

CLASS - IX

GEOGRAPHY AND ENVIRONMENT

1. Why do objects weigh more in the polar region than the equatorial region?

Ans. The Earth's shape is not perfectly round. It is like an oblate spheroid. Earth's equatorial region is little bulged (equatorial diameter : 12757 km) and polar region is little flattened (polar diameter: 12714 km). It means, the polar region is closer to the centre of the earth than the equatorial region. So, Earth's gravity is greater in the polar region than the equatorial region. Therefore, any object weighs more in the polar region than the equatorial region.

2. What is a GPS receiver? State the uses of GPS.

Ans. A satellite navigation device is colloquially called a GPS receiver. It is a device that is capable of receiving information from GNSS (Global Navigation Satellite Systems) satellites and then calculate the device's geographical position.

Uses of GPS:

Presently we use GPS for various purposes. These are as follows:

- i. **Finding locations :** GPS is used to locate a place over the surface of the earth by finding out the latitude and longitude of the place.
- ii. **Transportation:** Aeroplane and ship navigation depends on GPS. Not only that, surface transport is also depending on GPS. It may also indicate the traffic density.
- iii. **Roadside support:** It helps us by giving easy access to emergency roadside support like the location of a petrol pump, *dhaba*, health centre etc.
- iv. **Military purposes:** It helps the military to locate the enemy, launch a rocket and regulate a missile, etc. Movement of military forces is also guided by GPS.
- v. **Disaster management:** Presently, in the field of disaster management GPS has created a new horizon by finding out the location. We may supply relief, evacuate the place, recover the place and manage the hazardous situation.

3. 'There is a difference between the actual circumference of the Earth and that measured by Eratosthenes.' – Explain.

Ans: Eratosthenes, the great Greek mathematician, calculated the circumference of the earth in 240 BC. At first he came to know that the Sun was directly overhead of Syene (now Aswan, Egypt) at noon on the summer solstice. Eratosthenes measured the angle of a shadow cast by a stick at noon on the summer solstice in Alexandria, and found it made an angle of about 7.2° , or about $1/50$ of a complete circle ($360^\circ / 7.2^\circ = 50$). He also found that Syene lies about 5000 stadia from Alexandria. He then multiplied it with 50, which came to be about 250,000 stadia, which is about 46,250 km by modern conversion (1std = 0.185 km). According to modern day calculations the average circumference of the Earth is 40,000 km (approx.). So there is a difference of 6,250 km approximately between the actual measurement and that of Eratosthenes.

Although his basic method was sound but we donot actually know which version of the stadion Eratosthenes used and so his error could vary between 1% to 16%, which is still pretty good considering the level of information and technology in 2260 BP.