COSMOLOGY AND SOLAR SYSTEM

- **GEOGRAPHY CLASS SCHEDULE**

Total class duration – 15 hours

Per class duration -45 to 60 mins

Total recorded sessions-9

Total live session -6

class	Live/recorded
Cosmology and solar system	recorded
Our earth	recorded
Question answer discussion	Live
climate	rec0rded
Layers of atmosphere	recorded
Question answer discusion	Live
Major continents	recorded

Question answer discussion	Live
Indian physiography	recorded
Question discussion	live
Soils in india	Recorded
Natural vegetation and agriculture in India	recorded
Question discussion	live
Mineral resourses transport and communication	recorded
Question discussion	Live

What Is Planet?

The word planet means '*wanderer*'. This is because the planets do appear to wander listlessly across the night sky. The stars also move across the sky from east to west, but relative to each other, they appear fixed. The planets, on the other hand, seem to move relative to the fixed stars in backward and forward directions. This is

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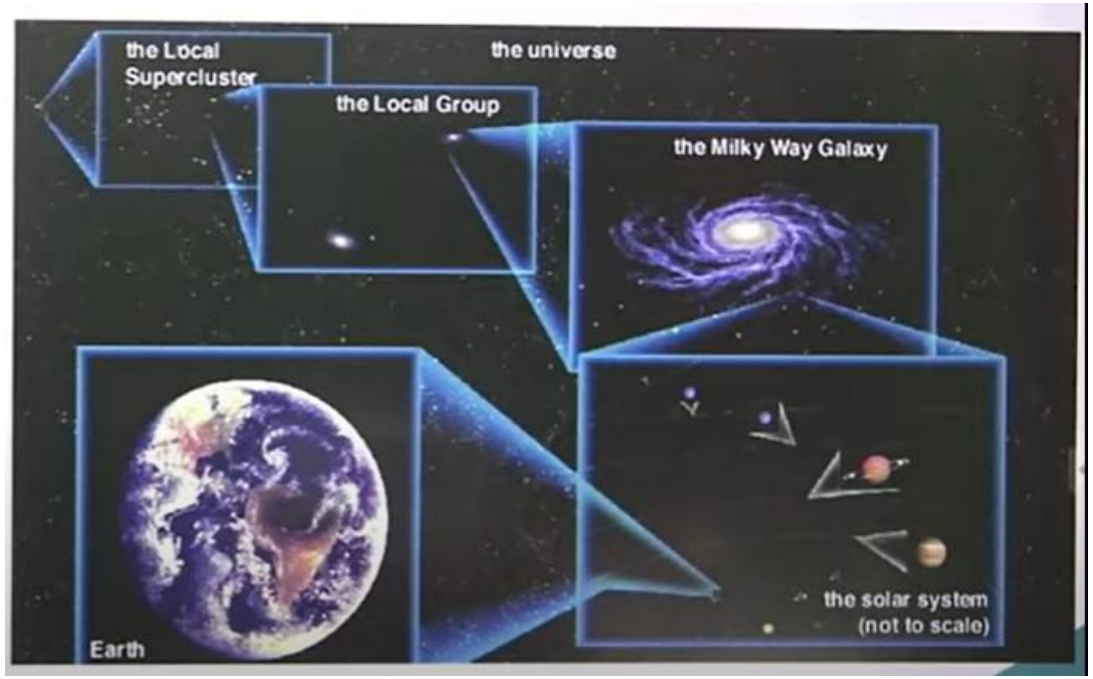
A planet is a large celestial body that revolves around the sun in fixed orbits. Planets do not have any light of their own but reflect the light of the sun. Planets also do not twinkle like stars because they are much closer to us. The earth is also a planet and is the only place we know in the universe to harbour life.

