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# Longitudes and Latitudes

### Focus On

- ❖ Locating position on the Earth
- ❖ Lines of Longitude
- ❖ Lines of Latitude



## HERE WE GO.....

Observe the globe and answer the questions that follow :

- Have you seen a criss-crossed pattern of lines on globe?
- What this pattern is called?
- What are these lines?
- How do they help us to find the time at a particular place?



In ancient time, people believed the Earth to be flat. There are various thoughts of different well-known scholars like Pythagorus, Plato, etc., about the shape of the Earth. Some of them believed that the Earth is circular and spherical in shape.

They observed that the Earth may not be flat as the movement of the Sun changed and it was possible to see greater distances when sailors climbed on the mast or higher altitudes.



Ferdinand Magellan

Ferdinand Magellan started on a voyage from Seville in Spain in 1519 to search the end of the world. The voyage was completed by his Second in Command Juan Sebastian Elcano in 1522 because Magellan died on the way. When their ship reached Seville, they proved that the Earth is not square but circular in shape through their **circumnavigation of the Earth**.

Now, it was clear that the shape of the Earth is a sphere but slightly depressed at the top and the bottom, with the emergence of modern science, later on. It means that the Earth is a spherical globe with a shape like an orange.

Today, through modern science and technology it is very easy to locate a person standing at a particular position anywhere in the world.



## Fact Byte

Magellan's crew was surprised to note that they had taken one extra day when they actually returned to Seville for what they had actually travelled. They did not account the date loss by crossing the International Date Line westward.

## Locating Position on the Earth

We know that the Earth is orbiting the Sun continuously and rotating on its axis as well simultaneously. Then, how do you think we can locate anything? How is it possible to find or locate things on the surface of the Earth?

We take the help of a map when we have to go somewhere. But how can we draw a map of the Earth because it is huge. This was a question which puzzled the scientists, intellectuals and explorers for a very long time. Then, they came up with the idea of mapping the world with the help of **Grid Lines**. Let us now learn how they did it.

### Globe : The Earth's Miniature Version

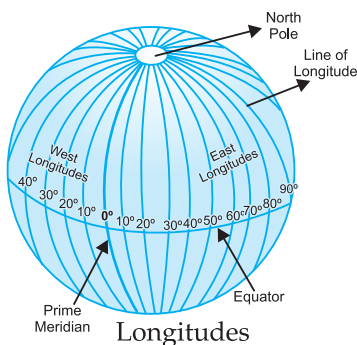
As you know, the globe is a miniature version of the Earth. It stands on supports at the top and the bottom. We can take the upper tip as the North Pole and the bottom as the South Pole. Assume it being the axis of the Earth on which it rotates in the same way as you can rotate the globe on its axis.

Now, let us see how we can locate various places on Earth and know their exact positions. Remember, the Earth is not stationary and you are not standing in the outer space to see and pinpoint the place. For this, we draw imaginary lines on the globe. Drawing these imaginary lines enables us to divide the large expanse of this Earth into small portions for the ease of locating places on a globe.



A Globe

## Lines of Longitude



We take the North Pole and the South Pole as the standard reference points and draw equidistant lines all around the globe from the North Pole to the South Pole. These are called the **Lines of Longitude** or the **Lines of Meridians**.

These lines are not parallel to each other. All the Lines of Longitude are of the same length. They meet at the poles and are farthest from each other at the Equator. There are a total of 360 lines of longitude. They help in determining the time as well.

### The Prime Meridian

The standard Line of Longitude assumed to be crossing the Royal Observatory in Greenwich is known as the Prime Meridian. This line divides the world into two equal halves. The region 180° east to this line is called the **Eastern Hemisphere** and the region 180° west to this line is called the **Western Hemisphere**.



The Royal Observatory at Greenwich



Interestingly, the line 180° east and 180° west is the same and is called the **International Date Line**.

