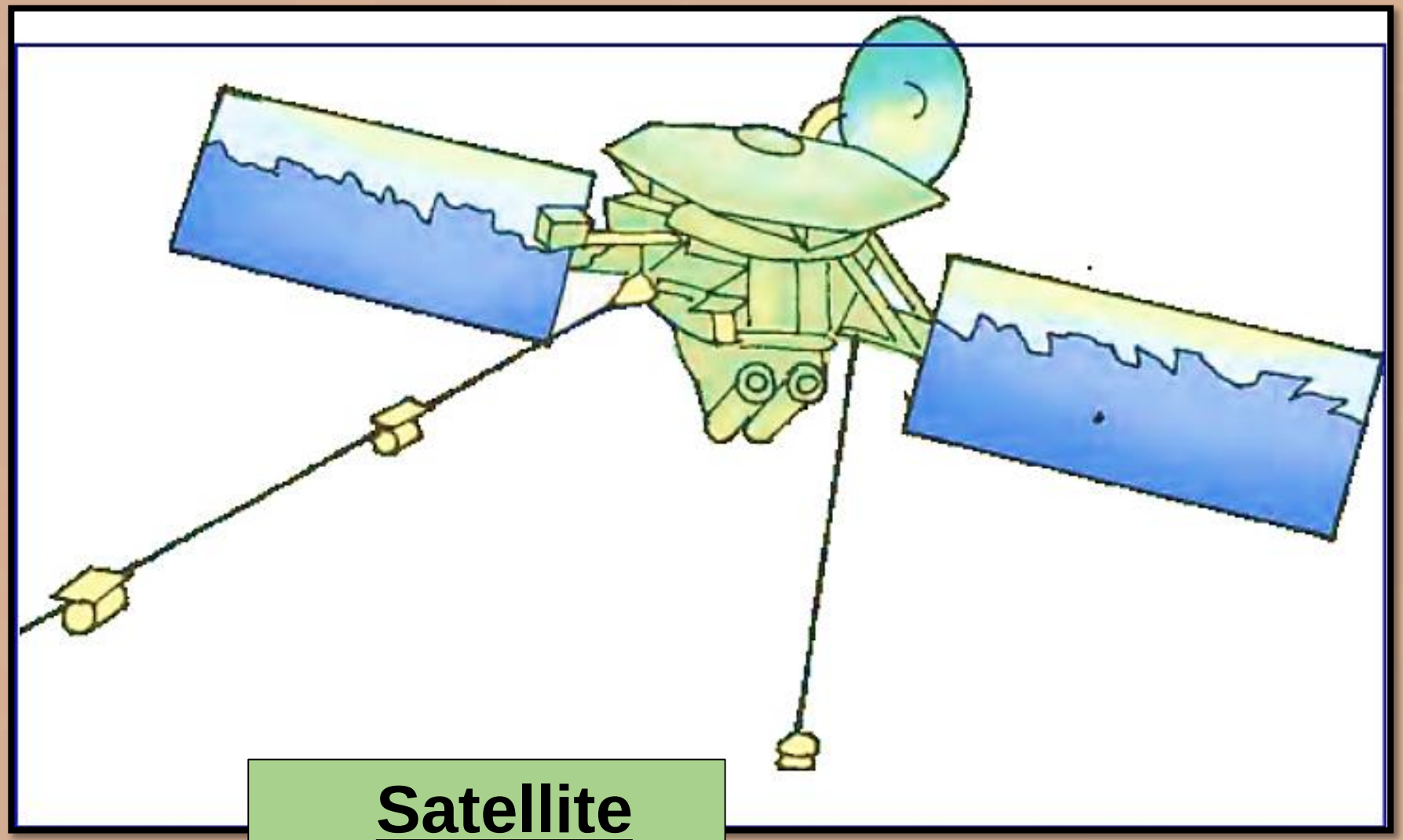
# Earth’s Natural Satellite

## Notes

# INTRODUCTION

In previous chapter you have studied about the planets, solar system and the earth. In this chapter you will study about another objects found in outer space called Satellites . Satellites are small heavenly bodies that revolve around the planets. Some planets have their own satellites.



**Satellite**

**A satellite is an object that revolves around a planet.**

**You know that earth and all the other planets revolve around the sun, but, do you know what revolves around the earth?**

It is the Moon. It revolves around the earth therefore it is called the natural satellite of earth. Satellites could be natural or artificial. Artificial satellites are man – made.

**Earth and moon**

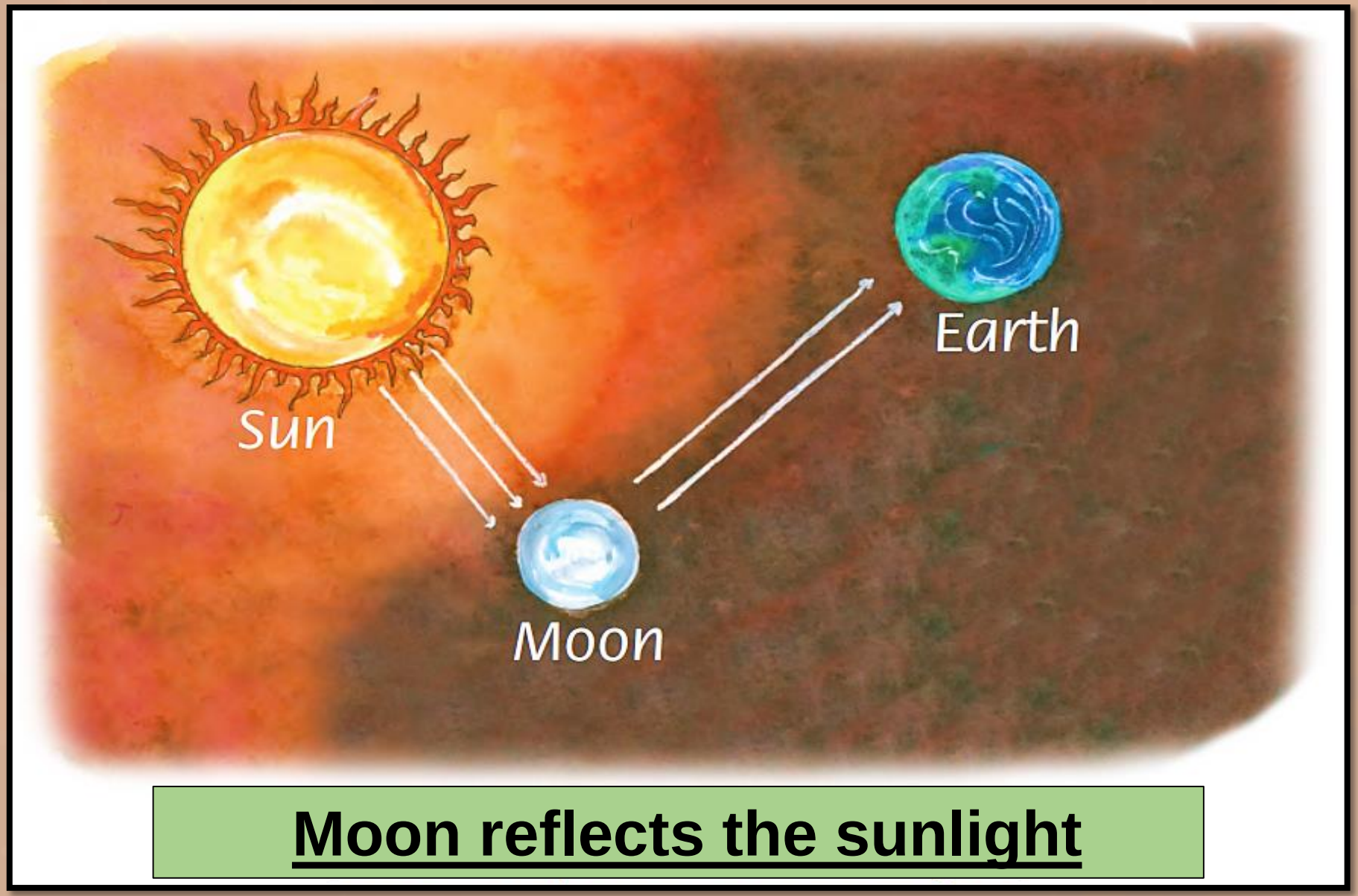
# MOON

Moon is the natural satellite of earth that orbits around the earth. Moon is considered to be closest to the earth than any other planet. It is about 3,84,400 km away from earth. Sun and moon appear to be of the same size, although sun is much bigger. This is because moon is closer to the earth. Moon is even smaller than the earth.

**Moon**

## How does the Moon Shine?

You have learnt that all the planets do not shine. From the earth, we see only the sun and the moon. Sun shines because of gases like hydrogen and helium that react in its core. These reactions release large amount of energy and light, which in turn makes the sun shine. But on moon nothing of this sort happens, then what makes it shine?




**Moon reflects the sunlight**

Moon does not have its own light, it reflects the light of the sun that falls on it. Moon is brightest in its full moon phase.

