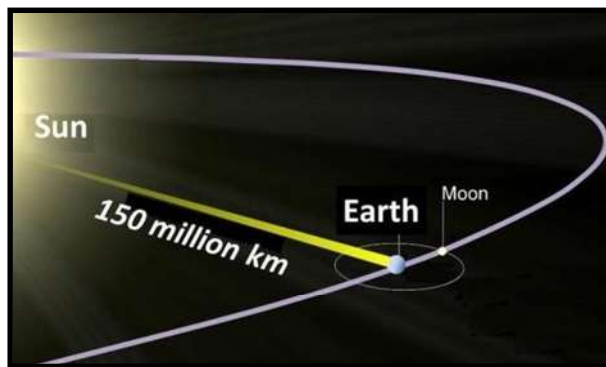


Stars and the Solar System

- The stars, planets, the Moon and the other objects which we see in the sky are called celestial bodies.

The Stars

- When we see the dark sky at night, we see many stars shining brighter than the others.
- Stars are bodies which emit their own light.
- They are also present in the sky during the day time, but they are not visible because of the bright sunlight.
- The Sun is also a star.
- The star nearest to the Earth is the Sun, which is the source of most of the energy on the Earth.
- Stars appear to move from east to west as Earth rotates from west to east.
- The Sun, being a star, appears to rise in the east and set in the west.



- The huge distances between the Earth and other celestial bodies are measured in light years.
- A light year is the distance covered by light in one year.
- The Pole star is situated in the direction of the Earth's axis, and hence, it does not appear to move.

Constellations

- The stars which form a group which has a recognizable shape of an identifiable object like an animal or a known object is called a constellation.





- To identify the stars, constellations were given their names many hundreds of years ago.
- We use constellations to divide the sky because they move so slowly that in our lifetime, they will always be found in about the same place.
- The stars contained in a constellation are not at the same distance. They just appear at the same line of sight.
- Orion (appears like a human figure with a belt, often referred to as 'The Hunter')
 - It can be seen in the late evenings during winter.
 - The belt with three bright stars in a row is usually the easiest part of Orion to spot.
 - It has seven or eight bright stars. The two brightest are Betelgeuse (shoulder) and Rigel (foot).

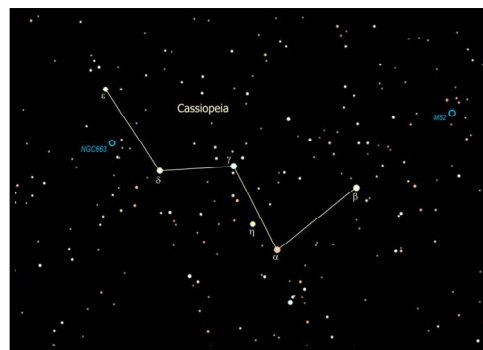


- The brightest star Sirius is located close to Orion.
- Ursa Major (Big Dipper, Great Bear, Saptarshi)
 - It can be seen at night in the summer sky.





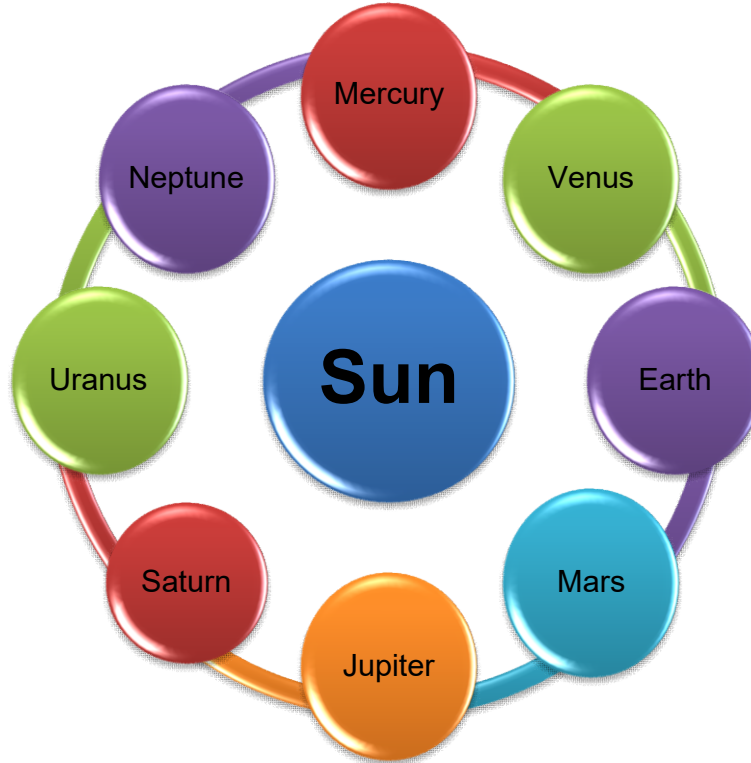
- It has seven prominent stars and appears like a big ladle or a question mark.
- There are three stars in the handle of the ladle and four in its bowl.
- Cassiopeia
 - Cassiopeia is a prominent constellation in the northern sky.
 - It is visible during winter in the early part of the night.
 - It looks like a distorted letter 'W' or 'M'.