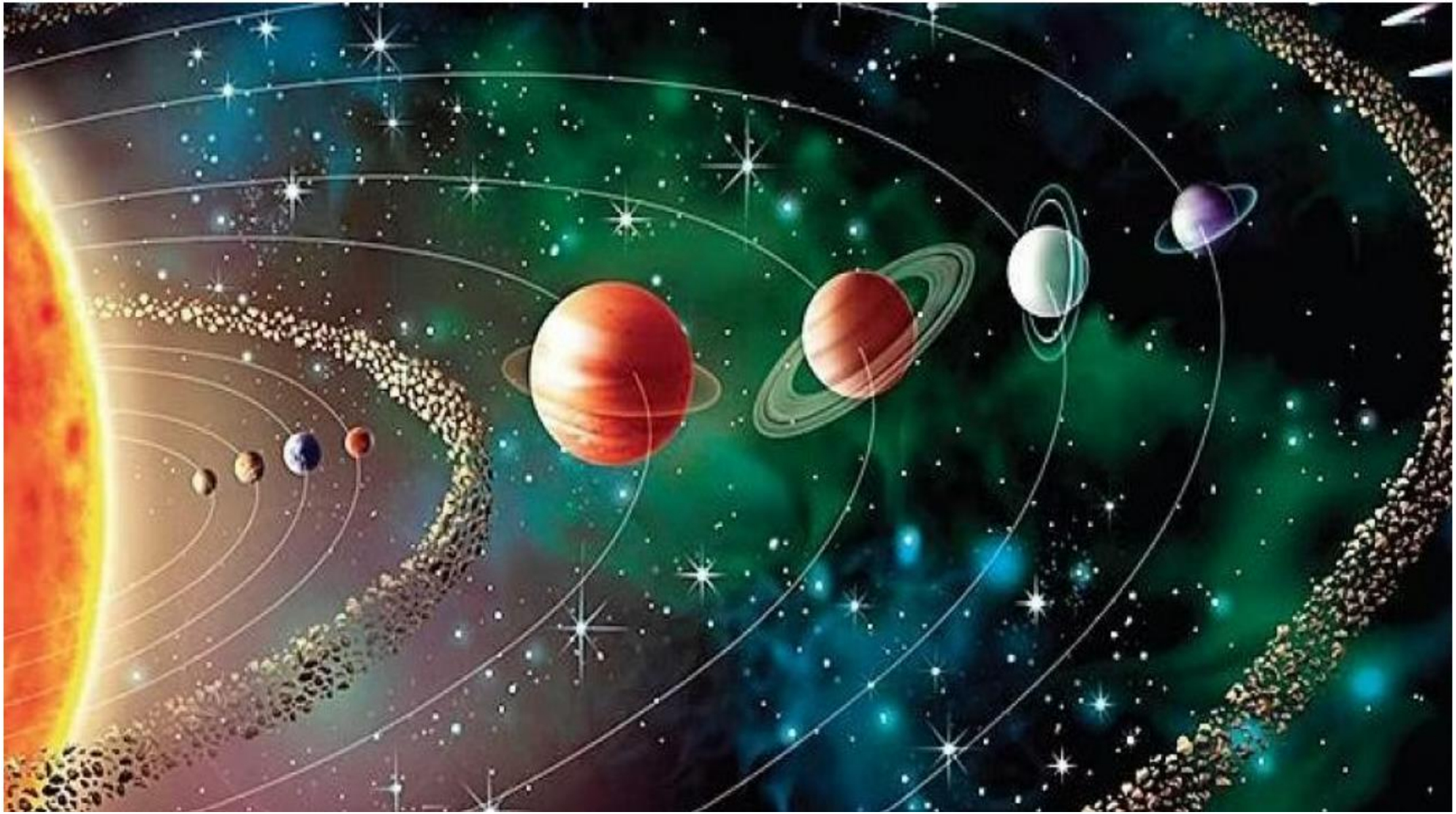
What Are Satellites?

Planets have other objects that orbit them. These are called **satellites**. The Moon is the Earth's satellite. Mercury and Venus are the only two planets without any satellites.

SOLAR SYSTEM

The sun, nine planets, satellites, asteroids and meteoroids form the solar system.



