

# Our World

A large cluster or collection of stars held together by gravitational force along with gases and dust is known as a **galaxy**. **Milky Way** is the name of our galaxy. The Sun along with the eight planets constitute our Solar System.

## The Solar System

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Important members of the Solar System are the Sun, the planets and their satellites and other celestial bodies such as stars, asteroids, comets and meteorites.

### The Sun – Centre of the Solar System

- The Sun is a ball of hot gases. Its diameter is 110 times larger than the Earth.
- Burning of the Sun causes the outer layers to exert great pressure in its innermost layers (core). Nuclear fusion takes place here in which hydrogen gas gets converted to helium gas releasing a great amount of energy.
- The energy from the Sun is released in the form of electromagnetic waves in all directions. The waves include ultraviolet rays, infrared rays and radio waves.
- The surface of the Sun has dark spots. These are dark because they have a temperature lower than the surface of the Earth and thus are called sunspots.

### The Planets

- Our Solar System has eight planets—Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Pluto was earlier considered a planet but has now been stripped of its planethood.
- All the planets revolve around the Sun in an elliptical orbit.
- A group of rocky objects found between the orbits of Mars and Jupiter are called asteroids. When fragments of rocks enter the surface of the Earth, they start burning because of friction. Such burning objects are known as shooting stars. When these do not get burnt completely, they land on the Earth and are known as meteorites.
- Mercury, Venus, Earth and Mars are called the inner planets. They are also known as terrestrial planets as their structure is similar to that of the Earth.
- Jupiter, Saturn, Uranus and Neptune are known as outer planets. These are also known as Jovian planets as their structure is similar to Jupiter. They have rings around them and have several moons.
- Pluto has been stripped of its planethood because it does not conform to the recognised elliptical path and has wide variation in its path while revolving around the Sun. It is also smaller than the other planets. Thus, scientists have termed it a dwarf planet.

### Differences between Stars and Planets

| Stars                                                                         | Planets                                                                                                         |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Stars are large balls of hot burning gases. They have their own light.</b> | Planets are mainly composed of rocks. They do not have light of their own. They reflect the light of the stars. |
| <b>The stars are very far away from us.</b>                                   | The planets are comparatively nearer to us.                                                                     |
| <b>Stars form large clusters called</b>                                       | Planets do not form any galaxy, and there are only eight planets in our galaxy.                                 |

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| <b>galaxies. There are millions of stars in these galaxies.</b> |                                                                     |
| <b>The movement of stars is very slow.</b>                      | All planets revolve around the Sun in a fixed path called an orbit. |

## Planets and their Characteristics

| Name of the Planet | Characteristics                                                                      |
|--------------------|--------------------------------------------------------------------------------------|
| <b>Mercury</b>     | Planet nearest to the Sun                                                            |
| <b>Venus</b>       | Hottest planet; also known as the Morning Star or Evening Star and the Earth's Twin. |
| <b>Earth</b>       | Only planet which supports life. It has one satellite.                               |
| <b>Mars</b>        | It is known as the 'Red planet'. It has 2 satellites.                                |
| <b>Jupiter</b>     | It is the largest planet. It has 28 satellites.                                      |
| <b>Saturn</b>      | The planet has beautiful rings around it and has 30 satellites.                      |
| <b>Uranus</b>      | It has 21 satellites.                                                                |
| <b>Neptune</b>     | Planet farthest from the Sun; it has 8 satellites.                                   |

## The Unique Planet – Earth

The Earth is a unique planet. It is the only planet in the Solar System which supports life. It supports life because of the following reasons:

- It is located at an optimum distance from the Sun. Thus, it is neither too hot nor too cold.
- Its average temperature is of 17°C, which is suitable for life forms to exist.
- The atmosphere of the Earth consists of gases such as oxygen, nitrogen and carbon dioxide. Ozone present in the atmosphere protects the Earth from the harmful ultraviolet rays of the Sun. The atmosphere also does not allow the heat to escape into space and hence keeps the Earth warm.
- 70% of the Earth is covered with water. The hydrological cycle helps in maintaining the life forms on the Earth.

## The Shape of the Earth

Reasons which prove that the Earth is spherical:

- During a lunar eclipse, the shadow of the Earth falls on the surface of the Moon. This shadow is visible as an arc of a circle. Because the shadow always appears spherical, we know that the Earth is spherical.
- The Pole Star can be observed at an angle of 90° in the sky at the North Pole. If we travel southwards, the angle of the Pole Star decreases, and at the Equator, the angle becomes zero. This proves that the path of travel is an arc of a circle.
- Because all the planets and the Moon appear spherical, we can conclude that the Earth too is spherical. The pictures of the Earth taken from space prove that the Earth is a sphere.

## Conditions Favouring Life on the Earth

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Life on the Earth began because of the existence of the atmosphere, heat and water.

**Biosphere:** It is a narrow zone between the lithosphere, hydrosphere and atmosphere. The upper crust of the Earth is called the biogeosphere where all forms of plant and animal life are found. Naturally occurring communities characterised by distinctive life forms adapted to broad climatic types are called **biomes**. Examples: Temperate forests, hot deserts

**Ecosystem:** The ecosystem is a community of living and non-living organisms which are interdependent in a same area. The relationships between living organisms and their interactions with their living and non-living surroundings constitute an ecosystem.

There are numerous ecosystems in the world. Examples: Pond, desert and river ecosystems

The non-living components of an ecosystem are called abiotic components. Examples: Temperature, humidity, wind, soil

The living components of the ecosystem are called biotic components. Examples: Plants, animals, humans

**The Gaia Theory:** The Gaia theory was propounded by the British scientist James Lovelock in 1979. According to this theory, the Earth acts as a single living and self-sustaining organism which can regulate and organise itself.

The following figure represents the life giving cycles of the Earth:

