

INTRODUCTION

The whole sky is filled with tiny shining objects – some are bright, others dim. It seems as if the sky is studded with diamonds. They all appear to be twinkling. But if you look at them carefully you will notice that some of them do not twinkle as others do. They simply glow without any flicker just as the moon shines.

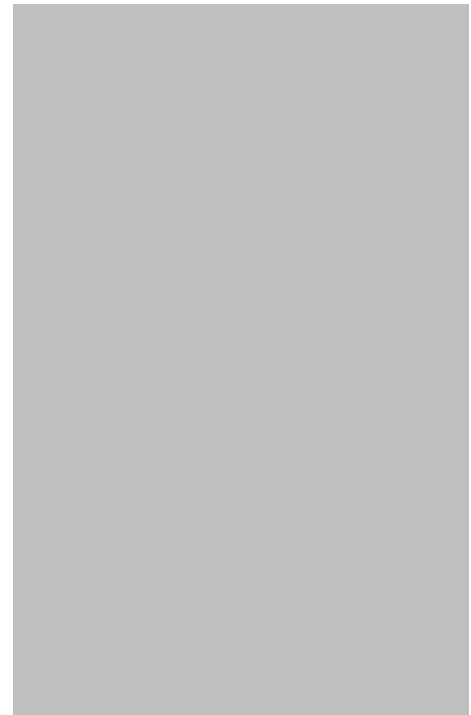


Along with these bright objects, you may also see the moon on most of the days. It may, however, appear at different times, in different shapes and at different positions. You can see the full moon only once in about a month's time. It is Full moon night or Poornima. A fortnight later, you cannot see it at all. It is a New moon night or Amavasya. On this day, you can watch the night sky best, provided it is a clear night.

The sun, the moon and all those objects shining in the night sky are called celestial bodies. Some celestial bodies are very big and hot. They are made up of gases. They have their own heat and light, which they emit in large amounts. These celestial bodies are called stars. The sun is a star.

While watching the night sky, you may notice various patterns formed by different groups of stars. These are called constellations. Ursa Major or Big Bear is one such constellation. One of the most easily recognisable constellation is the small bear or Saptarishi (Sapta-seven, rishi-sages). It is a group of seven stars that forms a part of the large Ursa Major Constellation. Ask someone elder in your family or neighbourhood to show you more stars, planets and constellations in the sky.

In ancient times, people used to determine directions during the night with the help of stars. The North star indicates the north direction. It is also called the Pole Star. It always remains in the same position in the sky. We can locate the position of the Pole Star with the help of the Saptarishi.



THE EARTH IN THE SOLAR SYSTEM

Some celestial bodies do not have their own heat and light. They are lit by the light of the stars. Such bodies are called planets. The word 'planet' comes from the Greek word "Planetai" which means 'wanderers'. The earth on which we live is a planet. It gets all its heat and light from the sun, which is our nearest star. If we look at the earth from a great distance, say the moon, it will appear to be shining just as the moon. The moon that we see in the sky is a satellite. It is a companion of our earth and moves round it. Like our earth, there are eight other planets that get heat and light from the sun. Some of them have their moons too.

THE SOLAR SYSTEM

The solar system means the 'Family of the Sun'. The sun and the eight planets that revolve around the sun are members of the solar system. The eight planets are -Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Besides the sun and the planets, there are some smaller celestial bodies as well in the solar system. These small bodies are called satellites. The satellites revolve round the planets in the same way as the planets revolve round the sun. Our earth has one satellite which we call the 'moon'.



THE SUN

The sun is in the centre of the solar system. It is huge and made up of extremely hot gases. It provides the pulling force that binds the solar system. The sun is the ultimate source of heat and light for the solar system. But that tremendous heat is not felt so much by us because despite being our nearest star, it is far away from us. The sun is about 150 million km away from the earth.

PLANETS

There are eight planets in our solar system. In order of their distance from the sun, they are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

The sun is made up of extremely hot gases and it gives out a lot of heat and light which is the source of all energy in the solar system. Our earth gets only a part of the energy. Without the sun's energy, our earth would become cold and lifeless. It is the sun which sustains all life. That is why many ancient people regarded the sun as a god. In the Rigveda there are many hymns sung in praise of the Sun or Surya.

THE EARTH IN THE SOLAR SYSTEM

You will be amazed to know that the sun is not the biggest star in the universe. It is only a medium sized star. The bigger stars are very far away from our earth. So, they look smaller than the sun. The sun looks bigger and brighter, compared to other stars, because it is much nearer to our earth.

PLANETS

There are eight planets in our solar system. In order of their distance from the sun, they are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

All the eight planets of the solar system move around the sun in fixed paths. These paths are elongated. They are called orbits. Mercury is nearest to the sun. It takes only about 88 days to complete one round along its orbit. Venus is considered as 'Earth's-twin' because its size and shape are very much similar to that of the earth.

Till recently (August 2006), Pluto was also considered a planet. However, in a meeting of the International Astronomical Union, a decision was taken that Pluto like other celestial objects (Ceres, 2003 UB313) discovered in recent past may be called 'dwarf planets'.