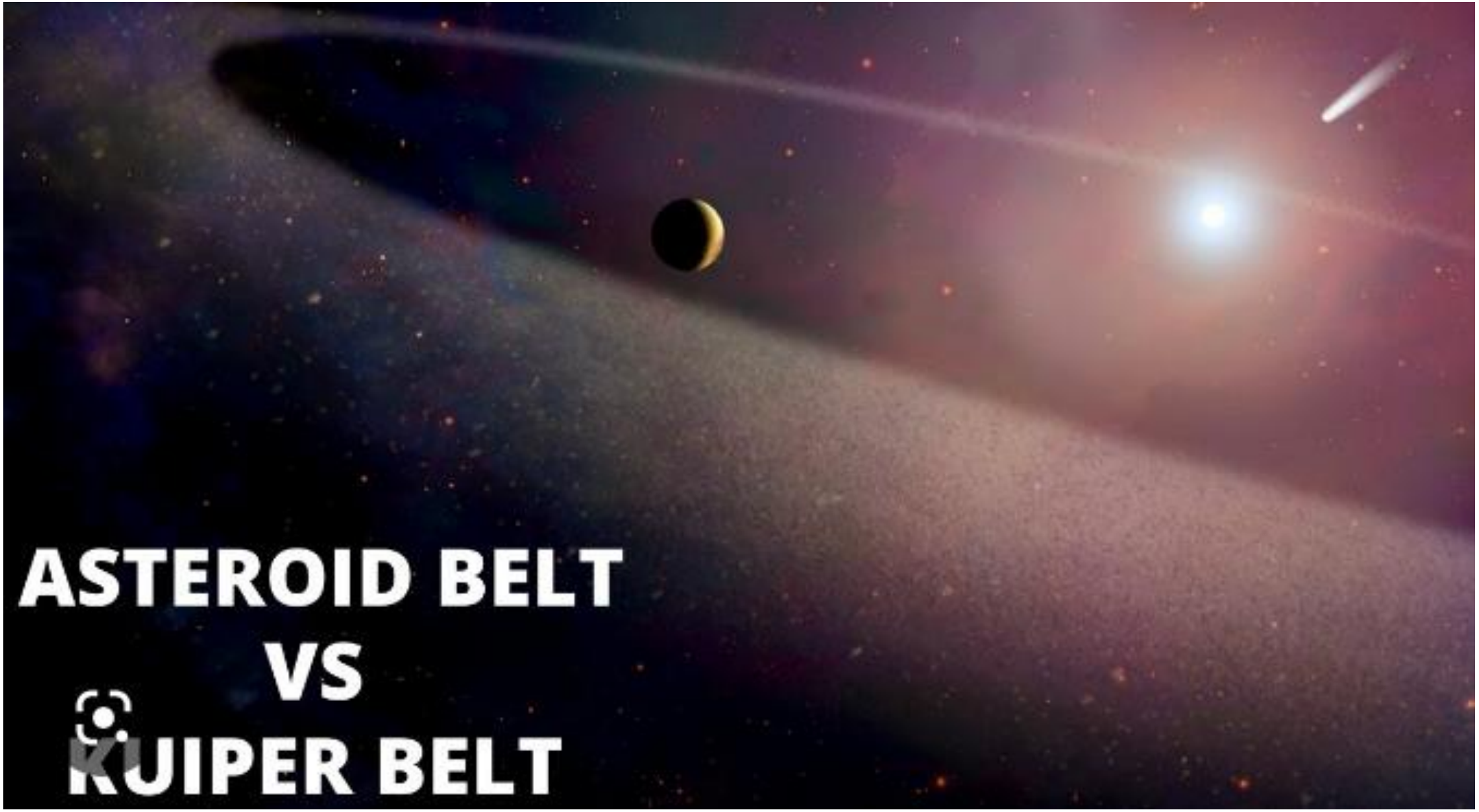


Inner Planets

- Small and Rocky
- Solid Surface
- Low mass
- High Density
- Close to sun
- Closely spaced orbits
- Few moons (if any)
- No rings
- Terrestrial Planets
- Mercury,Venus,Earth,Mars

Outer Planets

- Large and Gaseous
- No solid surface
- High mass
- Low Density
- Far from sun
- Separated orbits
- Many moons
- Many rings
- Gas giants
- Jupiter,Saturn, Uranus, Neptune