The Solar System

- The Sun and the celestial bodies which revolve around it form the Solar System.
- The Sun is a major source of heat and light for all the planets in the Solar System.
- The Solar System consists of a large number of bodies such as planets, comets, asteroids and meteors.
- The gravitational attraction between the Sun and these objects keeps them revolving around it.
- Earth is the only planet on which life is known to exist.
- There are eight planets which revolve around the Sun.





The Sun

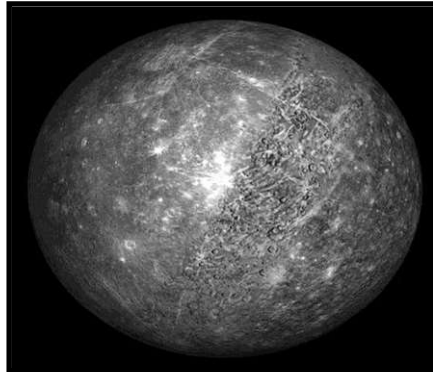
- The Sun is the nearest star from us.
- It is of average size, mass and brightness. Therefore, it appears bigger, brighter and hotter than other stars.
- It is continuously emitting huge amounts of heat and light.
- Light from the Sun reaches the Earth in approximately 8 minutes and 20 seconds.
- Its distance from the Earth is about 1.49×10^8 km.

The Planets

- The planets look like stars, but they do not have light of their own. They reflect sunlight which is incident on them.
- They have definite paths called orbits in which they revolve around the Sun.
- The time taken by a planet to complete one full revolution around the Sun is called its period of revolution.
- The time taken by a planet to rotate a full 360° on its axis is called its period of rotation.
- A celestial body which revolves around another celestial body is called a satellite. Some planets have their own satellites.



Mercury (Budh)



- It is the smallest planet in the Solar System and the closest to the Sun.
- It takes about 88 days to complete one revolution around the Sun.
- Mercury has no satellite of its own.

Venus (Shukra)



- The second closest planet to the Sun.
- It takes about 225 days to complete one revolution around the Sun.
- It has no satellite of its own.
- It rotates from east to west.
- It appears in the eastern sky before sunrise and in the western sky after sunset. So, it is also called morning or evening star.
- Venus also shows phases just like our Moon.

Earth (Prithvi)

- It is the only planet to support life in the Solar System.
- This is because
 - It is at the right distance from the Sun, so its temperature range is ideal for life to exist.
 - It has presence of liquid water.
 - It has an atmosphere.
- Earth appears blue-green from space.
- It has one Moon.

Mars (Mangal)

- It is the first planet outside the orbit of the Earth.
- It completes one revolution around the Sun in about 687 days.
- It has two moons (natural satellites) of its own.
- It appears slightly reddish and is therefore called the red planet.



Jupiter (Brihaspati)

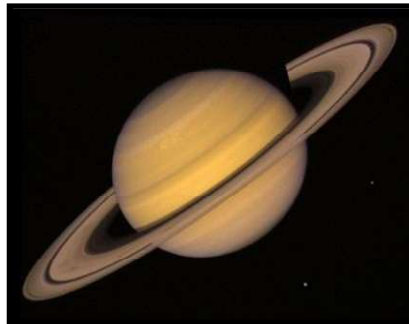
- It is the largest planet in the Solar System.



- It is so large that about 1300 earths can be placed inside this giant planet.
- It rotates the fastest among all planets.
- The mass of Jupiter is about 318 times that of the Earth.
- It has many moons. However, the four largest moons are called Io, Europa, Callisto and Ganymede.
- It also has a very faint ring.

Saturn (Shani)

- Saturn is yellowish and is the second largest planet.



- The rings of Saturn are made of ice particles and dust.
- It is the only planet which is lighter than water.
- The largest of Saturn's moons is Titan.

Uranus

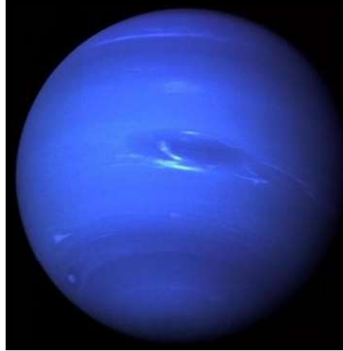
- It is a very cold planet and is much bigger than the Earth.



