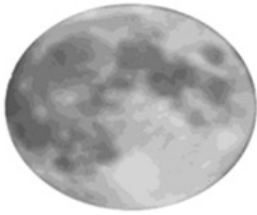


Introduction

Have you seen the night sky? Isn't it beautiful - serene, calm with twinkling stars, pleasant moon and fresh air. In this chapter we will study about the stars, planets, moon and other elements of the Solar system, commonly called the **Celestial objects**.



The Moon



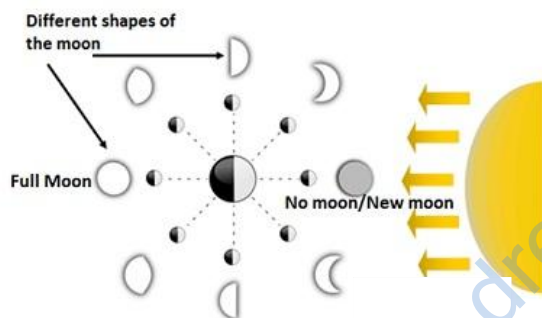
Moon



Craters on the moon's surface

- The moon is the **brightest object** in the night sky.
- The moon does not emit light of its own. It is **non-luminous**. It is visible because it reflects the sun's light that falls on it.
- The moon rotates on its axis and revolves around the earth
- There is no water and no air on the moon. **So, no life can exist on the moon.**
- The surface of the moon has many **craters** of different sizes with a large number of steep and high mountains. The surface is **dusty and barren**.

Phases of the Moon



Legend:



Earth : The black portion indicates 'night' side and white indicates 'day' side of the Earth

- The moon changes its shape everyday over a period one month and this repeats over and over again. These different shapes of the moon are called '**Phases of the Moon**'. In reality, the moon does not change its shape at all. Moon is always round in shape. As we know the moon is always visible because it reflects the light from the sun.
- It goes from a perfect round circle and gradually reduces in size and further becomes a no moon (as shown here). This takes about 15 days **This is called waxing.**
- Then the moon again begins to grow in size until it becomes a full moon. This takes another 15 days **This is called waning.**
- The total span between **2 full moons is approximately 30 days nearly a month**
- At any point of time, **the sun is able to illuminate only half part of the moon** The other half of the moon does not receive any portion of sunlight because of its spherical shape.
- Depending on the these positions of sun, moon, and the earth, **different proportions of the illuminated moon faces the earth**, causing the shape of the moon appearing to change as seen from earth.
- On a **full moon day**, when the moon appears as a bright complete circle, the earth is directly between the moon and the sun. The illuminated surface of the moon fully faces the earth, making the moon appear round.
- On a **new moon phase**, the moon is between the Sun and Earth. This means its light is not reflected to Earth. Instead, the light from the sun bounces back from the earth and causes a slight illumination on the moon.

Stars



The Sun

A Starry Sky

- A **Star** is a tiny, twinkling luminous object in the sky
- **Sun** is the biggest star.
- **Stars** emit light of their own.
- Stars are so huge **in size** but since they are very far away from the earth (even farther than the sun), they appear very **small to the human eye**
- Stars are present **during day time**, but they cannot be seen because of the bright sunlight.
- Stars appear to move from **east to west**. A star which rises in the east in the evening, sets in
- the west in the early morning. The sun rises in the east and sets in the west whereas the earth moves from west to east on its axis
- The **Pole star** is located on the axis of the earth. So, this appears stationary and does not move at all.

Constellations

- A **group of stars** forming a recognisable shape is called a constellation
- Constellations were devised during ancient times by people to help them recognise them. So, they gave them the shapes of familiar objects and people

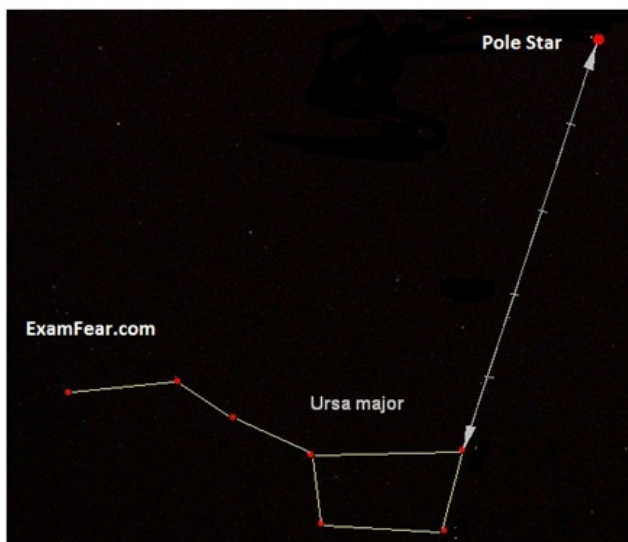
Great Bear



Great Bear

- Also called **Ursa Major, Big Dipper, Saptarshi**
- Generally seen during the early part of the summer.
- It appears like a **big ladle** with **seven prominent stars: 3 stars in the handle and 4 in the bowl.**
- This constellation appears to move from **east to west**

Pole Star



- **Pole star** is located very close to Ursa Major
- This star **does not move** at all.