**Moon as seen from the earth**

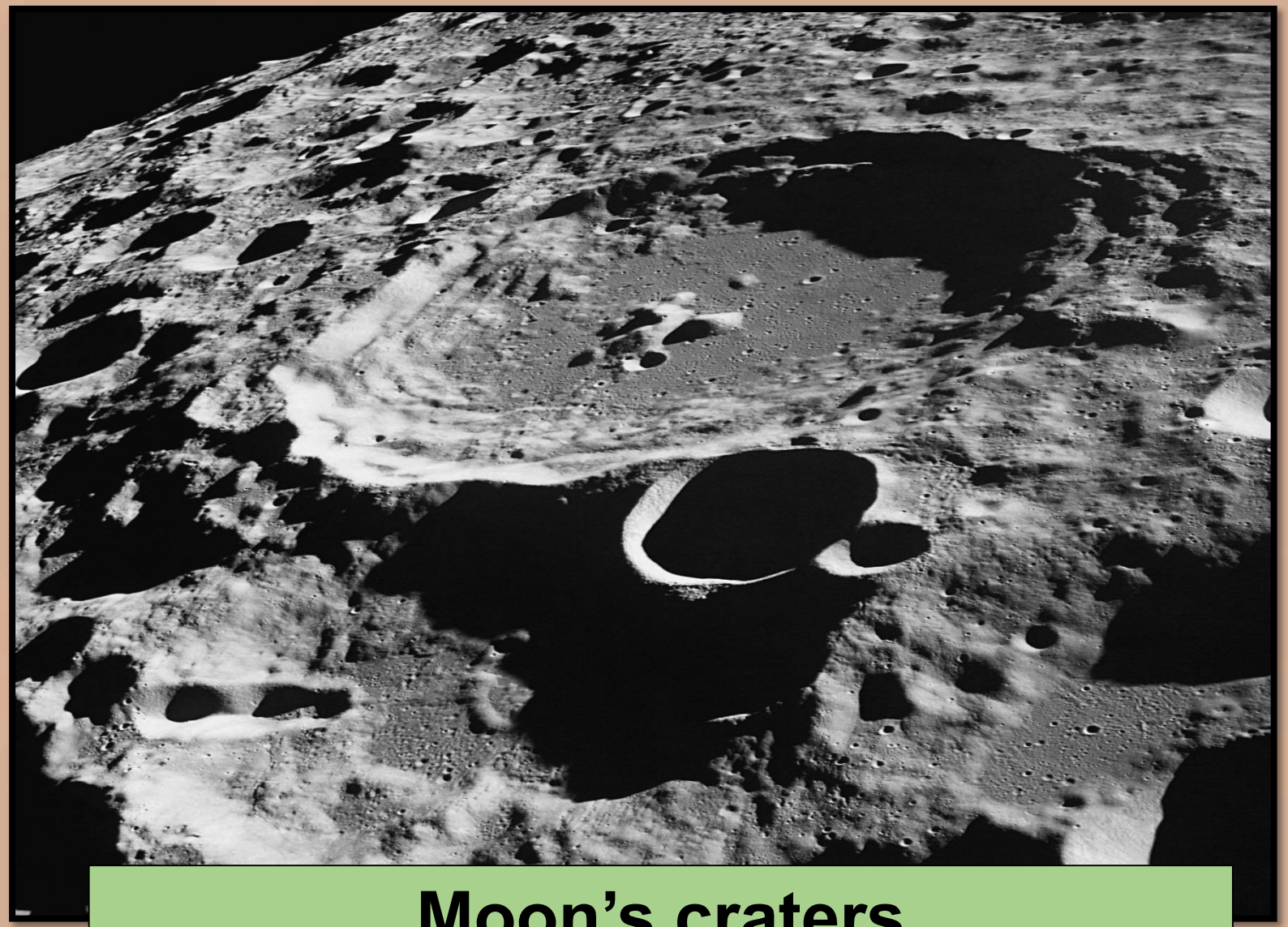
# Physical Features

- Moon is nearly as old as the earth, approximately 4,500 million years.
- It is the fifth largest satellite in the solar system. Moon is the second densest natural satellite found in the solar system.

## DID YOU KNOW ?

Mercury and Venus have no satellites. Earth has one large satellite known as the moon and Mars has two tiny moons. Bigger planets like Saturn and Jupiter are known to have thirty-one and sixty-three moons respectively.

- **Moon has a very uneven, haphazard and rough surface due to millions of craters.**
