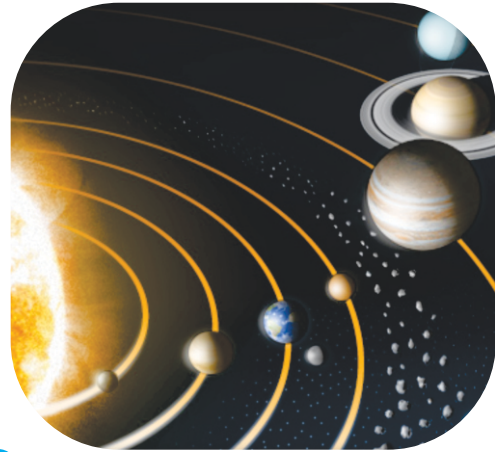


UNIT 8

SOLAR SYSTEM



In this unit, we will learn:

- Stars and Planets
- Solar system (Sun and Planets)
- Natural Satellites in solar system

The Sun and the planets are main parts of our solar system. The Sun has the central position in the solar system while the planets and many other objects are revolving around the Sun. The Earth is the only planet of the solar system on which life exists. In this unit we will get a brief introduction of the stars, planets and natural satellites.

8.1 Stars and Planets

We see several stars shining in the sky at night (Figure 8.1). The Sun is also a star. Have you ever thought what these stars are? These are huge spheres of burning gases which emit heat and light. In scientific terminology, a huge object which emits its own light is called a star.



Figure 8.1 Stars in the sky at night

In the universe, some stars are smaller while others are bigger than the Sun. Why cannot we see the stars during day time? This is because the Sun is closer to the Earth as compared to the other stars and in the presence of its bright sunlight, the light of distant stars becomes invisible.

Those objects which revolve around the Sun are called planets. Planets are not stars because they do not shine with their own light. There are eight planets that revolve around the Sun. Our Earth is also a planet.

8.2 Solar System (The Sun and Planets)

The Sun and other planets, satellites and comets which revolve around the Sun make our solar system.

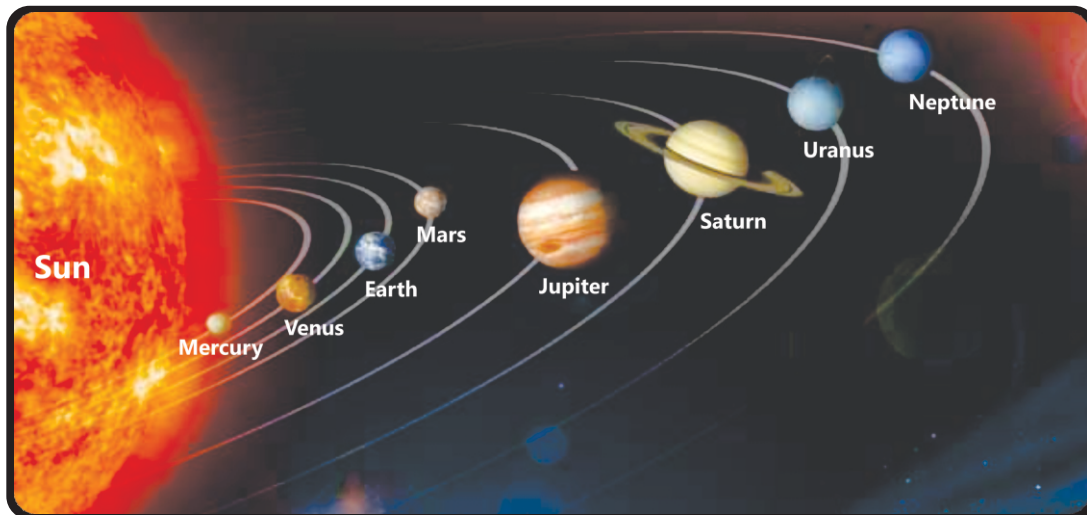


Figure 8.2 Solar System

The Sun

Our Sun is a medium sized star emitting heat and light continuously. It is very big as compared to the Earth. Its diameter is about 1.4 millions km, which is about 110 times bigger than that of the Earth. The temperature of the outer surface of the Sun is about $55,000^{\circ}\text{C}$, whereas the temperature of its central part (core) is about $15,000,000^{\circ}\text{C}$. The Sun is composed of about 75% hydrogen and 25% helium by mass. In the Sun's core, hydrogen is being converted into helium. This conversion produces heat, sunlight and other radiations.

The Planets

The eight planets which revolve around the Sun are named as Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. The arrangement and position of the planets in solar system is shown in Figure 8.2. This figure shows that planets are at different distances from the Sun.

As the distance of each of the eight planets from the Sun is different, hence, each one completes its cycle around the Sun in different periods. Some information about eight planets of solar system is given in Table 8.1.

