

UNIVERSE

- The study of the universe is known as **Cosmology**. The universe is commonly defined as the totality of everything that exists including all physical matter and energy, the planets, stars, galaxies and the contents of intergalactic space.
- **Galaxy** A galaxy is a vast system of billions of stars, dust and light gases bound by their own gravity. There are 100 billion galaxies in the universe and each galaxy has, on average, 100 billion stars.
- Our galaxy is the **Milky Way Galaxy** (or the **Akash Ganga**) formed after the Big Bang.
- **Andromeda** is the nearest galaxy to the Milky Way.
- **The Big Bang Theory** Big Bang was an explosion of concentrated matter in the universe that occurred 15 billion years ago, leading to the formation of galaxies of stars and other heavenly bodies.
- It is believed that the universe should be filled with radiation called the “cosmic microwave background.” NASA has launched two mission to study these radiation, i.e. the Cosmic Background Explorer (COBE) and the Wilkinson Microwave Anisotropy Probe (WMAP)
- **Stars** are heavenly bodies made up of hot burning gases and they shine by emitting their own light.
- **Black Hole** Stars having mass greater than three times that of the Sun, have very high gravitational power, so that even light can not escape from its gravity and hence called black hole.
- **Comets** Made up of frozen gases. They move around the Sun in elongated elliptical orbit with the tail always pointing away from the Sun.
- **Constellations** The sky is divided into units to enable the astronomers to identify the position of the stars. These units are called constellations. There are 88 known constellations.
- **Satellites** are the heavenly bodies that revolve around the planets. Moon is the natural satellite of the Earth.

Facts about the Moon

Diameter	3476 km
Average distance from Earth	384365 km



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Rotation Speed	27 days, 7 h, 43 min and 11.47 sec
Revolution Speed	27 days, 7 h, 43 min and 11.47 sec
Time taken by moonlight to reach the Earth	1.3 sec

Solar System

- The solar system consists of the Sun, eight planets and their satellites (or moons) and thousands of other smaller heavenly bodies such as asteroids, comets and meteors.
- The Sun is at the centre of the solar system and all these bodies revolve around it. It is the nearest star to the Earth.

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Facts about the Sun

Average distance from the Earth	149598900 km
Diameter	1391980 km
Temperature of the Core	15000000°C
Rotation Speed	25.38 days (with respect to equator); 33 days (with respect to poles)
Time taken by Sunlight to reach the Earth	8 min and 16.6 sec

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Important Facts about Universe

Biggest Planet	Jupiter
Biggest Satellite	Ganymede (Jupiter)
Blue Planet	Earth
Green Planet	Uranus
Brightest Planet	Venus
Brightest Planet outside Solar System	Sirius (Dog Star)
Closest Star of Solar System	Proxima Centauri
Coldest Planet	Neptune
Evening Star	Venus
Farthest Planet from Sun	Neptune
Planet with maximum number of satellites	Saturn (Overtaking Jupiter)
Fastest revolution in Solar System	Mercury
Hottest Planet	Venus
Densest Planet	Earth
Fastest rotation in Solar System	Jupiter
Morning Star	Venus
Nearest Planet to Earth	Venus
Nearest Planet to Sun	Mercury
Red Planet	Mars
Slowest Revolution in Solar System	Neptune
Slowest Rotation in Solar System	Venus
Smallest Planet	Mercury
Smallest Satellite	Deimos (Mars)
Earth's Twin	Venus
Only Satellite with an atmosphere like Earth	Titan

Asteroids (or Planetoids)

Small planetary bodies that revolve around the Sun and found in between the orbits of Mars and Jupiter. Also known as minor planets.

Meteors and Meteorites

- Meteors are also called **shooting stars**.
- **Meteors** are fragments of rocks coming towards the Earth.
- They are formed due to collisions among the asteroids.
- Meteors that do not burn up completely in Earth's atmosphere and land on the Earth, are called **meteorites**.
- Meteorites are composed of various proportions of a nickel-iron alloy (10% nickel and 90% iron) and silicate minerals.

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Classification of Planets

Inner Planets Include Mercury, Venus, Earth and Mars.

Outer Planets Include Jupiter, Saturn, Uranus and Neptune.

<i>Inner Planet</i>	<i>Outer Planet</i>
They are called Terrestrial or Rocky planets.	They are called Jovian or Gaseous planets.
They are nearer to the Sun.	They are far away from the Sun.

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According to the International Astronomical Union (IAU), it is a celestial body in direct orbit of the Sun that is massive enough that its shape is controlled by gravitational forces, but has not cleared its neighbourhood. e.g., Pluto, Ceres, Eris, Makemake and Haumea.

A light year is the distance light travels in one year at the speed of $3 \times 10^8 \times \text{m/s}$.

Astronomical unit is one year at the speed of $3 \times 10^8 \times \text{m/s}$. mean distance between Earth and Sun.

