

Introduction

- In a dark night in clear atmosphere where there is no bright light, dust and smoke we can see the sky full of twinkling stars.
- we can notice many other objects that do not twinkle they are known as planets.
- The brightest object in the night sky is moon.
- In the sky there are stars, planets, moon and many other objects they are known as celestial objects.
- All the celestial objects are different from each other.

The moon

➤ Activity 1

1. Observe the moon from one full moon to the next full moon.
 2. Note down the day of the full moon
 3. Make a sketch in your notebook of the moon every night.
 4. Also note down the position of the moon in sky every night (east or west).
 5. You will notice that the shape of the moon changes every day.
- The shape of the moon changes every day.
 - We refer the moon as full moon when it appears to be perfectly round.
 - We refer the moon as the new moon when moon is not visible even in the clear sky.
 - Moon takes 15 days to go from full moon to new moon. With all passing days moon get thinner and thinner and become the new moon on the fifteenth day.
 - Crescent moon is the small portion of moon that is visible on the next day of the new moon.
 - Then again in the next 15 days the moon grows every day and become the full moon.
 - During a month the various shape of the visible part of the moon are known as the phases of the moon.
 - We know that Moon does not has its own light it only reflects the sunlight falling on it.
 - The phases of the moon are just the parts of the moon that reflect the light of the sun towards us.

➤ Activity 2

1. Paint half of a ball with white colour and another half with black colour.
2. Draw a circle of about 2m on a playground with the help of your friend.
3. Now divide the circle in eight equal parts.
4. Now standing at the centre of the circle ask your friend to keep the white part of the ball facing towards the sun and revolve around you through those eight points.
5. Now observe and draw the shape of the visible part of the moon.

[Remember that during morning the white part should be facing the east direction and, in the afternoon, the white part of the ball should be facing the west direction]

The moon's surface

- The surface of the moon is heavily cratered and it is very dusty and barren.
- Craters are the hole in the surface of the moon.
- Number of steeps and high mountains are also present on the moon.
- There is no water and no atmosphere on moon.
- The first human being who landed on moon's surface was Neil Armstrong. He was an American astronaut. He landed on the moon on July 21, 1969.

The stars

- Stars are the celestial bodies that emits their own light. Sun is also a star that emits its own light.
- Sun appears to be bigger than all the stars because sun is very close to the earth as compared to other stars.
- The distance of sun from the earth is about 150,000,000 kilometres (150 million km).
- The next nearest star to earth is alpha its distance from earth is about 40,000,000,000,000 km.
- Light year is the unit used to express such large distance of these celestial bodies from the earth.
- The sun is 8 light minutes away from the earth and alpha is 4.3 light years away from the earth.
- This means that we see the
- Sky is present in the sky all the time but it is visible during night only because during night bright light of sun is not present.
- As the sun rises from east and set in the west, in the evening a star also rises in the east and in the early morning sets in the west.
- This happens because the earth moves from west to east and we know that the nearby objects appear to move in opposite direction of our motion.
- Pole star which is situated in the direction of the earth's axis of rotation appears to be stationary.

Constellations

- Constellations are the groups of stars forming a definite shape. Some of the constellations seen in the night sky are
 - i. Great bear
 - ii. Orion
 - iii. Cassiopeia

iv. Leo major

- Ursa major is one of the famous constellations also known as the big dipper, the great bear or the saptarshi.
- Ursa major can be seen during summer night.
- Ursa major consists of seven stars it looks like a ladle. The handle of the ladle has three stars and the bows has four stars.
- If we extend the imaginary straight line passing through the last two star of the ursa major to about five times the distance between these two stars this extended line will lead to the pole star. The pole star does not move from its place.

➤ **Activity 3**

1. Observe the ursa major for three to four times at an interval of 2 to 3 hours during a summer night.
 2. Locate the position of the pole star and the ursa major.
 3. You will find that the ursa major appear to revolve around the pole star from east to west.
- In the southern hemisphere, the pole star and some northern constellations may not be visible.
 - Another magnificent well-known constellation that can be seen during winter evening is Orion.
 - Orion is also known as the hunter. The middle three stars look like the belt of the hunter while a quadrilateral is formed by the four bright stars.
 - A straight line passing through the three middle stars of the Orion leads to the brightest star in the sky known as the Sirius.
 - Another prominent constellation which can be seen in early night during winters is known as Cassiopeia. This constellation is present in the northern sky.