Table 8.1: Some information about eight planets

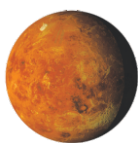
Name of the planet	Diameter (km)	Distance from the Sun (million km)		Revolution / orbit round the Sun
		Min.	Max.	
Mercury	4,880	46	69.8	87.97 Earth days
Venus	12,104	107.5	108.9	224.7 Earth days
Earth	12,756	147.1	152.1	365.25 days
Mars	6,794	206.6	249.2	686.98 Earth days
Jupiter	142,984	740.6	816	11.86 Earth years
Saturn	120,536	1350	1510	29.46 Earth years
Uranus	51,118	2730	3010	84.01 Earth years
Neptune	49,532	4460	4540	164.79 Earth years

Ref: Encyclopedia of space by DK. Edition 2009



Mercury

Mercury is a planet closest to the Sun having almost no atmosphere and no water. It is the smallest planet of the solar system. Its outer layer consists of rocks. Beneath the rocky layer, most of the planet comprises of iron.



Venus

Venus is similar to the Earth in size and mass. Its atmosphere primarily consists of carbon dioxide which traps heat (greenhouse effect) and makes it hotter than Mercury.

Do you know?

Venus is a planet, not a star. However, it is known as morning star and evening star. This is because the sunlight makes it shine brightly just before sunrise in the morning and after sunset in the evening.

**Earth**

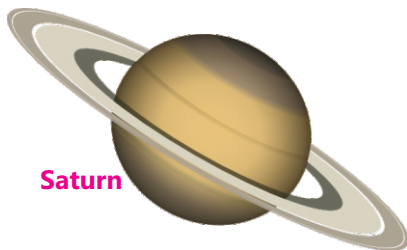
Earth is the third planet from the Sun. Its atmosphere, distance from the Sun and many other factors have made it heaven for life. The central part of the Earth is solid iron core which creates magnetic field. It is surrounded by a thick layer of molten rocks called mantle. The surface of the Earth is made of water, air and solid ground. Its atmosphere consists of nitrogen, oxygen, carbon dioxide and other gases.

**Mars**

Mars is also called red planet due to its reddish colour. Its colour is due to a layer of iron-rich dust. The planet has a central core of iron, surrounded by a thick layer of rock. Its atmosphere is thinner than that of the Earth. Mars has water, but it is locked up as ice. Scientists think that many millions of years ago, there was Earth-like climate on Mars.

**Jupiter**

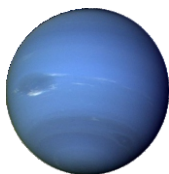
Jupiter is the largest planet in the solar system. It is a gas planet mainly composed of hydrogen and helium gases. It has no real surface. The gaseous clouds create a weather including storms.

**Saturn**

Saturn is the second largest planet in the solar system. Like Jupiter, it is made up of gases mainly hydrogen and helium. Saturn is encircled by thin rings consisting of billions of snowballs. These rings are over 302,000 km in diameter. Through a telescope the planet appears beautiful due to its rings.

**Uranus**

Uranus is also a gas planet, but its composition is different from other gas planets. It contains methane in addition to hydrogen and helium. Due to methane, it appears blue-green in colour.

**Neptune**

Neptune has a core of molten rock. Around the core, there is very cold water layer. The top layer is made of hydrogen, helium and small amount of methane. Methane gives it blue colour.

Interesting Information

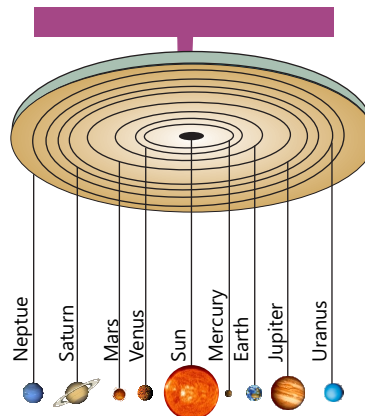
The Earth revolves anticlockwise around the Sun with the speed of about 107,244 km per hour.

Do you know?

Diameter of moon is 3476 km.

Activity 8.1

- Take a large ball, two small but different sized balls, six soft beads of different sizes, nine pieces of threads approximately equal in length, 18 small iron/steel hooks, one round cardboard sheet, one side of which is smooth and white.
- Paste white paper on the cardboard sheet.
- Draw eight circles of different diameter around one another on the white side of the cardboard.
- Hang the cardboard with some support in such a way that its white side should face the ground.
- Tie 18 hooks, one at each end of the nine pieces of threads.
- Join three balls and six beads separately with one end of each thread by fixing the hook into the ball or bead.
- Hang the large ball by fixing the hook tied at second end of its thread in the cardboard at the central point of the circles. It will represent the Sun in the model of the solar system.
- Follow the figure and hang the other beads and balls around the large ball (representing the Sun) in such a way that they should represent the size and position of the eight planets in the model of the solar system.