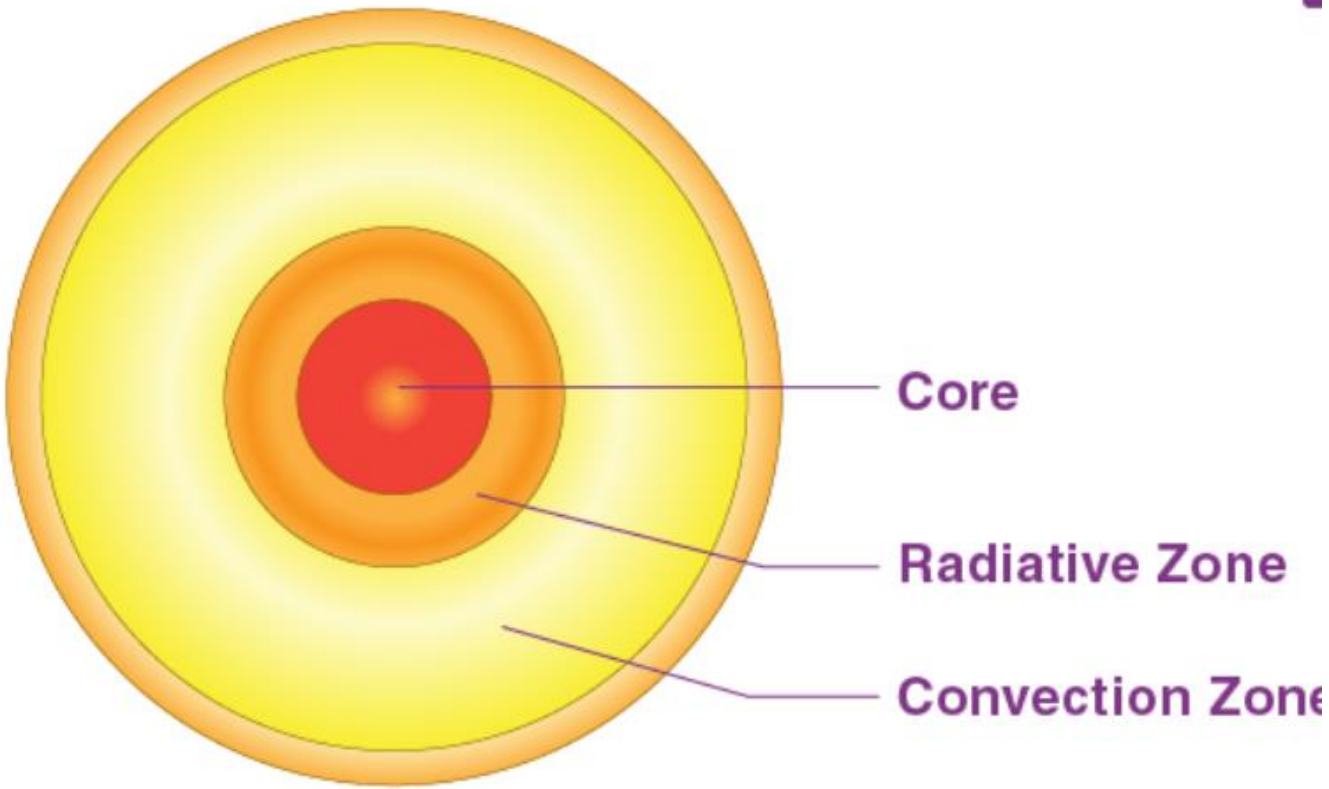

ASTEROID BELT
VS
KUIPER BELT

Difference Between Asteroid and Meteoroid

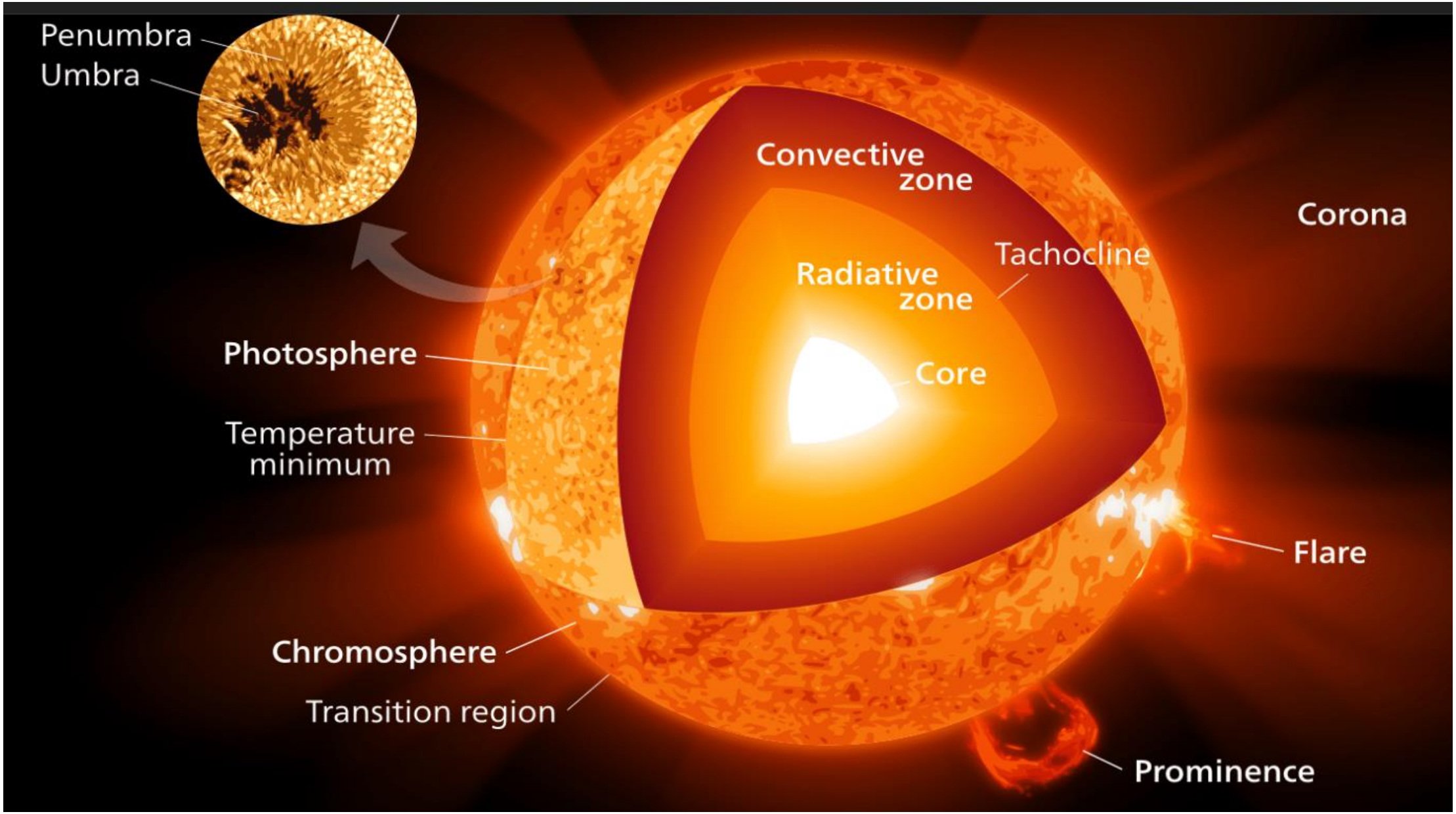
Asteroid	Meteoroid
Asteroids are minor planets.	Meteoroids are falling stars.
The orbital shape is elliptical and orbits the Sun	The orbital shape is elliptical and orbits the Sun but gets pulled into larger bodies.
Believed to be a leftover from the planet	Believed to be a smaller disintegrated element of comet or asteroid.
Does not have an atmosphere	Does not produce an atmosphere, but burn up when falling into a planet.
1 to more than 100 kilometres in diameter	Typically, less than 10 metres.

Internal Structure and Atmosphere of the Sun

The atmosphere of the Sun is formed by its outer layers. There are primarily three layers that make up the atmosphere which is named as the core, the radiative zone, and the convective zone. These are the internal parts of the Sun.



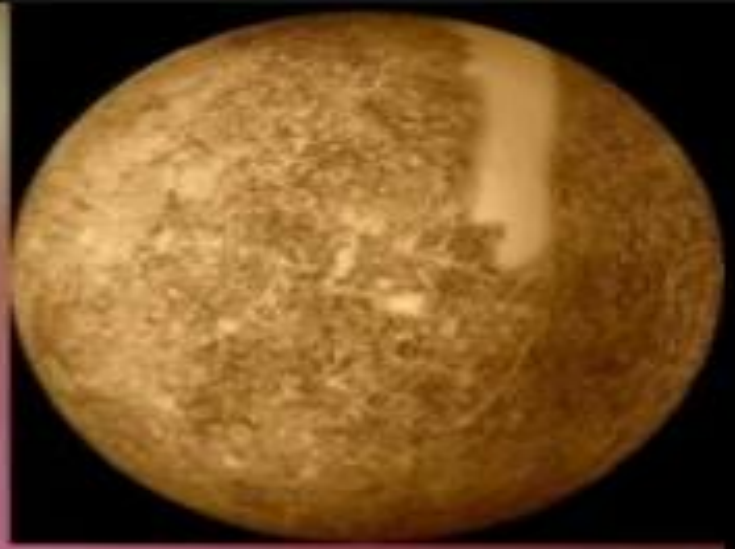
Internal Structure of the Sun


Penumbra
Umbra
Convective zone
Corona
Tachocline
Radiative zone
Photosphere
Core
Temperature minimum
Flare
Chromosphere
Transition region
Prominence

EARTH

- It is the third nearest planet to the sun and fifth largest planet of our solar system.
- The earth is a unique planet because it supports life.
- It is also called the blue planet.
- Its shape is Geoid.