- **Craters are the big hollow holes in the surface of the moon. Large rock pieces called meteorites hit the moon surface and form craters.**



**Moon’s craters**

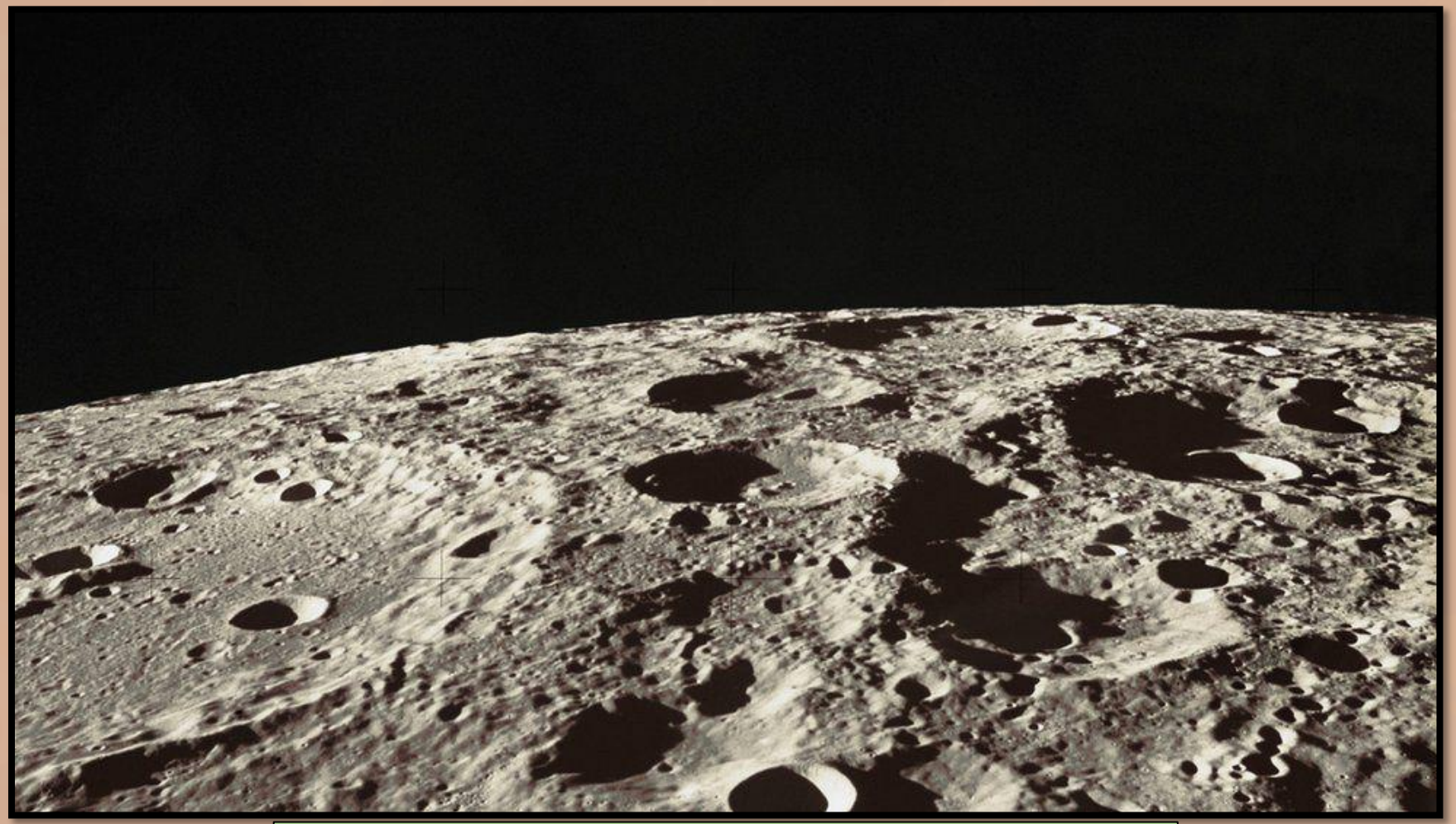
- **It has mountainous and rocky plain.**

**Rocky plain of moon**

# Life on the Moon

There is no life on the moon. Life cannot exist there, as the basic necessities for life—air and water do not exist there. Any kind of sound cannot be heard on the moon due to the absence of air. Moon is very barren and deserted satellite, with no flora or fauna at all.

