
Lesson at a Glance

- The Globe is a true **model of the earth**, in a small form. A needle, called the **Axis** is fixed through the globe in a tilted manner.
- The axis of the globe passes through two extreme points: known as the **Poles** (the North Pole and the South Pole). This axis is shown in the form of a needle on the globe. The real earth has no such axis.
- The circle passing through the centre of the earth, and perpendicular to the axis, is called the **Equator**. It divides the earth into two **Hemispheres**, the Northern and the Southern. We can imagine a number of more circles parallel to the equator, having their centres on the axis and having different radii. These circles are called **Parallels of Latitudes**.
- The parallels are identified with the help of degrees. The equator represents the zero degrees latitude. The latitudes in the Northern Hemisphere are designated as degrees north ($^{\circ}\text{N}$), e.g. 10°N , 20°N , and so on till 90°N (which is the North Pole). Similarly the latitudes in the Southern Hemisphere are designated as degrees south ($^{\circ}\text{S}$), and 90°S is the South Pole.
- The circle passing through Greenwich in Britain, and perpendicular to the equator, and parallel to the axis, is called the **Prime Meridian**. It divides the earth into two Hemispheres, the Eastern and the Western. Together, the Equator and the Prime Meridian divide the earth into four equal parts. We can imagine a number of more circles parallel to the Prime Meridian, having their centre at the centre of the earth, and having equal radii. These circles are called **Degrees of Longitudes**.
- The longitudes are identified with the help of degrees. The Prime Meridian represents the zero degrees longitude. The longitudes in the Eastern Hemisphere are designated as degrees east ($^{\circ}\text{E}$), e.g. 10°E , 20°E , and so on till 180° . Similar is the case with the Western Hemisphere.
- Degrees are further divided into minutes and minutes into seconds. Note that the symbol for a minute is an apostrophe (') and that for a second is a double apostrophe ("). $60'$ (60 minutes) make up a degree and $60''$ (60 seconds) make up a minute. So $30'$ means

half a degree and 40" means two-thirds of a minute.

- Two points on earth can lie on the same latitude but still be far away from each other. Also, two distant points may lie on the same longitude. But only one point lies on a particular pair of latitude and longitude. So latitudes and longitudes are helpful in locating a point on earth.

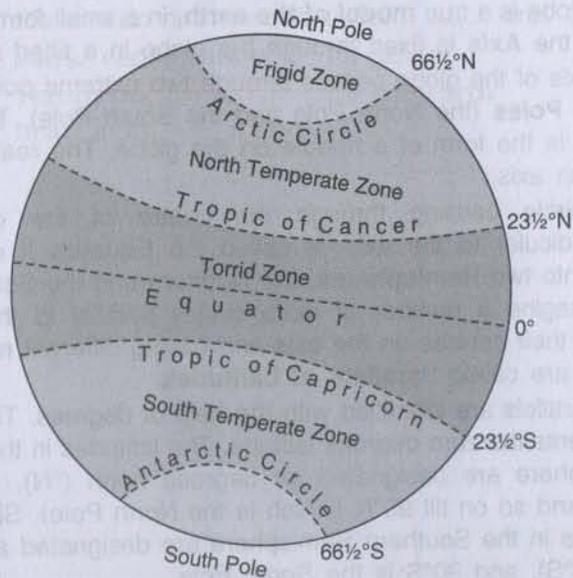


Fig. 2.1. Grid (Latitudes and Longitudes).

- The **Tropic of Cancer** and the **Arctic Circle** are studied as special latitudes in the Northern Hemisphere. They are at $23\frac{1}{2}^{\circ}$ N and $66\frac{1}{2}^{\circ}$ N respectively.
- The **Tropic of Capricorn** and the **Antarctic Circle** are studied as special latitudes in the Southern Hemisphere. They are at $23\frac{1}{2}^{\circ}$ S and $66\frac{1}{2}^{\circ}$ S respectively.
- The area between the Tropic of Cancer and the Tropic of Capricorn receive maximum heat from the Sun and this region is called the **Torrid Zone**.
- The area between the Arctic Circle and the Tropic of Cancer in the Northern Hemisphere, and that between the Antarctic Circle and the Tropic of Capricorn in the Southern, have moderate temperatures. These regions are the **Temperate Zones**.

- The area north to the Arctic Circle and that south to the Antarctic Circle are close to the Poles and receive the sunlight of very low intensity. So it is very cold here. These regions are called the **Frigid Zones**.