The solar system

- Celestial bodies like planets, comets, asteroids and meteors revolving around the sun together form the solar system.
- Planet earth is the member of the solar system which revolve around the sun.
- There are seven more planet which are in this order: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
- These seven planets also revolve around the sun.
- Earlier there were nine planets. The ninth planet was Pluto but in 2006 Pluto was considered as the dwarf planet as it does not fit in the definition of the planet.

The sun

- Sun is the closest star to the earth.
- Every planet revolves around the Sun. The main source of light and heat energy for all the planets is Sun.
- Sun emits its own light.

The planets

- Planets do not twinkle like stars as planets do not have their own light. They only reflect sunlight.
- All planets revolve around the sun in the fixed path known as the orbit.
- Period of revolution is the time taken by the planet to complete one revolution around the sun.
- As the distance between a planet and the sun increases the period of revolution is also increase.
- All planets apart from revolving around the sun, rotates along its own axis.
- Period of rotation is the time taken by the planet to complete one rotation along its own axis.
- Any celestial body revolving around a planet is called the satellite of that planet.
- Moons/satellites revolves around some planets.
- Earth has many artificial satellites revolving around it and moon is known as the natural satellite of the earth.

Mercury (Budh)

- Mercury is the smallest of all the planet in our solar system and nearest planet to the sun.
- Mercury has no moon/satellites revolving around it.

Venus (Shukra)

- Venus is the brightest planet in the solar system.
- Venus is nearest planet to the earth.
- Venus also does not have any moon/satellite of its own.
- Its rotation is opposite to the rotation of earth. It rotates from east to west.
- Just like the moon Venus also visible in different phases.

Earth (Prithvi)

- Earth is known as the blue planet because of the existence of planet.
- It is the only planet where life exist.
- Earth rotates from west to east.
- Earth is at the right distance from the sun that is why there is good amount of water and suitable atmosphere is present.
- The temperature on earth is also suitable for the existence of life.
- Earth has its own natural satellite which is the moon.
- The seasonal change occurs on the earth because of its axis of rotation is tilted with respect to the orbit of revolution.

Mars (mangal)

- Mars is known as the red planet.
- Mars rotates from west to east.
- Mars has two small satellites that means mars has two moons.

Jupiter (Brihaspati)

- Jupiter is the largest planet in the solar system.
- Jupiter has large number of moons.
- Around Jupiter faint rings are present.
- Mass of Jupiter is very large as compared to the earth it is about 318 times that of the earth.

Saturn (Shani)

- After Jupiter there is Saturn which is yellow in colour.
- Saturn also have ring around it which cannot be seen with naked eyes.
- The density of Saturn is even less than the density of water.

Uranus and Neptune

- Like the Venus the direction of rotation of Uranus is also from east to west.
- Its orbital motion appears to roll on its side of the highly tilted axis of rotation.
- Neptune is the last planet of the solar system it is very far from the sun and can only be seen with large telescope.
- Mercury, Venus, earth, mars are the inner planet which has less number of moons.
- Jupiter, Saturn, Uranus, Neptune are called the outer planet which has rings around them and large number of moons.

Some other members of the solar system

Asteroids

- There is a belt of small object between mars and Jupiter. These small objects revolve around the sun and are known as asteroids.
- With the help of large telescope, we can see asteroids.

Comets

- Another member of the solar system that revolve around the sun is comets.
- The orbit of comets is highly elliptical.
- Comet look like a bright head with a tail directed away from the sun.
- Many comets appear after a particular time period like the Halley's comet appears nearly after 76 years.

Meteors and meteorites

- Some small objects that enter the earth's atmosphere with high speed and evaporates because it gets heated by the friction due to the atmosphere.
- These small objects are commonly known as shooting stars but they are meteors.
- Some meteors which do not evaporate because of their large size reaches the earth surface are known as meteorites.

Artificial satellites

- The man-made satellite which is launched from the earth are known as artificial satellite.
- There are many artificial satellites that are launched by India.
- Aryabhata was the first Indian satellite.
- INSAT, IRS, KALPANA-1, EDUSAT, etc. are some Indian satellites.
- For weather forecasting, transmitting television and radio signals, telecommunication and remote sensing, artificial satellites are used.