The gravitational force of the moon is much weaker than that of the earth, about 1/6$^{th}$ only. We can easily lift heavy objects there. This weak gravitational force cannot hold the atmosphere. One cannot protect himself from the harmful rays of the sun and meteors hitting the moon in the absence of atmosphere. The side of the moon which faces sun is very hot and the opposite side is extremely cold.



**Moon’s surface**

There are no weather changes, no clouds, no rain on the moon. The sky always appears black and dark.

Moreover, the temperature of the moon has an extreme range from +150°C to —110°C. The moon has no tilt in its axis around which it rotates and therefore no seasons to speak of.

# Phases of Moon

You must have seen that moon appears in different shapes, when looked from the earth. These different shapes are its phases.

New moon

Crescent

Half moon

Gibbous

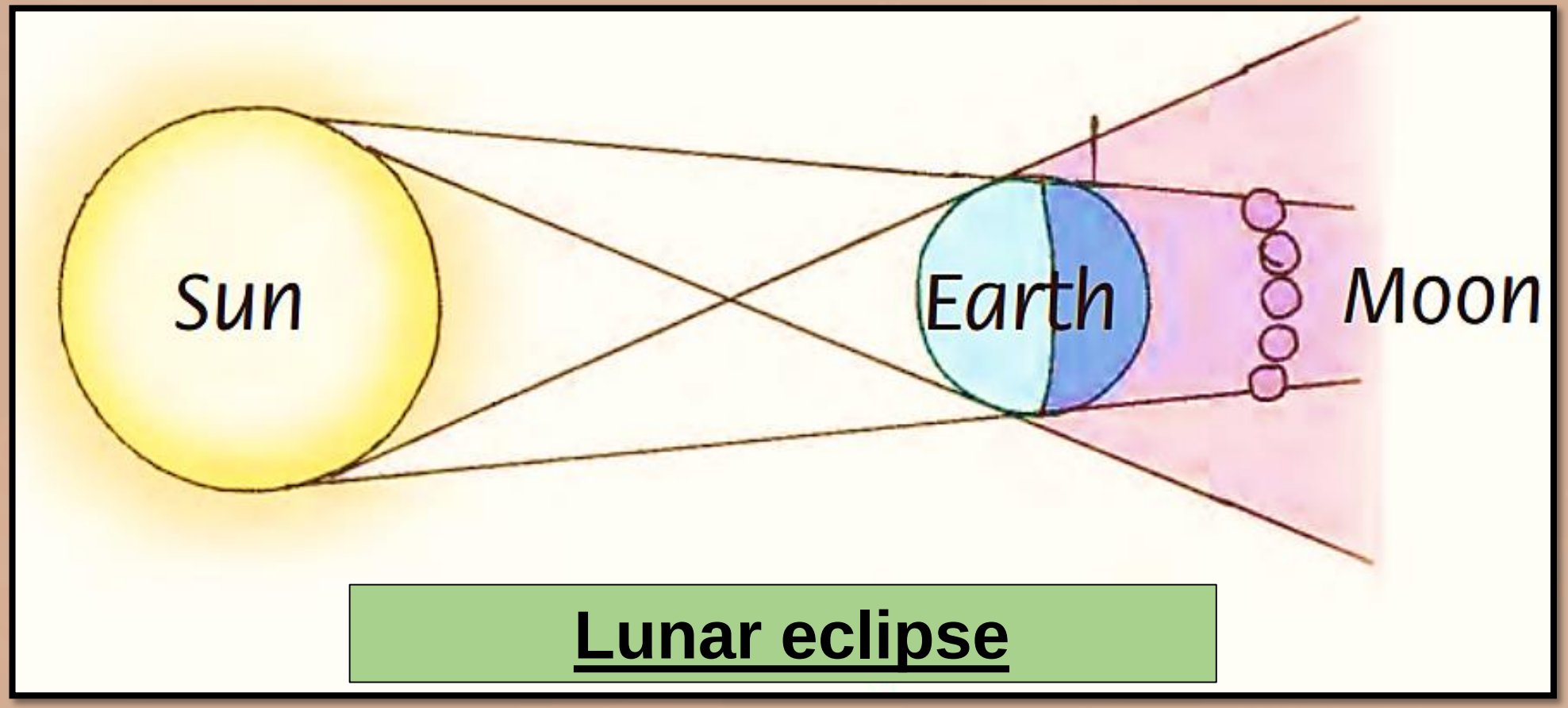
Full moon

**Different phases of the moon**

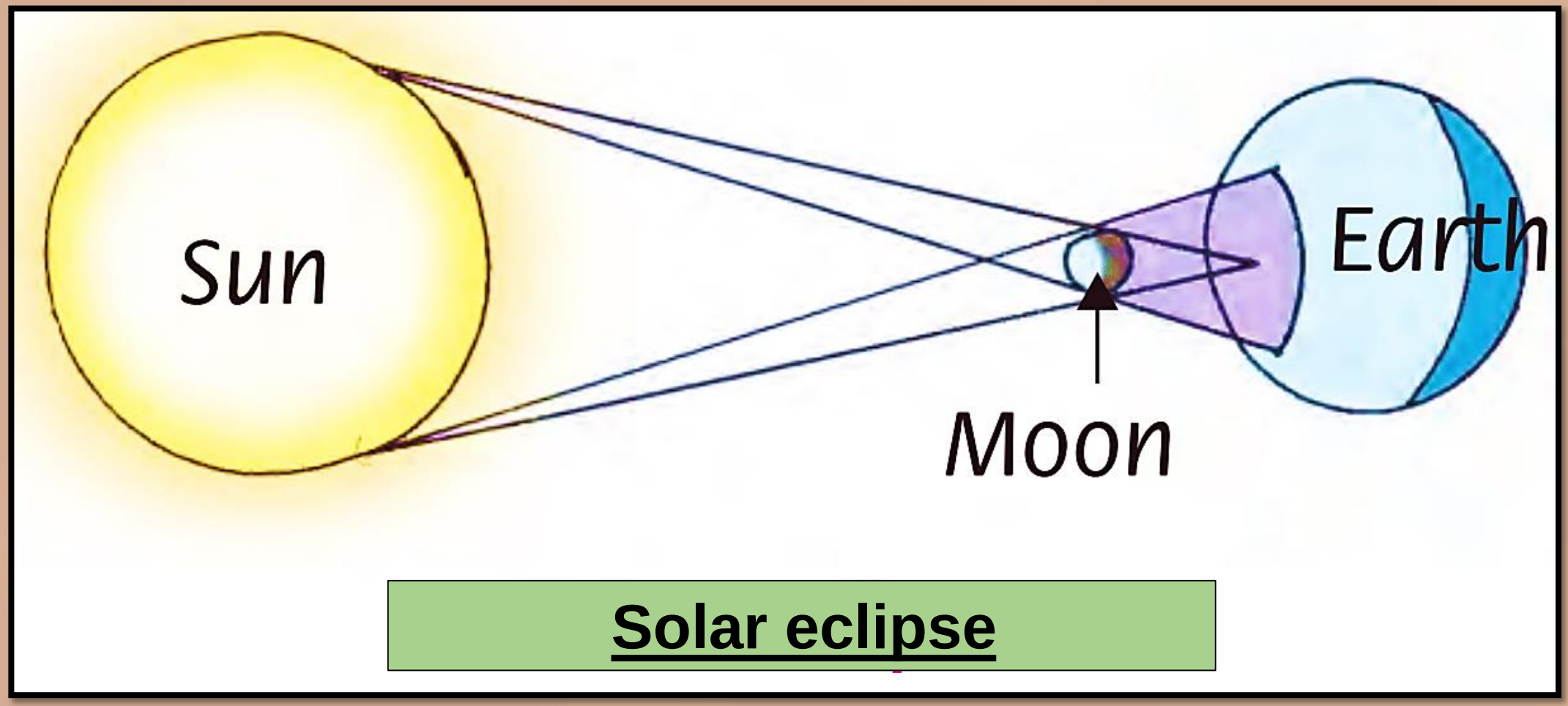
# ECLIPSE: MOON AND SUN

When one planet comes in between the two planets, and the shadow of the larger planet hides the smaller planet, then, we call it an eclipse. Eclipses occur when the sun, earth and moon, all are in a straight line.

Let us now see how this happens. Look at the diagrams showing eclipse.