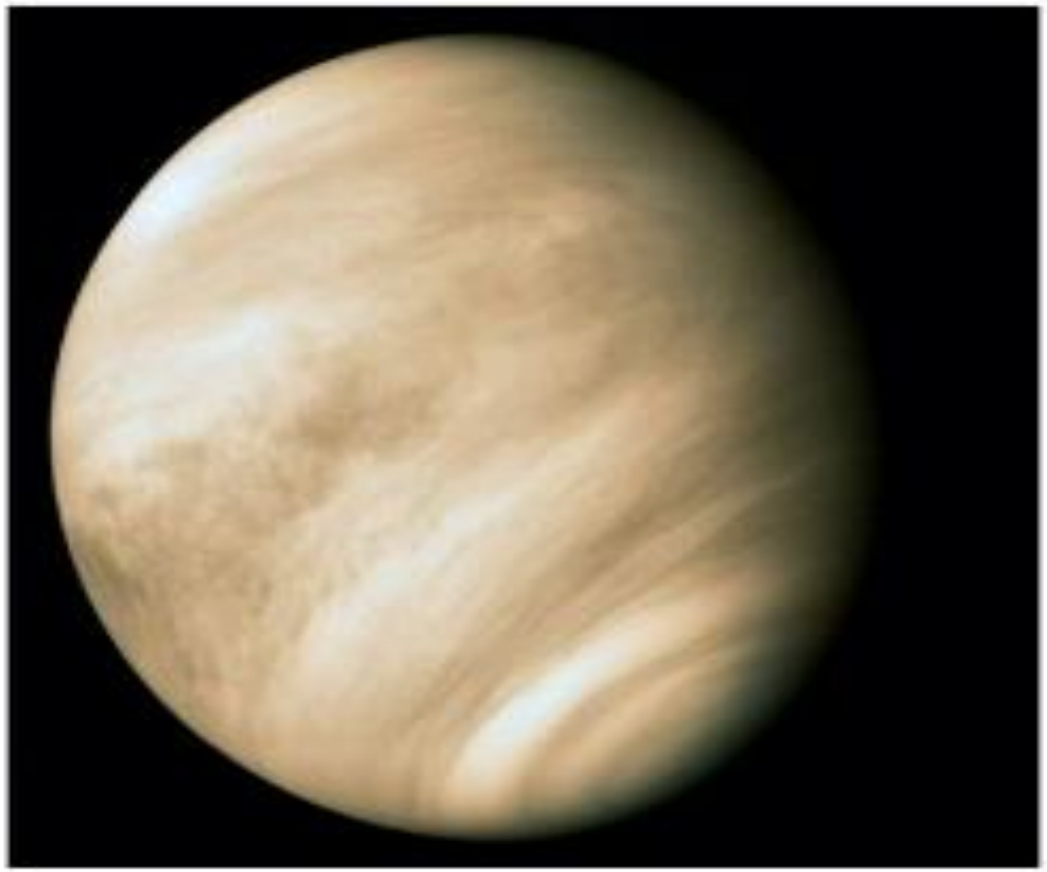
Mercury



- Characteristics:
  - Smallest and closest to the sun
  - Dense with large Iron core
  - Fastest moving planet - 88 day revolution
- Temperature and Atmosphere:
  - It takes 88 days for sunrise to sunset
  - During the day, temperature = 430 deg. C
  - At night, temperature = 170 deg. C
  - Virtually NO atmosphere - temp makes particles move fast, little gravity makes it easy for particle to escape into space

Venus

- Venus is the second planet from the Sun.
- Venus is the hottest planet at 482 °C
- Venus is covered with pale clouds which makes it difficult to see the surface of the planet.
- No life can exist on Venus.
- Venus has no moons.
- One day on Venus lasts 243 earth days.
- Venus has a tilt of 177 ° which means that it spins in a clockwise direction
- It takes 225 days to orbit the Sun.



Jupiter

- Fifth planet from the sun
  - largest planet in the solar system, more than 300 times that of Earth
  - orbital period is almost 12 years
  - rotates on its axis faster than any other planet (every 9 hours & 50 min)
  - has at least 63 moons, 4 of which are the size of small planets
  - has several thin rings that are made up of millions of particles

Saturn's Physical characteristics

- Saturn Has rings.
- Saturn has a very hot interior, reaching 11,700 °C at the core.
- It also has a magnetic field.
- The outer atmosphere of Saturn has traces of ammonia, acetylene, ethane, phosphine and methane.
- Saturn is the least dense of the planets.

Characteristics of Uranus

- 7th planet from the sun
- Radius: 15,759 miles (25,362 km)
- Mass: 86.81E24 kg (Earth's Mass: 14.54)
- Uranus is the coldest planet -224 Celsius
- Color: Blue
- Distance from the sun: 1,787,000,000 miles (2,877,000,000 km)

NEPTUNE

- Neptune is one of the four gas giants in our Solar System, as well as being one of the four Jovian planets.
- As a gas giant, Neptune has no solid surface, so even if a spaceship could reach it, it could not land because it would simply keep sinking into the planet.
- Neptune cannot be seen with the naked eye and was therefore not discovered until 1846.
- Although Neptune is a gas giant, it is actually in a subclass of gas giants known as ice giants. It has a higher percentage of “ices” in its atmosphere.

