



Chapter-17

Stars and the Solar System

Notes

Celestial objects

The stars, the planets, the moon and many other objects in the sky are called celestial objects.

The moon

- The moon does not produce its own light. We see the moon because the sunlight falling on it gets reflected towards us.
- The various shapes of the bright side of the moon as seen during a month are called phases of moon.
- The day on which the whole disc of the moon is visible is known as the **full moon day**.
- The day on which the moon is not seen at all is known as **new moon day**.
- On the next day of the new moon day, only a small portion of the moon appears in the sky. This is known as the **crescent moon**.
- The moon completes one rotation on its axis as it completes one revolution around the Earth. So, we can see only one side of the moon.
- **Moon's surface** is dusty and barren. There are many craters of different sizes and a large number of steep and high mountains. It has no atmosphere and no water.

The Stars

- They are celestial bodies that emit light of their own.
- The Sun is also a star.
- The Sun is nearly 150,000,000 Km or 8 light minutes from the Earth.
- The second nearest star is **Alpha Centauri** which is 40,000,000,000,000 Km from the Earth or 4.3 light years from the Earth.
- **Light year** is the distance travelled by light in one year.
- The brightest star is **Sirius**.

- The stars are present in the sky during the day time also. However, they are not visible because of the glare of the sunlight.
- Stars appear to move from east to west as the Earth rotates from west to east.
- The Pole star does not appear to move as it is situated close to the direction of the axis of rotation of the earth.

Constellations

- Constellation is a group of stars which form a recognizable pattern or shape. Examples: Ursa Major, Orion, Cassiopeia, Leo Major, etc.
- **Ursa Major:** It is also known as the **Big Dipper**, the **Great Bear** or the *Saptarshi*. There are seven prominent stars in this constellation. It appears like a big ladle or question mark. There are three stars in the handle of the ladle and four in the bowl.
- **Orion:** It is seen during winter in the late evening. It has seven or eight bright stars. It is also known as the *Hunter*. The three middle stars represent the belt of the hunter. The four bright stars appear to be arranged in the form of quadrilateral. The star Sirius is located to it.
- **Cassiopeia:** It is visible during winter in the early part of the night. It looks like a distorted letter W or M.

The Solar System

- The Sun and the celestial bodies which revolve around it form the solar system.
- It consists of eight planets, comets, asteroids and meteors.
- The gravitational attraction between the Sun and these objects keeps them revolving round the sun.
- The eight planets in their order of distance from the Sun are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
- Till 2006 there were nine planets in the solar system. Pluto was the farthest planet from the Sun. In 2006, the International Astronomical Union (IAU) adopted a new definition of planet. Pluto does not fit this definition and no longer a planet of the solar system.

The Sun

- It is the nearest star.
- It is continuously emitting huge amount of heat and light.
- It is the source of almost all the energy on the Earth.

The Planets

- They look like stars but they do not have light of their own.
- A planet has a definite path in which it revolves around the Sun called an orbit.
- The time taken by a planet to complete one revolution is called its **period of revolution**.
- A planet rotates in its own axis. The time taken by a planet to complete one rotation is called its **period of rotation**.

Satellites

- Any celestial body revolving around another celestial body is called its satellite. E.g., moon is the natural satellite of the planet Earth.

Mercury (*Budh*)

- It is planet nearest to the Sun.
- It is the smallest planet of our solar system.
- It can be seen just before sunrise or just after sunset.
- It has no satellite of its own.

Venus (*Shukra*)

- It is the nearest planet to the Earth.
- It is the brightest planet in the night sky.
- It appears in the eastern sky before sunrise and in the western sky just after sunset. Therefore, it is often called a **morning star** or an **evening star**.
- It has no satellite of its own.
- It rotates from east to west.

The Earth (*Prithvi*)

- It is the only planet in the solar system on which life exist.
- Environmental conditions that are responsible for existence of life on the Earth are:-
 - (i) Right distance from the Sun, i.e., it has the right temperature range.
 - (ii) The presence of water.
 - (iii) The presence of atmosphere , and
 - (iv) The presence of a blanket of ozone.
- It appears blue green in colour due to reflection of light from water and landmass.
- It has one natural satellite, i.e., moon.

Mars (*Mangal*)

- It is slightly reddish in colour and, therefore, it is called the **red planet**.
- It has two small satellites.

Jupiter (*Brihaspati*)

- It is the largest planet of the solar system.
- It has large number of satellite.
- It has faint rings around it.

Saturn (*Shani*)

- It is yellowish in colour.
- It has rings around it.
- It also has large number of satellites.
- Its density is less than that of water.

Uranus and Neptune

- These are outermost planets of the solar system.
- Uranus also rotates from east to west. It has highly tilted rotational axis.

Inner Planets

- The first four planets, Mercury, Venus, Earth and Mars are much nearer to the Sun than other four planets. These planets are called inner planets.
- They have very few moons.

Outer Planets

- The planets outside the orbit of Mars, namely, Jupiter, Saturn, Uranus and Neptune are much farther than the inner planets. They are called the outer planets.
- They have ring system around them.
- They have large number of moons.

Asteroids

Small objects that lie between the orbits of Mars and Jupiter that revolve around the Sun are called asteroids.

Comets

- These are celestial bodies that revolve round the Sun in highly elliptical orbits.
- It generally has a bright head with a long tail.
- The tail of the comet is always directed away from the Sun.
- E.g. Halley's Comet.

Meteor and Meteorites

- **Meteors** are small celestial objects that enter the Earth's atmosphere and appear as bright streaks of light in the sky. They are commonly known as **shooting stars**.
- Some meteors are large and so they can reach the Earth before they evaporate completely. The body that reaches the Earth is called **meteorite**.

Meteor Shower

When the Earth crosses the tail of a comet, swarms of meteors are seen. These are known as meteor shower.

Artificial Satellite

- These are man-made satellites that are launched from the Earth and revolve round the Earth much closer than the moon.
- Examples: Aryabhata, INSAT, IRS, EDUSAT, Kalpana-1, etc.
- Aryabhata was the first Indian satellite.
- Uses: They are used for forecasting weather, transmitting television and radio signals. They are also used for telecommunication and remote sensing.