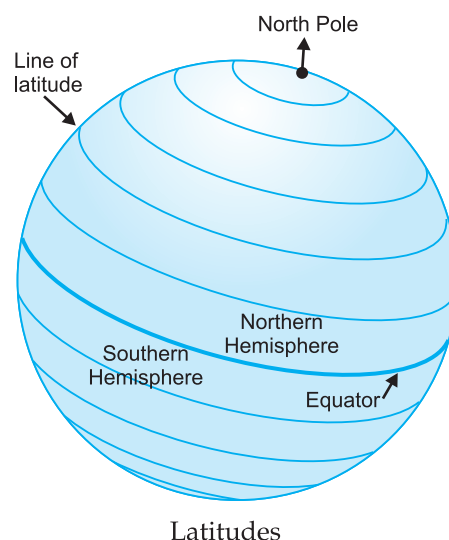
## Lines of Latitude

We take the mid-point of the globe from the North Pole to the South Pole and draw a horizontal line round the globe at this point. This line will again divide the globe into two equal parts. This line is called the **Equator**. The upper portion of the Equator is called the **Northern Hemisphere** and the lower portion of the Equator is called the **Southern Hemisphere**.

Now we can draw **parallel** equidistant lines at a distance of 10° towards the north and south from the Equator. These lines are called the **Lines of Latitude**. These lines keep on getting shorter and shorter as they move towards the pole. Finally, there would be 90 lines at the top of the Equator and 90 lines at the bottom of the Equator. In all, there are 181 lines of Latitude. In the Northern Hemisphere, the lines are labelled 10°N, 20°N and so on while in the Southern Hemisphere, they are labelled 10°S, 20°S and so on.

The Equator is the largest latitude. It is marked as 0° latitude. It is also called the **Great Circle**. North Pole is represented as 90°N while South Pole is represented as 90°S.

Now that we have drawn the vertical and horizontal lines, we call them as **longitudes** and **latitudes** respectively. We have a network of intersecting lines. The points where these lines intersect each other provide us a location coordinate, which help us in locating a place on the globe.



Latitudes

LET'S DO

Find out the length of the Equator?

**Fact Byte**

Global Positioning System and the satellite systems also tell the position of a person or a place on the globe in terms of latitude or longitude.

### Flash On

- ◆ Ferdinand Magellan's circumnavigation of the Earth helped to prove that the Earth is round.
- ◆ The imaginary lines running east to west and parallel to the Equator are called latitudes.
- ◆ The imaginary lines running through the North and South Poles, which are not parallel, are called longitudes or meridians.

### Stir Up Your Mind

#### A. Tick (✓) the correct answer :

1. Who proved that our planet is not square but circular in shape by his circumnavigation of the Earth?
- |                |                          |                        |                          |
|----------------|--------------------------|------------------------|--------------------------|
| (a) Plato      | <input type="checkbox"/> | (b) Ferdinand Magellan | <input type="checkbox"/> |
| (c) Copernicus | <input type="checkbox"/> | (d) Nelson Mandela     | <input type="checkbox"/> |





2. Which latitude is also called the Great Circle?  
 (a) Tropic of Capricorn  (b) Equator   
 (c) Axis  (d) Tropic of Cancer
3. How many Lines of Latitude are there?  
 (a) 360  (b) 270  (c) 181  (d) 180
4. The criss-cross pattern of lines used to locate the exact position of a place or a person is known as :  
 (a) Grid  (b) Global Positioning System   
 (c) Meridian  (d) Arctic Circle
5. Which Line of Longitude is assumed to be crossing the Royal Observatory at Greenwich?  
 (a) Prime Meridian  (b) Tropic of Cancer  (c) North Pole  (d) Equator

**B. Fill in the blanks :**

- The Lines of Longitude stretch from \_\_\_\_\_ to \_\_\_\_\_.
- \_\_\_\_\_ are parallel equidistant lines with a distance of  $10^\circ$  to each other from the Equator.
- The distance of \_\_\_\_\_ and it is greatest from each other at the Equator and they meet at the poles.
- The shape of the Earth is a \_\_\_\_\_ but slightly depressed at the top and the bottom.
- \_\_\_\_\_ is located at  $66\frac{1}{2}^\circ$  N from the Equator.

**C. Answer the following briefly :**

- How many Lines of Latitude are there?
- What are longitudes and latitudes?
- Name some important Lines of Latitude.
- Where the Royal Observatory is located?
- What is the Prime Meridian?

**D. Answer the following in detail :**

- Define the longitudes and latitudes.
- Who proved that the Earth is circular in shape? How?
- How do we find the location of a place or a thing on Earth?



**Practice Time**

**QUIZ**

Find out the longitude and latitude coordinates for :

- The Taj Mahal
- Your City
- Asia and Europe
- Eiffel Tower

**HOTSPOT**

- Do you know why there are 180 latitudes and 360 longitudes?
- What is the reason of two places named American Samoa and Tonga have a difference of one day while they are only few miles away from each other.
- Which country has the most time zones?

