

Stars and the Solar System

We can see many celestial bodies in a clear night sky.

Stars are one of the celestial bodies which emit light of their own.

The moon is a natural satellite of the Earth. It revolves around the Earth on its orbit. The different shapes of the bright visible part of the moon as seen from the Earth are called phases of the moon.

Sun is also one of the stars which emits light and is a great source of heat. It is the closest star and is the centre of our solar system.

Constellations: The group of stars which appear to form some recognizable shape or pattern is known as a constellation. These groups of stars or constellations are named after the objects which they seemed to resemble such as an animal, a human being.

The stars are millions of km far from Earth and from each other. Such large distances are expressed in a unit known as light year. It is the distance travelled by light in one year, i.e., 9.46×10^{12} km.

Stars are many light years away from the Earth and thus they look very small from Earth.

Stars appear to travel from east to west.

Pole star is the most shining star in the night sky. The pole star appears to be stationary. It is situated near the axis of rotation of Earth and is thus helpful in finding direction.

Other important parts of the night sky are planets. Planets revolve around the Sun.

Our solar system consists of eight planets revolving around the Sun. It also consists of many other celestial bodies like asteroids, comets and meteors.

Inner or Terrestrial Planets: First four planets Mercury, Venus, Earth and Mars are much nearer to the Sun and have less number of satellites. They are called the inner planets. These are also called terrestrial planets because their structure is rocky similar to that of Earth.

Jovian Planets: The planets outside the orbit of Mars, namely Jupiter, Saturn, Uranus and Neptune are called outer planets because they are much farther off than inner planets. They are also known as Jovian planets because their structure is gaseous and are similar to that of Jupiter.

Comets are the celestial bodies that revolve in highly elliptical orbits around the Sun.

A bright streak of light in a night sky are commonly called shooting stars or meteors.

Important facts about the Planets

Mercury (Budha)

It is the closest planet to the Sun. Its distance from Sun is 57×10^6 km. Since it is very close to the Sun, most of the time it is hidden in the glare of the Sun. It can be visible before the Sunrise in the east and after the Sunset in the west. It appears quite bright and correspondingly it is termed as 'morning star' and 'evening star'. It is termed as a star because it appears very bright in the sky.

It is of the same size as the moon.

It revolves around the Sun in 88 days and takes 58 days to complete one rotation on its axis.

Life cannot exist on mercury due to lack of atmosphere and extreme temperature [$340^{\circ}\text{C} \Leftrightarrow -150^{\circ}\text{C}$] and it has no protective blanket around it to save it from harmful radiations.

The surface features of mercury resemble those of moon more than those of the Earth.

It has no moon or satellite of its own.

Venus (Shukra)

Its distance from the Sun is 108×10^6 km.

It completes its Orbit around the Sun in 225 days.

It has almost the same radius, density and mass as that of Earth. Thus, it is called the twin of Earth.

It is the brightest planet and appears as a morning and evening star.

The surface temperature of Venus is about 450°C and it is covered by a thick blanket of cloud made up of CO₂, H₂, O₂, N₂. NO life is possible on this planet because of high temperature, absence of water and insufficient oxygen.

It has no moon or satellite of its own.

The Earth (Prithvi)

Its distance from the Sun is 149 x 10⁶ km.

It has plenty of water, oxygen in the atmosphere and is neither too cold nor too hot, making life possible on this planet.

It takes 365 $\frac{1}{4}$ days to complete one revolution around the Sun and 24 hours to complete one rotation on its axis.

It has a thick blanket of the ozone layer high up in its atmosphere to save the life from harmful effects of ultraviolet radiations coming from the Sun.

It has one satellite called the moon.

Mars (Mangal)

Its distance is 227 x 10⁶ km from the Sun.

It takes 687 days to complete one revolution around the Sun and 24 hours to complete one rotation on its axis.

It has a reddish appearance.

It has two natural satellites or moons named Phobos and Deimos.

Unlike Mercury and Venus it can be seen in any part of the night sky.

The day temperature varies from 5°C to 15°C and there is no evidence as yet of life on Mars.

It has no protective blanket to protect it from harmful solar radiations.

Jupiter (Brihaspati or Guru)

Its distance from the Sun is 778×10^6 km.

It takes 12 years to complete one revolution around the Sun.

It is the largest planet and is more massive than the combined mass of other planets of the solar system.

It has dozen satellites or moons. Four of them are quite large and bright and can be seen with a low power telescope.

There is a faint ring consisting of extremely small particles around Jupiter.

Saturn (Shani)

After Jupiter, Saturn is the second biggest planet of the solar system.

It looks like a large yellow star to the naked eye.

It possesses well-developed set-of rings around it. These rings consist of particles whose sizes vary from tiny specks to rocks measuring a few kilometres in diameter.

It is at a distance of 1427×10^6 km from the Sun.

It takes about 29.5 years to complete one revolution around the Sun.

It is said to have 30 satellites or moons of its own. u-U) Uranus (Arun)

This is the seventh planet from the Sun and is 2870×10^6 km away from the Sun.

It takes 84 years to complete one revolution around the Sun.

It has 21 satellites or moons of its own.

It rotates about its axis from east to west in contrast to other planets which rotate from west to east.

Its atmosphere contains hydrogen and methane.

Neptune (Varun)

It is the eighth planet in terms of its distance from the Sun.

It has 8 satellites revolving around it.

Its distance from Sim is 4504×10^6 km.

It takes 165 years to complete one revolution around the Sim.

Artificial Satellites

- The artificial satellites revolve around the Earth much closer than the moon.
- Artificial satellites are used for weather forecasting, long-distance communication and remote sensing.

Asteroids: There is a large gap between the orbits of Mars and Jupiter. This gap is occupied by a large number of small objects which revolve around the Sim. These are called asteroids.

Astronomy: The study of celestial objects and associated phenomena is called astronomy.

Cassiopeia: Cassiopeia is a constellation, which is visible in winter in the northern sky. It looks like a distorted letter W or 'M'.

Celestial Objects: Objects, such as the stars, the planets, the moon and many other objects in the sky are called celestial bodies.

Comets: Comets are celestial bodies that revolve around the Sun in highly elliptical orbits. A comet appears generally as a bright head with a long tail. The tail of a comet is always directed away from the Sim.

Constellations: A group of stars appearing in different shapes is called constellation. Their shapes resemble different objects and thus are named after the name of the objects.

Light Year: Distance travelled by light in one year.

Meteors: A meteor is usually a small heavenly object moving around the Sun. When a meteor occasionally enters the Earth's atmosphere, it gets heated up because of friction and glows but evaporates in a very short period of time. That is why, they appear as a bright streak in the sky.

Meteorites: Some meteors are so large that a part of them reaches the surface of the Earth before they evaporate completely. These are called meteorites.

Natural Satellites: A natural celestial body revolving around another celestial body (say planets) is called natural satellite.

Orbit: A planet revolves around the Sun in a definite path. This path is known as the orbit of the planet.

Orion: Orion is a constellation of 7 or 8 stars which looks like a hunter.

Phases of Moon: The various shapes of the right part of the moon as seen during a month are called phases of the moon.

Planets: Planets are the celestial bodies which revolve around the Sun in a well-defined orbit.

Pole Star: It is the only star which always appears to remain in the same position in the sky.

Remote sensing: Artificial satellites are used for weather forecasting, long-distance communication and remote sensing.

Solar System: The Sun and the celestial bodies which revolve around the Sun form the solar system.

Stars: Stars are the celestial bodies, which emit light of their own. The Sun is also a star.

Ursa Major: It is a group of seven stars and is also known as "Saptarishi".