- It has 27 natural satellites.
- It also rotates from east to west.

Neptune

- It is very far away from the Sun, and it is very cold.
- It looks like a small bluish circle through a powerful telescope.



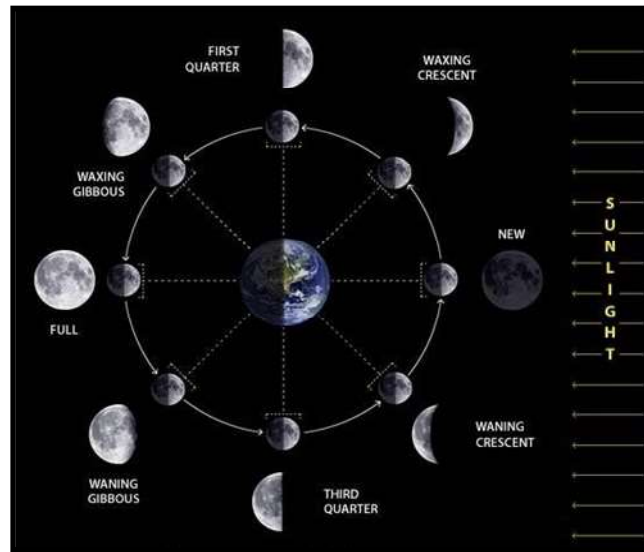
- It was discovered through mathematical calculation.
- Mercury, Venus, Earth and Mars are called the inner planets. Jupiter, Saturn, Uranus and Neptune are called the outer planets.
- The outer planets have several moons and a system of rings.

The Moon

- The Moon is the brightest object in the night sky.
- It is the only natural satellite of Earth and the fifth largest satellite in the Solar System.
- The average centre-to-centre distance from the Earth to the Moon is 384,000 km, about thirty times the diameter of the Earth.
- The various shapes of the bright part of the Moon seen during a month are called the phases of the Moon.

Phases of the Moon

- We see parts of the Moon on different days because the Moon does not produce its own light.
- We see only that part of the Moon from which the light of the Sun is reflected towards us.



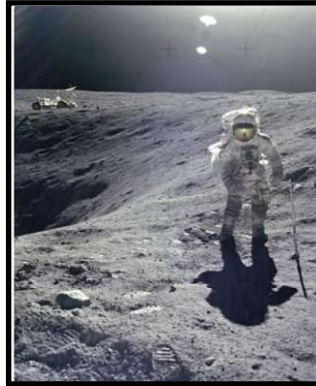
- **Full Moon Day**
 - The day on which the whole disc of the Moon is visible is known as a Full Moon day.
 - Thereafter, every night, the size of the bright part of the Moon appears to become thinner and thinner.
- **New Moon Day**
 - On the fifteenth day after the Full Moon, the Moon is not visible. This day is known as the New Moon day.
- **Crescent Moon**
 - The small portion of the Moon which appears in the sky is known as the crescent Moon.
 - The Moon grows larger every after the New Moon and again on the fifteenth day, we see the full view of the Moon.
- The Moon completes one rotation on its axis as it completes one revolution around the Earth.

The Moon's Surface

- The Moon's surface is dusty and barren.

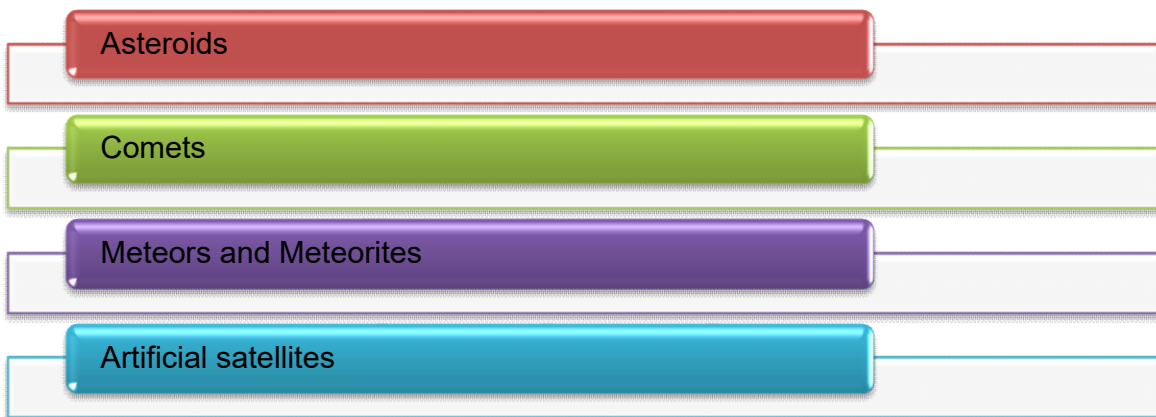


- The surface has many craters of different sizes.
- It has a large number of steep and high mountains and some of these are as high as the highest mountains on the Earth.
- It has no atmosphere and no water.
- The first man to land on the surface of the Moon was American astronaut Neil Armstrong who landed on 21 July 1969, and he was followed by Edwin Aldrin.