**Do you know?**

Venus, Mars, Jupiter and Saturn are the planets which can be seen without telescope. Other planets are so far that we cannot see them without telescope.

8.3 Natural Satellites in Solar System

A satellite is an object that orbits a bigger mass. The Moon is a

satellite of the Earth. Mars has two Moons. Similarly, most other planets have satellites that orbit around them. These are natural satellites. These natural satellites are usually termed as Moons.

Do you know?

Scientists have launched several artificial satellites into the space for space research. Artificial satellites are sent into space with the help of rockets. The first artificial satellite named as Sputnik-1 was launched into space by Russia on 4th October 1957. Since then thousands of satellites have been launched into space for different purposes.

Activity 8.2

Comparison of the size of Earth, Sun and Moon

Observe the picture that has been taken from space and answer the following questions:

1. Why does the Sun look smaller than the Earth?
2. How many times is the diameter of the Sun bigger than that of the Earth?
3. How many times is the diameter of the Sun bigger than that of the Moon?
4. How many times is the diameter of the Moon smaller than the Earth?



Science, Technology, Society and Environment

Geostationary satellites and polar satellites are used for studying the weather, navigation, and communication. Satellites in high polar elliptical orbits are used for communication to the people living close to the North Pole, as it is difficult for them to receive signals from geostationary satellites above the equator. Low Earth orbit satellites pass over the Earth's surface only a few hundred kilometres up. They can be used to photograph the surface of the Earth in detail.

KEY POINTS

- A huge object which emits its own light is called a star. The Sun is also a star.
- Eight large material objects in the space which are not stars but revolve around the Sun are called planets. These planets are named as Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
- An object that orbits around a planet is called a satellite. The Moon is a satellite of the Earth.

QUESTIONS

8.1. Fill in the blanks.

- The _____ is third planet from the Sun.
- The _____ is the largest planet in the solar system.
- Pluto is _____ a planet.
- The first artificial satellite named as _____ was launched into space in 1957.
- Moon takes about _____ days to orbit around the Earth.

8.2 Encircle the correct option.

- After which planet does the Neptune orbit?
 - Mars
 - Uranus
 - Earth
 - Mercury
- Before which planet does the Venus orbit?
 - Mercury
 - Mars
 - Earth
 - Saturn

- iii. Which is the biggest planet amongst the following?
- a. Venus
 - b. Mars
 - c. Uranus
 - d. Earth
- iv. Which one of the following is the natural satellite of the Earth?
- a. Mars
 - b. Pluto
 - c. Moon
 - d. Mercury
- v. Which is the biggest planet of our solar system?
- a. Earth
 - b. Jupiter
 - c. Uranus
 - d. Saturn
- vi. The second largest planet in the solar system is:
- a. Venus
 - b. Uranus
 - c. Jupiter
 - d. Saturn
- vii. Diameter of the Earth is about:
- a. 4900km
 - b. 6800km
 - c. 12100km
 - d. 12756km
- viii. The cause of blue colour of Neptune is:
- a. water
 - b. hydrogen
 - c. helium
 - d. methane
- ix. Scientists think that many millions of years ago, there was Earth-like climate on:
- a. Venus
 - b. Uranus
 - c. Mars
 - d. Moon
- x. The Earth's Moon completes one revolution around the Earth in:
- a. 27 days
 - b. 28 days
 - c. 29 or 30 days
 - d. 31 days

8.3 Short answer questions:

- (i) Which is the self illuminated object in the solar system?
 (ii) What is a satellite?

8.4 Differentiate between the stars and planets.

8.5 Explain why the Sun bears prime importance in the solar system?

8.6 Venus is very similar to the Earth in size. Why is it unlikely to support life?

8.7 Compare the sizes of the Earth, Sun and Moon.

8.8 Search the names of the planets given in box in the crossword.

Word Puzzle

MERCURY
 VENUS
 EARTH
 MARS
 JUPITER
 SATURN
 URANUS
 NEPTUNE

E	M	E	R	C	U	R	Y	H	T	V
P	D	A	F	T	A	K	E	A	W	E
N	E	R	G	O	T	E	L	I	H	N
S	A	T	U	R	N	E	R	A	U	U
E	L	H	P	Y	E	T	M	A	R	S
A	S	E	D	O	P	N	G	E	A	T
P	E	V	A	H	T	C	I	N	N	P
A	T	E	P	L	U	T	O	N	U	C
E	E	I	N	E	N	V	A	H	S	E
J	U	P	I	T	E	R	D	A	T	Y