Atmosphere and Water Comparisons

Sun

- Hot gases in atmosphere (hydrogen & helium)
- No water

Earth

- Oxygen & nitrogen atmosphere
- Surface covered ¾ in water

Moon

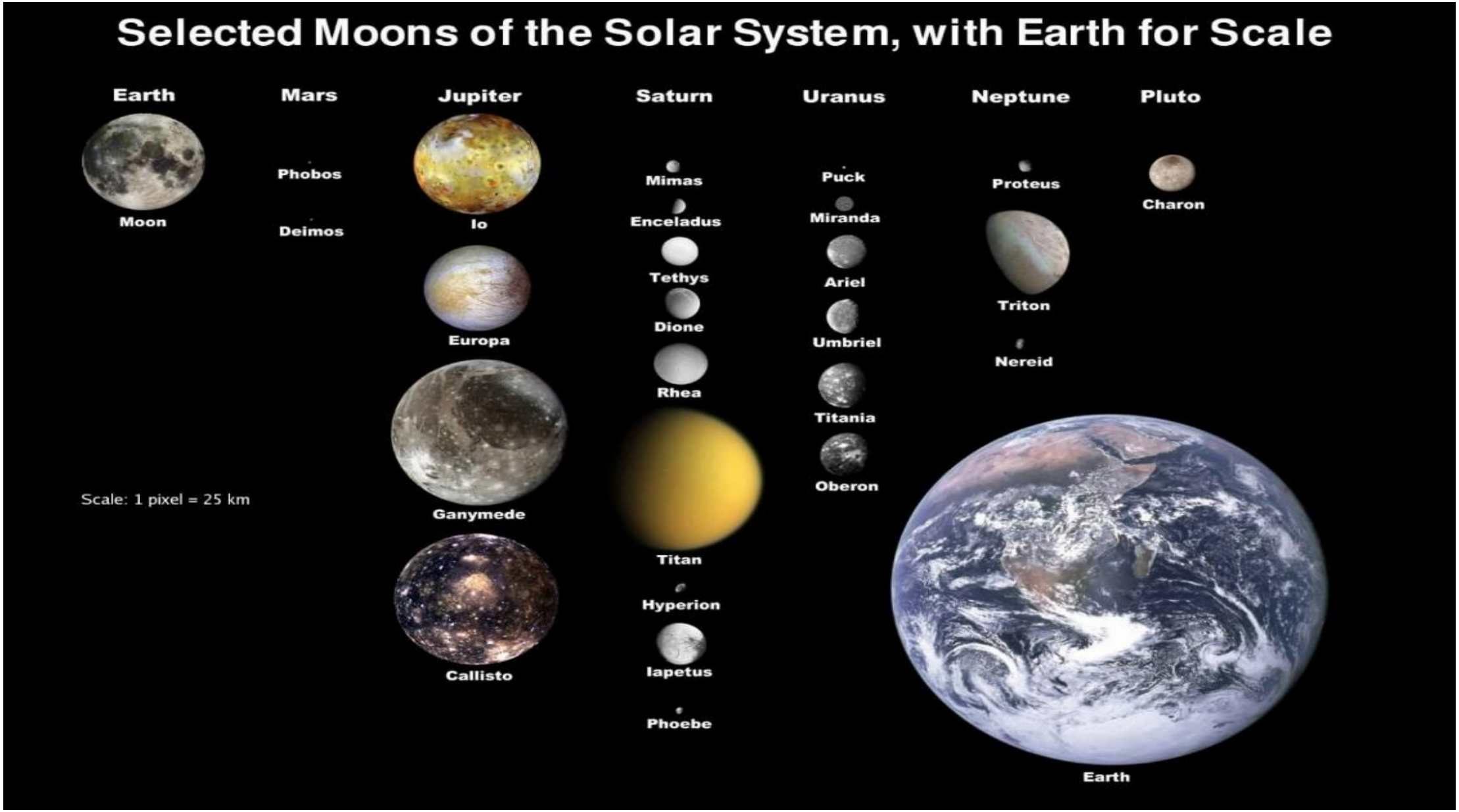
- No atmosphere
- Amount of water not known

MOON

1. The moon is a natural satellite of the Earth.
2. It revolves round the earth in a definite regular path.
3. The moon is about one fourth the size of the Earth and its weight is about one eighth of our Earth.
4. Its surface is covered with hard and loose dirt, craters and mountains.
5. On the moon, days are extremely hot and night are very cold.

Moon

- Its diameter is only one-quarter that of the earth.
- It is about **3,84,400 km** away from us.
- A ray of light from the sun takes about **eight minutes** to reach the earth. Light takes only a second to reach us from the moon.
- The moon is **tidally locked** to the earth, meaning that the moon revolves around the earth in about **27 days** which is the same time it takes to complete one spin.
- Tidal locking is the name given to the situation when an **object's orbital period matches its rotational period**.
- As a result of tidal locking, **only one side of the moon is visible to us on the earth**.
- The moon is a significant **stabiliser of Earth's orbital axis**. Without it, Earth's tilt could vary as much as 85 degrees (at present the Earth's axis of rotation is tilted at an angle of **23.5°** relative to our orbital plane).
- **Neil Armstrong** was the first, and **Buzz Aldrin** was the second to step on the surface of the moon on **29 July 1969 (Apollo 11 mission)**.


Selected Moons of the Solar System, with Earth for Scale
Earth
Moon
Mars
Phobos
Deimos
Jupiter
Io
Europa
Ganymede
Callisto
Saturn
Mimas
Enceladus
Tethys
Dione
Rhea
Titan
Hyperion
Iapetus
Phoebe
Uranus
Puck
Miranda
Ariel
Umbriel
Titania
Oberon
Neptune
Proteus
Triton
Nereid
Pluto
Charon
Scale: 1 pixel = 25 km
Earth

ASTEROIDS

- They are numerous tiny bodies which move around the sun between the orbits of Mars and Jupiter.
- The largest asteroid is the Ceres.

