

Project Paridhi

What is solstice and equinox?

A **Solstice** is the point during the Earth's orbit around the sun at which the sun is at its greatest distance from the equator i.e. at the tropics. When the sun is overhead at Tropic of Cancer it is known as Summer solstice and when the sun overhead at Tropic of Capricorn it is known as Winter solstice. While during an **Equinox**, the sun is overhead at equator.

Eratosthenes and the Experiment?

Eratosthenes was a Greek mathematician, geographer and an Astronomer. He is remembered for his calculation of circumference of the Earth in 3rd century BC by studying the shadow movements and proving that the Earth is round. He was the first person to calculate the circumference of Earth with such precision.

Eratosthenes used to live in Alexandria, Egypt. He observed something very interesting that at Syene in Egypt, on any general day shadow would be casted for a well but on the day of Summer Solstice, Sun would be overhead at the mid-day (local noon) and no shadow would be formed of the well and the Sun would be perfectly seen at the center of the well. But at Alexandria, Egypt where he lived, on the same day that is on the summer solstice, shadow is casted for everything like towers and buildings. He assumed that the Earth is spherical and Sun is so far that the rays can be taken as parallel. Now at Syene the Sun rays would be falling directly in line with the well but at the same time the Sun would be at an angle for place like Alexandria. He found out the angle to be 7 degrees after performing the shortest shadow experiment which you have already performed. The distance between the cities was known from the caravans travelling to be about 4,400 stadia (1 stadia being equal to 157.2 meters used by ancient Greeks). Using the knowledge of this distance and sun angle, Eratosthenes found the circumference of the Earth.

How to do the Eratosthenes Experiment?

During Equinox and Solstice we know the exact location of sun from the equator and we can then conduct the Eratosthenes Experiment. Project Paridhi can be done on any day of the year, but on days of equinox and solstices the sun is directly overhead on the equator or Tropics of Cancer/Capricorn hence making the calculation easier. This project also celebrates the days of solstice and equinox and helps participants understand seasons and motion of the Earth. Gnomons (a Greek word for an object whose shadow serves as an indicator of time, especially of the hour of the day) of all sizes and shapes have been used in the past - including soft drink bottles and cricket wickets to huge gnomons such as, QutubMinar, SamratYantraat JantarMantar and sundial at Barapullah, Delhi.