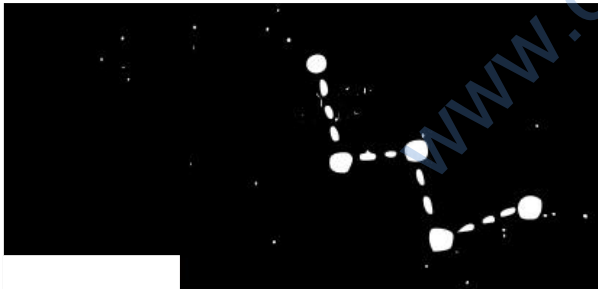
Orion



Orion

- It is also called **Hunter**.
- It can be seen during **winter in the evenings**.
- It is made up of **7 or 8 stars** bright stars
- The brightest star in the star, **Sirius** is located very close to this constellation.

Cassiopeia



Cassiopeia

- It is visible during winter in the early part of the night.
- It vaguely looks like a **M or W**.

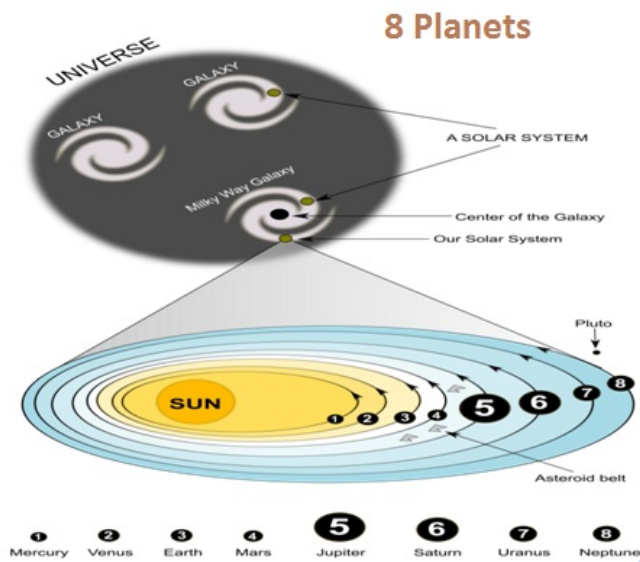
The Sun



Sun

- The Sun is the **nearest star** from us.
- It is the main source of **heat, light and energy for all planets including earth**
- The Sun and His family of 8 planets, satellites and other celestial object is commonly referred to as **Solar System**.



Planets



- There are **8 planets** in the Solar System
 - **Mercury**
 - **Venus**
 - **Earth**
 - **Mars**
 - **Jupiter**
 - **Saturn**
 - **Uranus**
 - **Neptune**
- Mercury, Venus, Earth and Mars are called **Inner Planets**.
- Jupiter, Saturn, Uranus and Neptune are called **Outer Planets**.
- Planets look like stars but they **don't twinkle** because they don't have light of their own.
- They simply reflect the sunlight that falls on them.
- The planets keep **rotating and revolving**. So their position is continuously changing.
- The definite fixed path in which the planets move around the sun is called the **orbit**.

- The time taken by a planet to complete one revolution around the sun is called its **period of revolution**.
- As the distance from the sun increases, the period of revolution of that planet also increases.
- The time taken by a planet to complete one rotation on its own axis is called its **period of rotation**.
- Some planets are known to have moons/satellites revolving round them. These are called its
- **satellite**.
- **Moon is a natural satellite** of the Earth
- There are many man-made satellites revolving round the Earth. These are called **artificial satellites**.
- Generally, inner planets have fewer number of satellites and outer planets have more number of satellites.

Planets and their Features

Planet	Features	Picture
<p>Mercury(Budh)</p>	<ul style="list-style-type: none"> • It is the planet nearest to the sun • It is the smallest planet in the solar system • Since it is closed to the sun, it is often hidden by the sun's bright light. So, it can be observed early in the morning or late in the night in places which are open and not obstructed by trees and tall buildings • It does not have any satellites 	 <p style="text-align: center;">Mercury</p>
<p>Venus (Shukra)</p>	<ul style="list-style-type: none"> • Earth's nearest neighbor • Brightest planet in the sky and can be spotted easily and often. • Venus appears in the eastern sky before sunrise. Sometimes, it appears in the western sky just after sunset. Therefore it is often called a morning or an evening star. • It shows up in various phases like the moon • No satellites of its own. • It rotates from east to west 	 <p style="text-align: center;">Venus</p>