Asteroid belt

- Asteroids are remnants of planetary formation that circle the Sun in a zone lying **between Mars and Jupiter**. The circular chain of asteroids is called the asteroid belt.
- The remnants of planetary formation failed to coalesce because of the gravitational interference of Jupiter.
- The asteroid belt lies between 2.3 and 3.3 AU from the Sun.
- Asteroids (**planetoids** — another term for an asteroid) are composed mainly of refractory rocky and metallic minerals, with some ice.
- Asteroids range in size from hundreds of kilometres across to microscopic.
- All asteroids except the largest, **Ceres**, are classified as small Solar System bodies.
- Fragments of asteroids break off to form **meteoroids**, which can reach the Earth's surface.

METEOROID

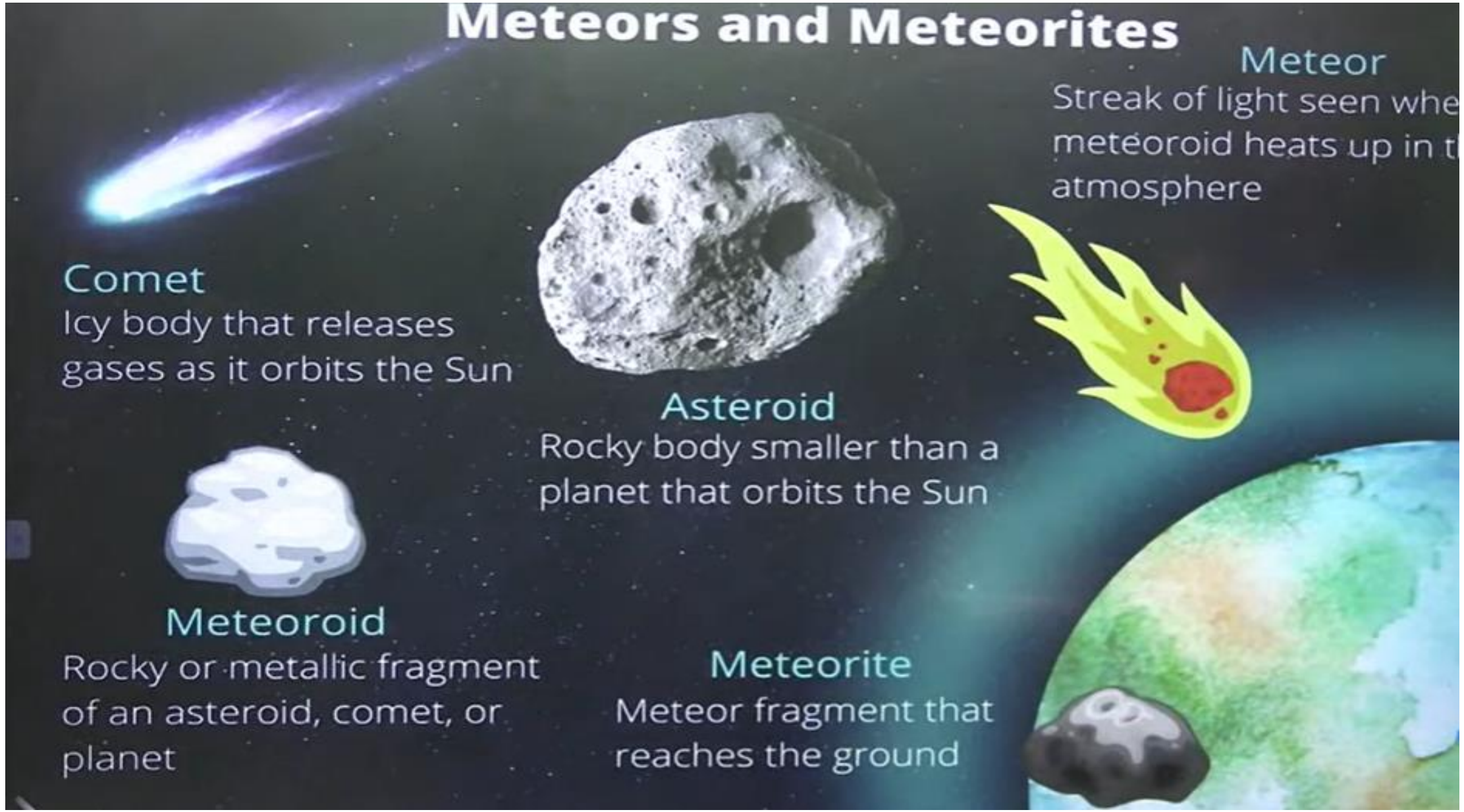
- The small pieces of rocks which move around the sun are called meteoroids.
- Our solar system is a part of the Milky Way galaxy.
- Milky Way galaxy was named Akash Ganga.
- There are millions of galaxies that make the Universe.


