The Solar System

Introduction to the Solar System

Aryan visits his uncle Ravi in a small town and notices the clear night sky. Uncle Ravi explains that due to less pollution, stars are more visible. The solar system consists of the Sun, planets, moons, and other celestial objects that revolve around the Sun.

Understanding the Universe

- The vast night sky has fascinated humans for centuries.
- Various theories explain the origin of the universe; the most widely accepted is the Big Bang Theory.
- The Big Bang Theory states that the universe began around 13.8 billion years ago due to an explosion of an infinitely dense point, leading to space expansion and matter formation.
- Astronomy is the branch of science that studies celestial bodies, using tools like telescopes, satellites, and space probes.

The Sun: The Central Star of Our Solar System

- The Sun is the largest object in the solar system, made mainly of hydrogen and helium.
- It generates heat and light through nuclear fusion.
- The Sun is 150 million km away from Earth, and its rays take 8 minutes to reach us.
- Surface temperature: 6,000°C.
- The Sun influences climate, weather, and the water cycle.
- In India, it is revered as Sūrya, symbolizing energy and life.

Planets: Wanderers of the Solar System

- The term "planet" originates from the Greek word "planes," meaning "wanderer".
- Planets move in fixed orbits around the Sun.
- Each planet has a specific revolution period, which increases with distance from the Sun.
- Planets also rotate on their own axes (rotation period).

Types of Planets

1. Inner Planets (Terrestrial Planets)

- Mercury, Venus, Earth, and Mars.
- Small, rocky, dense.
- Close to the Sun, no rings.
- Composed of solid materials and metals.

2. Outer Planets (Gas Giants)

- Jupiter, Saturn, Uranus, and Neptune.
- Large, composed mainly of gases.
- Have ring systems and multiple moons.

3. Dwarf Planets

- Pluto, Ceres, Haumea, Makemake, and Eris.
- Smaller and do not clear their orbits.
- Important for understanding solar system diversity.

Details of Planets

Planet	Key Characteristics	Distance from Sun	Revolution Period
Mercury	Smallest planet, closest to Sun, extreme temperature variations.	58 million km	88 days
Venus	Brightest object after Sun and Moon, called "Morning/Evening Star", no moons.	180 million km	225 days
Earth	"Blue Planet," supports life, has water and atmosphere, one moon.	150 million km	365.25 days
Mars	"Red Planet," iron-rich soil, two moons (Phobos & Deimos).	228 million km	322 days
Jupiter	Largest planet, Great Red Spot (storm), faint rings, 95 moons.	778 million km	11 years
Saturn	Famous for ring system, 146 moons.	1,427 million km	29 years 167 days

Uranus	Blue-green due to methane, 28 moons, faint rings.	2,872 million km	84 years 7 days
Neptune	Farthest planet, 14 moons, bluish, extremely cold.	4,502 million km	165 years

Interesting Facts

- Inner Planets vs. Outer Planets
  - Inner planets are rocky and small.
  - Outer planets are gas giants and large.
  - Outer planets have rings, inner planets do not.
- Planetary Mnemonic
  - To remember the order of planets from the Sun:
    - "My Very Educated Mother Just Served Us Noodles" (M V E M J S U N)
    - Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.

Key Terms

- **Celestial bodies:** Natural objects in the sky (Sun, Moon, stars, planets).
- **Orbit:** The path of a planet around the Sun.
- **Revolution:** The time a planet takes to complete one orbit around the Sun.
- **Rotation:** The spinning of a planet on its axis.
- **Nuclear fusion:** The process by which the Sun produces energy.