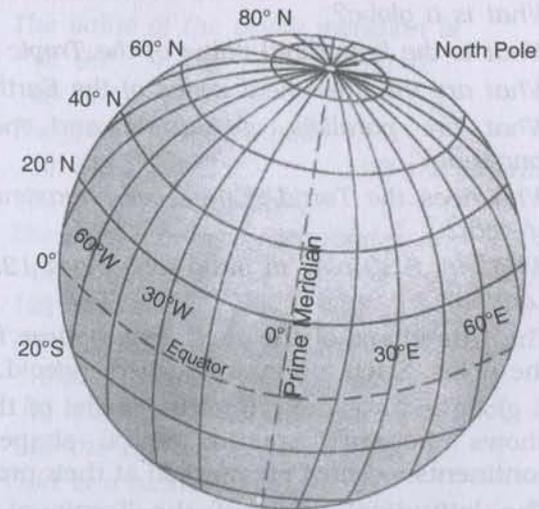


Fig. 2.2. Heat Zones

- The Frigid Zones, the Temperate Zones and the Torrid Zone are called the **Heat Zones**.
- The sun does not shine equally on all longitudes at a time. When it is 12 noon at a time, it means that the sun is not at all visible at the place on the other side of the earth. So it must be midnight there. In fact, we can say that the time difference is 24 hours at 360 degrees longitudes apart. So every longitude brings a difference of 4 minutes. This gives us the concept of Time Zones. Two consecutive time zones differ by an hour. The time at a particular place is said to be the local time.
- It may happen that a certain country extends over a long range of longitudes, thus giving a large amount of time difference. *E.g.* Russia extends over eleven time zones. India actually extends over a range of a 2-hour time difference. But this is not too much, so for convenience and for uniformity, we have a standard meridian set at Allahabad ($82^{\circ} 30'$), which gives the time for all over India. This time is called the **Indian Standard Time (IST)**.

TEXTBOOK QUESTIONS SOLVED

9. 1. Answer the following questions briefly:

- What is the true shape of the earth?
- What is a globe?
- What is the latitudinal value of the Tropic of Cancer?
- What are the three heat zones of the Earth?
- What are parallels of latitude and meridians of longitude?
- Why does the Torrid Zone receive maximum amount of heat?
- Why is it 5.30 p.m. in India when it is 12.00 noon in London?

- Ans.**
- The true shape of the earth is a sphere flattened at the poles. Such a shape is called a geoid.
 - A globe is an exact miniature model of the earth. It shows the earth in its actual shape, with all continents, oceans, etc marked at their proper places.
 - The latitudinal value of the Tropic of Cancer is $23\frac{1}{2}^{\circ}$ N.
 - The heat zones of the Earth are: the Torrid Zone, the Temperate Zones and the Frigid Zones.
 - Parallels of latitudes.** All of the imaginary circles parallel to the Equator are called parallels of latitudes. These circles have varying centres and all these central points lie on the same line: the axis of the earth.
Meridians of longitudes. All of the imaginary circles perpendicular to the Equator are called meridians of longitudes. These circles have the same centre, which is also the centre of the earth.
 - The mid-day sun directly faces the area between the Tropics of Cancer and Capricorn. So the heat received is maximum at these latitudes. These latitudes fall under the Torrid Zone.
 - India and the United Kingdom lie on different longitudes. Each degree of longitudes corresponds to a difference of four minutes. This is because the earth rotates 360° in 24 hours, i.e. 1° in 4 minutes. The

standard meridian of India is $82^{\circ} 30' E$, and that of London is 0° . This means a difference of 4 minutes \times 82.5 = 330 minutes = 5.5 hours. So when it is 12 noon in London, it is 5.30 p.m. in India.

9. 2. Tick the correct answer:

- The value of the prime meridian is
(i) 90° (ii) 0°
(iii) 60°
- The frigid zone lies near
(i) the Poles (ii) the Equator
(iii) the Tropic of Cancer
- The total number of longitudes are
(i) 360 (ii) 180
(iii) 90
- The Antarctic Circle is located in
(i) the Northern Hemisphere
(ii) the Southern Hemisphere
(iii) the Eastern Hemisphere
- Grid is a network of
(i) parallels of latitudes and meridians of longitudes
(ii) the Tropic of Cancer and the Tropic of Capricorn
(iii) the North Pole and the South Pole

Ans. (a)—(ii), (b)—(i), (c)—(i), (d)—(ii), (e)—(i).

*** Remark:** Actually the number of longitudes is infinite. We can draw longitudes of any degree value. We show in diagrams distinct longitudes just for our convenience, e.g. the number of longitudes can be 360 (shown at gap of 1 degree), 180 (shown at every 2 degrees), and so on—as we wish.

9. 3. Fill in the blanks.

- The Tropic of Capricorn is located at
- The Standard Meridian of India is
- The 0° Meridian is also known as
- The distance between the longitudes decreases towards
- The Arctic Circle is located in the hemisphere.

Ans. (a) $23\frac{1}{2}^{\circ}$ S, (b) $82\frac{1}{2}^{\circ}$ E, (c) Prime Meridian, (d) Prime Meridian, (e) Northern.

THINGS TO DO

1. Draw a diagram of the globe showing the earth's axis, the Equator, Tropics of Cancer and Capricorn, Arctic Circle and Antarctic Circle.

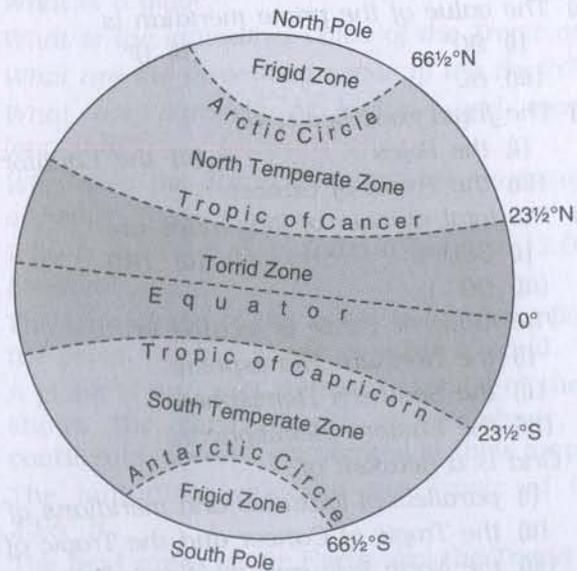
Ans.

Fig. 2.3. Important Latitudes and Heat Zones.