**Lunar eclipse**



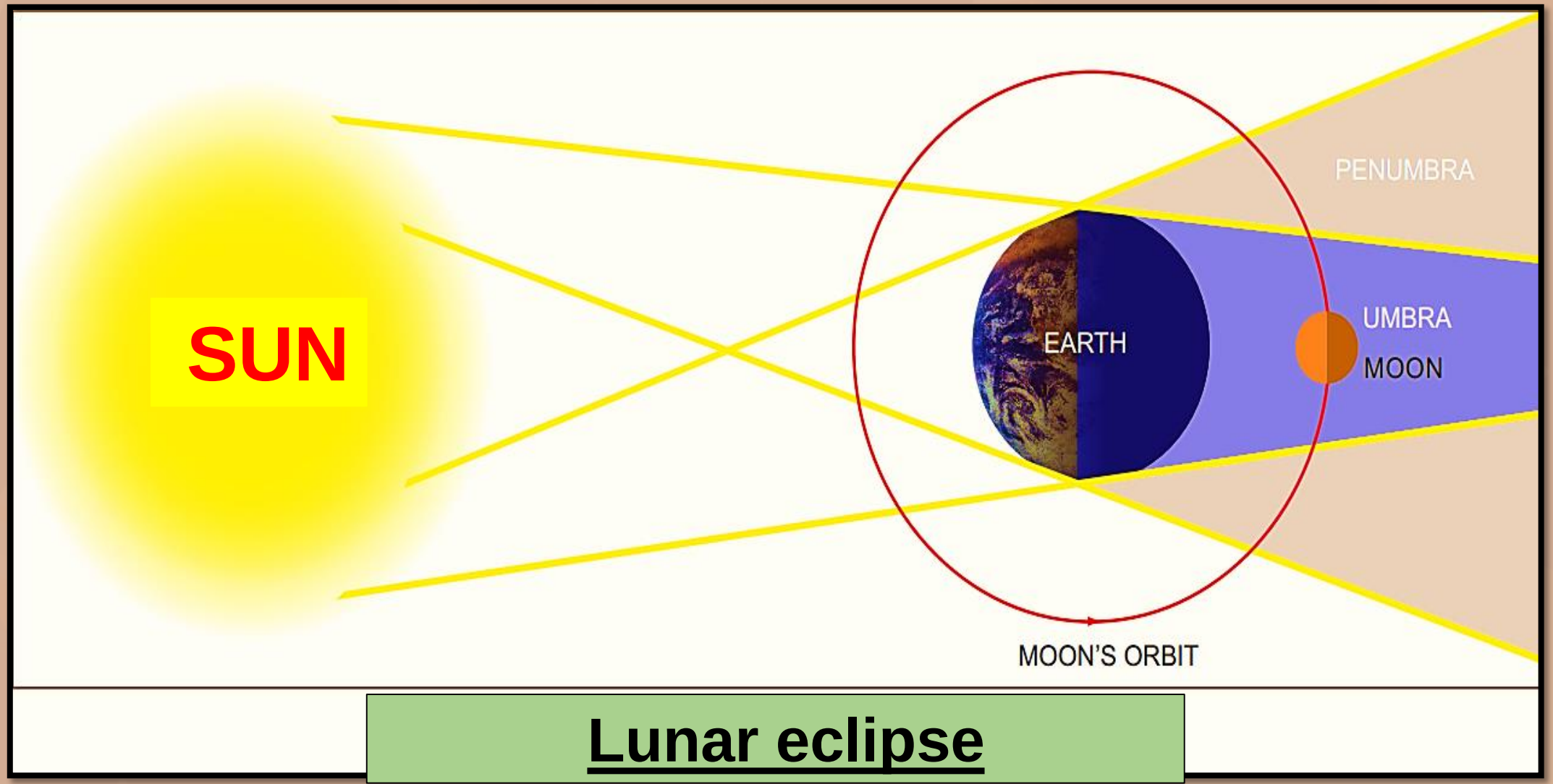

**Solar eclipse**

Opaque object is the one that does not allow the light to pass through it, eg. wood. When light falls on an opaque object then it creates a shadow. All planets are opaque. When the sun’s light falls on the earth and the moon, then the earth overshadows moon and sometimes moon overshadows the earth.

There are two types of eclipses on our planet, i.e. lunar eclipse and solar eclipse.

## Lunar Eclipse

**While revolving around the earth moon comes under the earth's shadow and cannot receive the sun's light and hides completely. This phenomena is called eclipse of moon or lunar eclipse.**

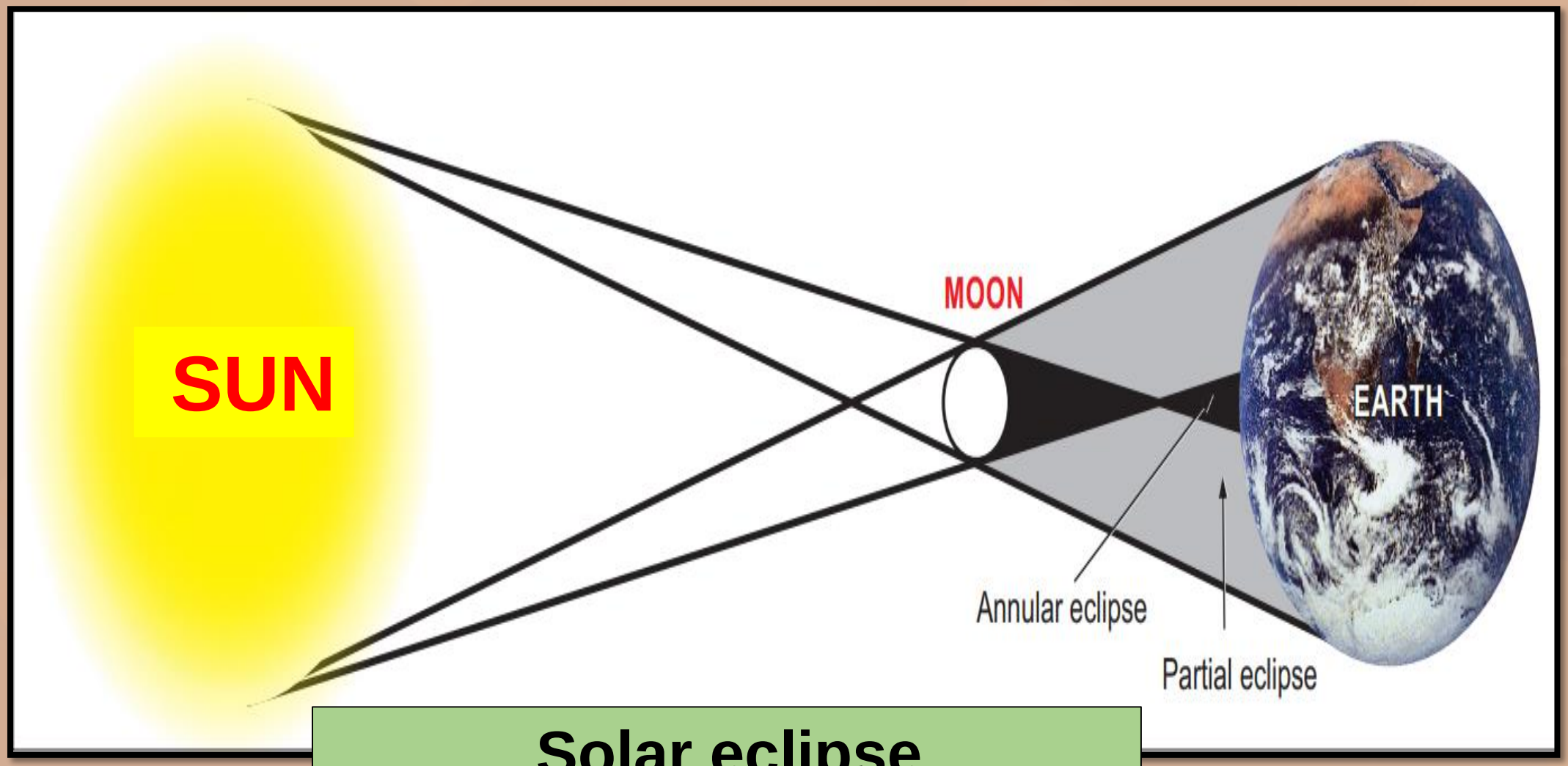



# Lunar eclipse

Lunar eclipse normally occurs on full moon day, when earth is between the sun and the moon. When moon is partially shadowed by the earth then it is partial lunar eclipse. When moon is in complete shadow of the earth then it is total lunar eclipse.