Other Members of the Solar System

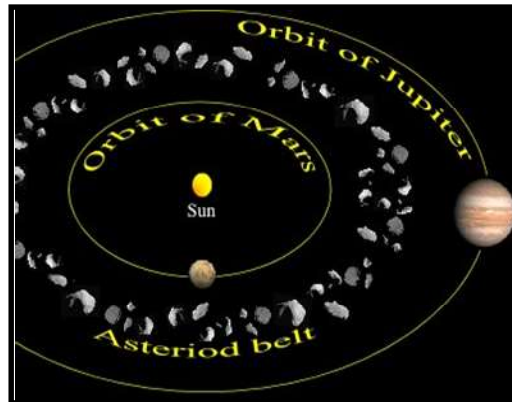
- Apart from the Sun and the planets, the Solar System also consists of celestial bodies such as asteroids, meteors, comets and artificial satellites.



Asteroids

- These are large pieces of rock or rock and metal.
- They are found in the gap between the orbits of Mars and Jupiter.
- This gap is called the Asteroid belt.





- They can only be seen through large telescopes.

Comets

- A comet is a luminous heavenly body which revolves around the Sun in an elliptical orbit.
- It appears generally as a bright head with a long tail.
- When it is close to the Sun, its nucleus—which consists of frozen gases, ice and dust—melts and emits a large amount of gas and dust.

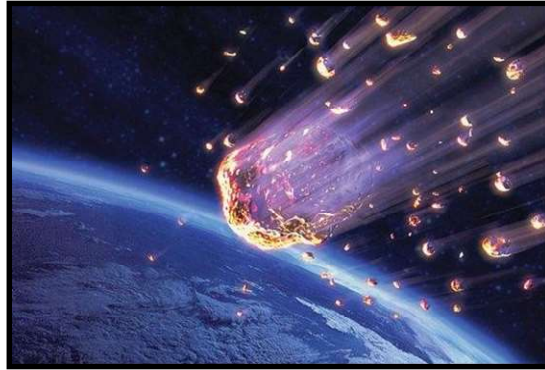


- The tail of a comet is always directed away from the Sun.
- One of the best known comets is the Halley's Comet, which appears after nearly every 76 years.
- It is named after Edmund Halley and was last seen in 1986.

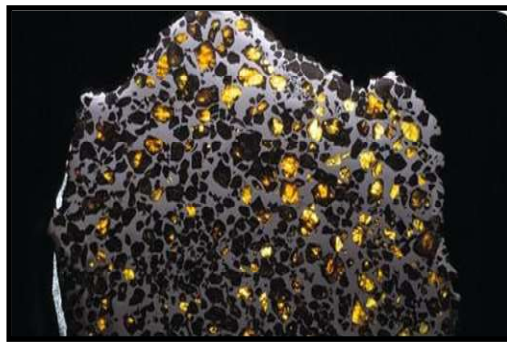
Meteors and Meteorites

- A meteor is made of debris.
- It enters the Earth's atmosphere at a very high speed.





- The friction with the atmosphere makes the meteor hot and it burns till it disintegrates.
- As it falls to the ground, it glows brightly. This is why it is called a shooting star.
- Some meteors reach the ground before burning completely and evaporating.
- These are called meteorites.



- They help scientists in investigating the nature of the material from which the Solar System was formed.
- When the Earth crosses the tail of a comet, swarms of meteors are seen. These are known as meteor showers.

Artificial Satellites

- Artificial satellites are man-made devices which orbit the Earth, Moon and Sun.
- They are launched from the Earth and they revolve around it much closer than the Moon.
- They gather information about the bodies they orbit.





- There are about 5,000 artificial satellites orbiting the Earth.
- They are used for transmission of television and radio signals, telecommunications, weather forecasting and remote sensing.
- India has built and launched several artificial satellites.
- Aryabhata was the first Indian satellite.



- The other Indian satellites are INSAT, IRS, Kalpana-1 and EDUSAT.