THE EARTH

The earth is the third nearest planet to the sun. In size, it is the fifth largest planet. It is slightly flattened at the poles. That is why, its shape is described as a Geoid. Geoid means an earth-like shape. Conditions favourable to support life are probably found only on the earth. The earth is neither too hot nor too cold. It has water and air, which are very essential for our survival. The air has life-supporting gases like oxygen. Because of these reasons, the earth is a unique planet in the solar system. From the outer space, the earth appears blue because its two-thirds surface is covered by water. It is, therefore, called a blue planet.

As already said, our earth is the third nearest planet to the sun after Mercury and Venus. It is about 150 million kilometres away from the sun. It is imagined that if our earth moved as much as ten per cent nearer or away from the sun it would not be fit for supporting life. 'In the first case, it would be too hot while in the second case it would be too cold to sustain life. The size and shape of the earth is similar to the planet Venus. Hence sometimes Venus is called the Earth's twin.

THE SATELLITES

The word satellite means a junior companion or an attendant. A satellite moves round the planet in the same way as a planet moves round the sun. In other words, while revolving round the planet, the satellites also revolve round the sun. Our earth has one satellite which we call Moon while Uranus and Neptune have 18 satellites each. Mercury and Venus have no satellites. Satellites, like the planets, have no light or heat of their own. They reflect the light of the sun. There are some differences between them. While planets revolve round the sun, the satellites revolve round the planets. For example, the earth revolves round the sun, but the moon (a satellite) moves round the earth.



□ **THE MOON**

Our earth has only one satellite, that is, the moon. Its diameter is only one-quarter that of the earth. It appears so big because it is nearer to our planet than other celestial bodies. It is about 3,84,400 km away from us.

The moon moves around the earth in about 27 days. It takes exactly the same time to complete one spin. As a result, only one side of the moon is visible to us on the earth. The moon does not have conditions favourable for life. It has neither water nor air. It has mountains, plains and depressions on its surface. These cast shadows on the moon's surface. Look at the full moon and observe these shadows.

The moon completes its revolution around the earth in 29 days and 8 hours. It is called a lunar month. It also completes its rotation on its own axis in the same time. As a result, it shows only one side to us while the other side of the moon remains away from us.

In recent years, space explorations have provided a lot of information to us about the moon's surface. An American astronaut, Neil Armstrong, was the first man to land on the moon. Samples of the lunar soil have also been brought by several space missions. They all show that the moon's surface is very rough and uneven. There is no air or water on the moon and it is very hot during the day while the nights are very cold. As a result, there is no life on the moon.



□ **ASTEROIDS**

Apart from the stars, planets and satellites, there are numerous tiny bodies which also move around the sun. These bodies are called asteroids. They are found between the orbits of Mars and Jupiter. Scientists are of the view that asteroids are parts of a planet which exploded many years back.



□ **METEOROIDS**

The small pieces of rocks which move around the sun are called meteoroids. Sometimes these meteoroids come near the earth and tend to drop upon it. During this process due to friction with the air they get heated up and burn. It causes a flash of light. Sometimes, a meteor without being completely burnt, falls on the earth and creates a hollow.

Do you see a whitish broad band, like a white glowing path across the sky on a clear starry night? It is a cluster of millions of stars. This band is the Milky Way galaxy. Our solar system is a part of this galaxy. In ancient India, it was imagined to be a river of light flowing in the sky. Thus, it was named Akash Ganga. A galaxy is a huge system of billions of stars, and clouds of dust and gases. There are millions of such galaxies that make the Universe. It is difficult to imagine how big the universe is. Scientists are still trying to find out more and more about it. We are not certain about its size but we know that all of us – you and I belong to this universe.



INDIA'S SPACE PROGRAMME

India's space programme began in 1975 with the launching of Aryabhata, the first Indian satellite, into space with the help of Russia. Then two other satellites, namely, Bhaskara I and Bhaskara II, were sent into space in 1979 and 1981 respectively with Soviet help.

After this, India with the help of U.S.A. launched INSAT-1A and INSAT-1B into space in 1983. The launching of INSAT-1B proved quite successful. Then in 1984 Squadron Leader Rakesh Sharma was sent into space along with two other Russian cosmonauts.

Man-made satellites are placed in the orbit of the earth by rockets. Examples of Indian Satellites are IRS, INSAT, EDUSAT.

India's space programme took another leap forward with the launching of INSAT-2 series. They provide space services for telecommunication, meteorological observations, T.V. broadcasting, disaster warning, and data collection.

The artificial satellites have proved very useful in telecommunication, meteorology, T.V. relay and broadcasting.

INSAT-2E was the last of the series of INSAT-2 satellites. INSAT-3B satellite was launched in 2000, INSAT-3C in 2002, INSAT-3A and 3E in 2003. INSAT-4 series have been planned. INSAT-4A was launched in December 2005. There are 7 satellites on the INSAT-4 series.