## Solar Eclipse

**While revolving around the earth, moon comes between the sun and the earth and over shadows the sun. This phenomena is called solar eclipse.**




# Solar eclipse

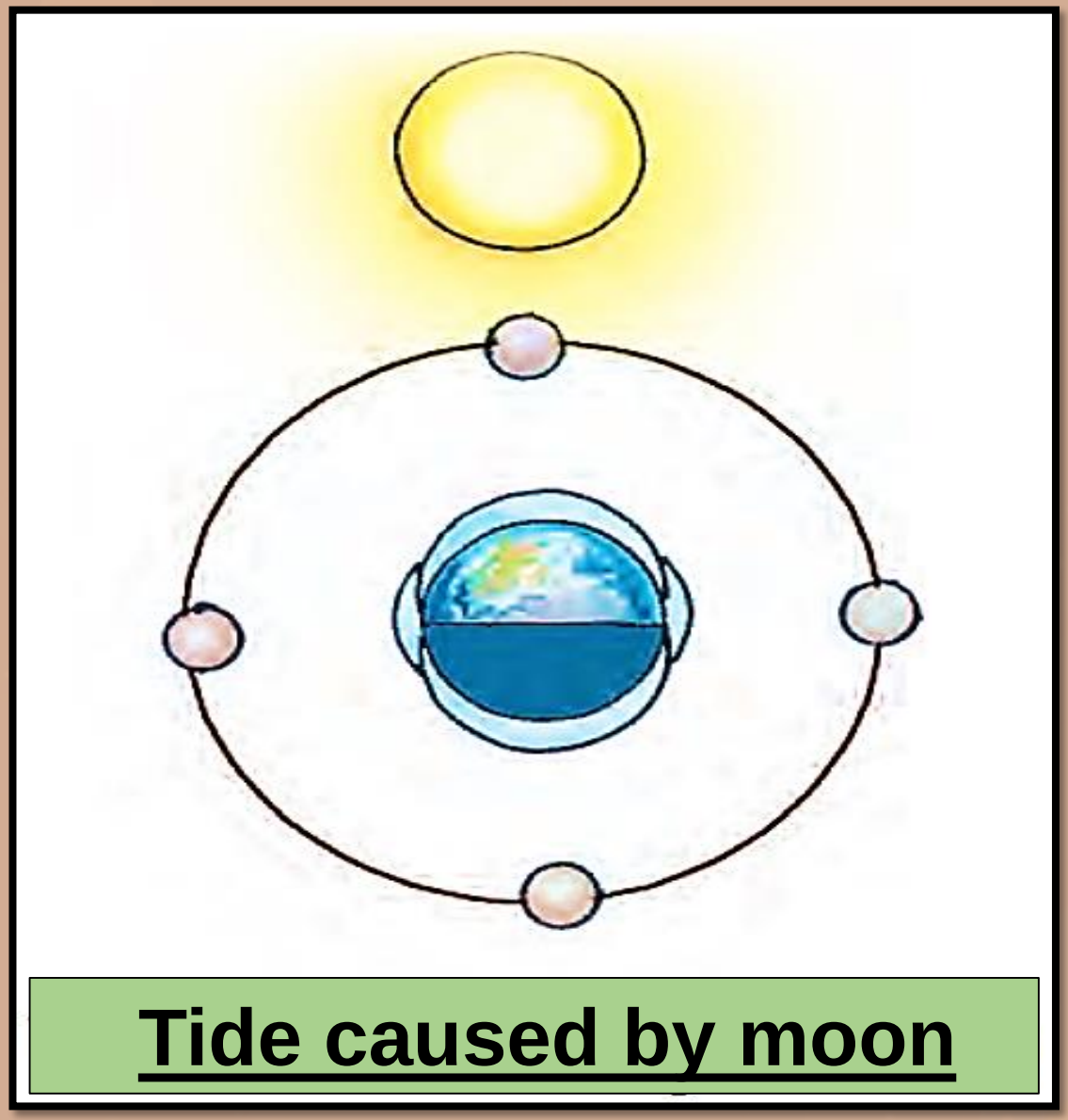
In contrast to lunar eclipse, solar eclipse occurs near the new moon days, when moon is between the sun and the earth. When sun completely hides under the moon's shadow, then it is called the total solar eclipse.

When sun is partially hidden then it is called the partial solar eclipse.

Sun and the moon appear of the same size when looked from the earth. In a total eclipse, the moon completely covers the disc of the sun and the solar corona becomes visible to the naked eyes as a bright ring.

# Tides caused by Moon

Tides on the earth are mostly generated by the moon's gravitational pull, from one side of the earth to the other. The rotation of the earth contributes to the formation of tide and the earth create two low tides everyday. Since the earth spins about 27 times faster than the moon moves around it.



**Tide caused by moon**

As moon is closer to the earth its gravity attracts the water upwards from large water bodies like oceans and seas. This attraction gives rise to high tides. More gigantic high tides occur at the time of full moon

and new moon days.

