takes 4 minutes to rotate. Thus, there is difference of 4 minutes between two adjacent longitudes. Therefore, the time in different places on the earth varies as per their longitudes.

Activity

- ***Find out if the time in the countries given below is ahead or behind India. Why is it so? Think.***

Country	Ahead/ Behind	Country	Ahead/ Behind	Country	Ahead/ Behind
Nepal		USA		Uganda	
Pakistan		Canada		France	
Bangladesh		Singapore		S. Africa	
New Zealand		Japan		Ukraine	

Local Time

The time taken according to the overhead position of the Sun in a particular place is known as the local time of that place. It differs by 4 minutes with every one degree longitude. When any longitude faces the sun (directly) it would be 12:00 noon in all the places on that longitude. In this way, the local time of the place is decided according to mid-noon. The places located on the same longitude have the same time and places located at different longitudes, in the same country, have different times.

In a country, if the local time is different in different places it can create problems in administration. How can one work in such situation? What must one do to solve this problem? Let us understand.

Standard Time

The local time of a place which is situated in the middle of the country is taken as the standard time of the country. This means that time is fixed on the basis of a particular longitude in a country, which is known as 'Standard Time'. The Standard Time of our country is decided on the basis of 82.5° E longitude, which passes through Allahabad (in Uttar Pradesh). This means that if it is 12:00 noon in Allahabad, it is 12:00 noon everywhere in the country. This makes it convenient for the smooth administration of the country.

Activity

- ***You will find the standard time of different countries and main cities in a smart phone. With the help of a globe find out the major cities of different countries and note down their standard time using the phone. Also mention whether the country is ahead or behind (in time) India.***

Sr.No.	City	Ahead/ Behind	Sr.No.	City	Ahead/ Behind

Things to know

- ***The longitudes to the east of the Greenwich Line are denoted by the letter 'E' while those situated to the west are denoted by the letter 'W'.***
- ***The International Date Line is also called 'IDL' in short.***
- ***If a country extends to a great extent eastwards and westwards, then it may have more than one standard time.***
- ***The latitudes to the north of the Equator are denoted by the letter 'N', while those situated to the south are denoted by the letter 'S'.***
- ***The actual distance between two latitudes is 111 km.***

EXERCISE

1. How much time does one Longitude take to pass by the Sun?
2. Draw a circle and draw latitudes on it.
3. Draw a circle and draw longitudes on it.
4. What is the latitude of these countries in relation to the 0˚ latitude?
   USA, Brazil, Russia, Norway, United Kingdom.
5. With the help of a mobile phone find the names of cities in various countries which are ahead or behind the Greenwich Line.

Sr.No.	City	Ahead/ Behind	Sr.No.	City	Ahead/ Behind

6. Which circle lies on the 0˚ latitude?