ASTEROIDS
Pen
COMETS
METEORITES
METEORS

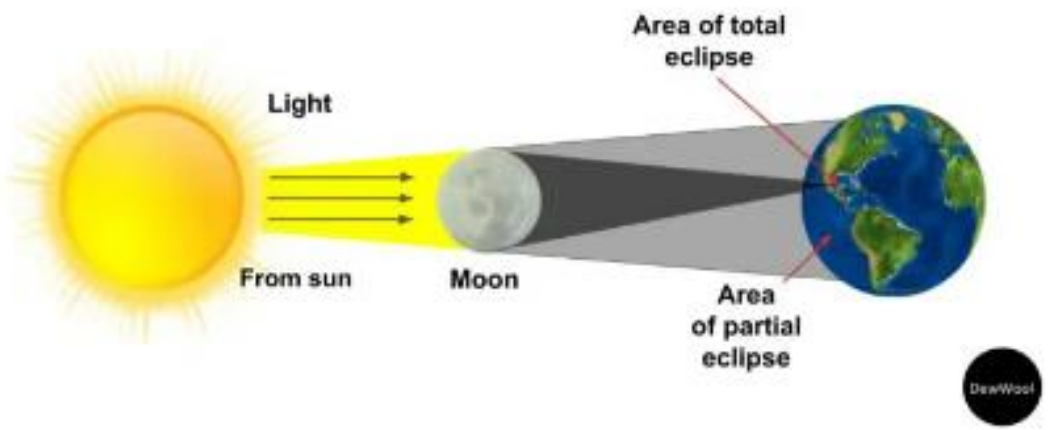
Meteoroid, Meteor and Meteorite

- **A meteoroid** is any solid debris originating from **asteroids, comets or other celestial object** and floats through interplanetary space.
- A **meteor** is the streak of light that appears in the sky when a meteoroid enters the atmosphere (**mesosphere**) at about 200 km at high speed and burns up because of the friction.
- A meteor is popularly termed a **'shooting star'** or '**falling star**'.
- In some cases, the meteoroid does not burn up completely and makes its way to the Earth's surface. The surviving chunk is called a **meteorite**.
- The circular depression created on the earth's surface after the meteorite's impact is called as a **meteorite crater**.
- Meteorite impacts are common on all planets and moons in the solar system.
- The most conspicuous meteorite craters can be found on the surfaces of the **Moon** and **Mercury** (because they are geologically inactive due to negligible atmosphere).

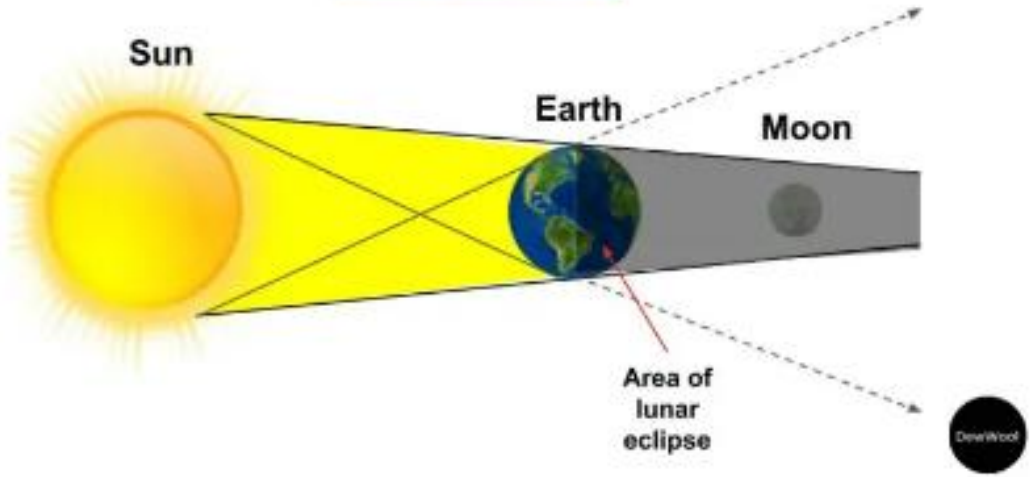
Meteors and Meteorites



Solar Eclipse



Lunar Eclipse



Solar eclipse	Lunar eclipse
The solar eclipse is the one in which the moon is in between the earth and the sun	The lunar eclipse is the one in which the Earth is in between the sun and the moon
Occurs once in 18 months	Occurs twice a year
Lasts for about 5-7 minutes	Lasts for an hour
Witnessed in a few places	Witnesses in many places
Occurs during day-time	Occurs during night-time
The solar eclipse happens in the new moon phase	The lunar eclipse happens in the full moon phase
If directly seen through the naked eyes then there are high chances of losing vision as it damages the retina	Witnessing lunar eclipse with bare eyes is harmless compared to the solar eclipse

During solar eclipse

1. The earth comes in between the sun and the moon
2. The moon comes in between the sun and the earth
3. The moon comes exactly halfway between the earth and the sun
4. The sun comes in between the earth and the moon

'*Great Bear*' is the name of a:

1. Galaxy
2. Moon
3. Constellation
4. Star

The approximate period between two consecutive new moons is _____ days.

1. 15.5
2. 29.5
3. 14.5
4. 28.5

Which among the following planets is also known as Veiled Planet?

1. Venus

2. Mars

3. Jupiter

4. Uranus

Asteroids are found between the orbits of

1. Saturn and Jupiter
2. Mars and Jupiter
3. The Earth and Mars
4. Saturn and Uranus

Which planet is made up of thick white and yellowish clouds of sulfuric acid?

1. Uranus
2. Venus
3. Neptune
4. Mars

Which of the following planets is called the yellow planet?

1. Uranus

2. Earth

3. Mars

4. Venus

Which Planet has largest number of natural satellites?

1. Mars

2. Jupiter

3. Venus

4. Saturn

Which is the hottest planet of our solar system?

1. Venus

2. Pluto

3. Mars

4. Mercury

Which planet is called red planet due to its rock Iron Oxides?

1. Mars
2. Jupiter
3. Saturn
4. Venus

Heavenly matter landing on the earth’s surface is known as?

1. Meteorite
2. Shooting star
3. UFO
4. Galaxy