# ARTIFICIAL SATELLITES

Artificial satellites are man-made satellites that revolve around the earth, just like moon does. The first man-made satellite was Sputnik-1 launched in 1957 by Russian scientists. Yuri Gagarin was the first man to go in space on April 12, 1961.

**Yuri Gagarin**

# DID YOU KNOW ?

## Human Landing on Moon

Moon is the only heavenly body on which man has landed. The first human space craft landed on moon was APOLLO II, from NASA Apollo Program of America. Three astronauts went on this mission and the first man to step on the moon was Neil Armstrong and second was Edwin Aldrin. The third astronaut, who stayed inside the shuttle was Michael Collins.

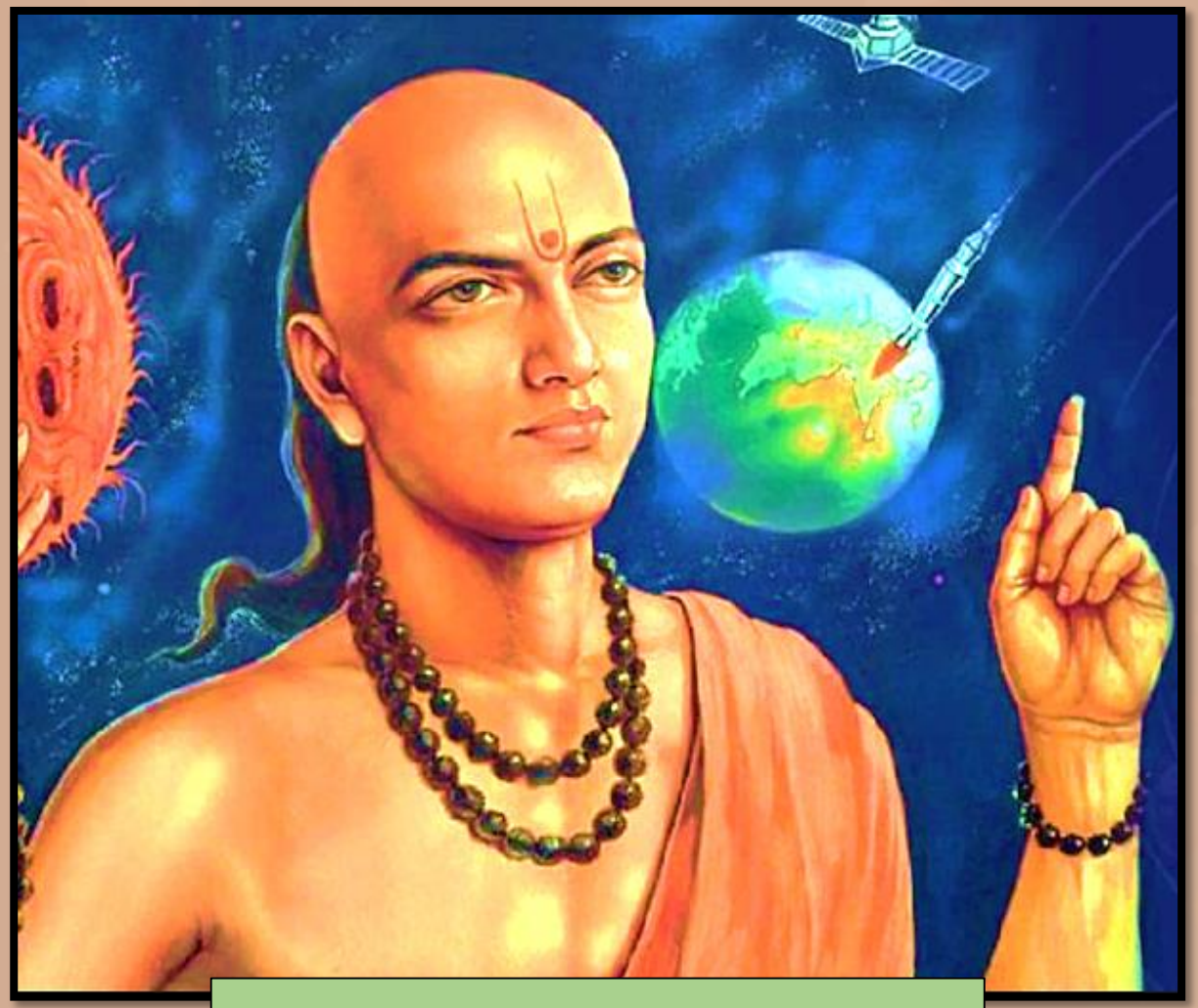
Appollo II

Neil Armstrong

Edwin Aldrin

Michael Collins

India launched its first artificial satellite on April 19, 1975. It was named after a great Indian astronomer Aryabhatta. India has launched a number of artificial satellite such as Insat-1A, Apple, Bhaskra, Rohini etc.



**Aryabhata**

# Uses of Artificial Satellites

**Artificial satellites are used for the following purposes:**

1. **Scientific research and experiments.**
2. **Communication through signals, that the satellite transfers and receives.**

3. Weather and climatic changes are observed and any disaster like cyclones, forest fires could be predicted and people are fore – warned with the help of satellites.

4. Transforming signals of television all over the world.

5. Taking pictures for study of the earth.

6. Scientists also use satellites to study the solar system and other galaxies.

# Fact File

- The surface of the moon has about the same area as the Continent of Africa.
- Footprints left on the moon by Apollo astronauts will remain for at least 10 million years because there is no erosion on the moon.
- Neil Armstrong was the first man to step on the moon.

# Things to Remember

- Moon does not have its own light.
- Moon has very haphazard plain due to millions of craters on its surface.
- Moon has no atmosphere.
- There are two types of eclipses — lunar and solar.
- India launched its first artificial satellite on April 19, 1975.