Earth

- It is the only planet where life is known to exist.
- It is because of the following reasons
 - Right temperature
 - Presence of water
 - Presence of atmosphere
 - Presence of Ozone layer
- The earth appears bluish-green in space because of the reflection of light from water and landmass on its surface
- Moon is earth's only natural satellite
- The axis of rotation of the earth is slightly tilted which is the reason for season's on earth



Earth

**Mars
(Mangal)**

- It appears reddish and is often called the 'Red planet'
- It has 2 small natural satellites





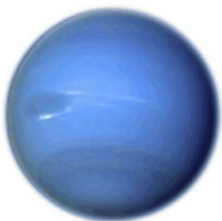
Mars

**Jupiter
(Brihaspathi)**

- It is the largest planet in the solar system.
- It is about 1300 times bigger than earth and about 318 times heavier than Earth

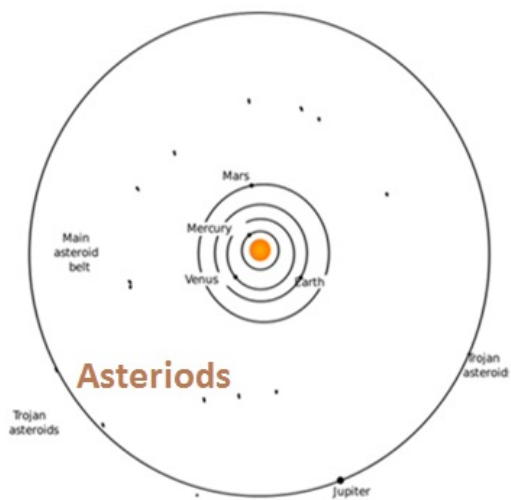


Jupiter

	<ul style="list-style-type: none"> • It rotates very rapidly on its axis • It has many satellites • It is quite bright and can be seen in the night sky along with its 4 large moons. 	
Saturn (Shani)	<ul style="list-style-type: none"> • It appears yellowish in colour • It is beautiful and different because of its rings. But these rings cannot be seen with the naked eye. It can be viewed only with a telescope. • It is less dense than water and least dense among all planets 	 <p>Saturn</p>
Uranus	<ul style="list-style-type: none"> • It has a highly tilted axis because of which it appears that it rolls around the sun. • It can only be seen with a telescope. • It moves from east to west 	 <p>Uranus</p>
Neptune	<ul style="list-style-type: none"> • Last planet of the solar system • It can only be seen with a telescope • It has a large number of satellites 	 <p>Neptune</p>

Asteroids

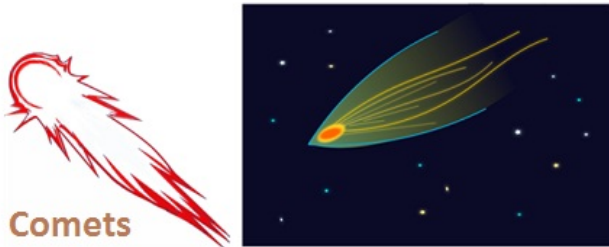
- Asteroids are rocky-metallic like objects which range in size from tiny to They orbit around the sun, but they are too small to be considered planets .
- There is **a very large gap in between the orbits of Mars and Jupiter which is occupied by a large number of small celestial objects called asteroids**
- They can only be viewed using telescopes.



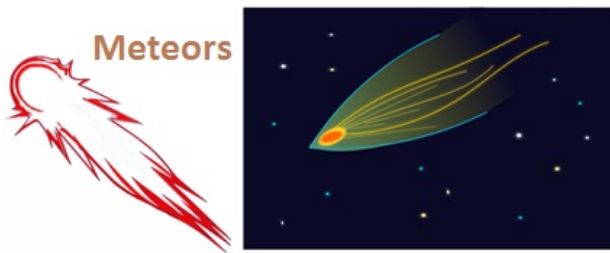
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Comets

- Comets are celestial objects which revolve around the Sun in **elliptical orbits with a very large period of revolution.**
- A comet appears as a **bright head with a long tail**, whose direction is always **opposite to that of the sun**
- The **tail's length** always grows in size as it approaches the Sun
- **Comets appear periodically.**
- **Halley's comet** appears once in 76 years, the last being 1986.



Meteors and Meteorites



- Meteors are commonly called '**Shooting Stars**' because they appear like bright streaks of light falling from the sky.

A meteor enters the earth's atmosphere at very high speeds. At such high speeds the friction generated with the earth's atmosphere heats it up. Thereby it **momentarily glows and because of the high heat also evaporates very quickly**

Artificial Satellites

Artificial Satellite



- Artificial Satellites are man-made objects which revolve around a planet just like natural satellites do.
- While moon is the natural satellite, Earth has many Artificial Satellites.
- They revolve around the Earth
- They are used for **weather forecasting, transmission of radio signals.**
- **Aryabhata** was the first Indian satellite launched in 1975
- Some other satellites by India are **Bhaskara (1979) , Rohini (1980), INSAT-4C (2006), Chandrayaan (2008)**