Cosmo School

Lecture Sheet: 01

Science (Chapter-12: The Outer Space and Satellites)

Class: VIII

Name of the student: .....Date: 11/10/2020

Outer Space:

Outer space, or simply space, is the expanse that exists beyond Earth and between celestial bodies.

Outer space is the vast extension of space in which all objects of the sky including the planets, stars, and galaxies have their existence.

The beginning of the outer space

- Space is all around earth and extends beyond the air which surrounds the earth.
- The atmosphere of the earth rotates along with it.
- The outer space begins, where atmosphere ends.

Q. Why is atmosphere taken as the part of the earth?

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The Universe:

The universe is all of space and time and their contents, including planets, stars, galaxies, and all other forms of matter and energy.

- Nobody knows how big the universe is.
- The universe is constantly expanding and changing.
- The large distances are measured not in kilometers but in light year. This is the distance that light travel in a year. One light year is equal to 9 million km
- The nearest star to the sun is Alpha Centauri. It is over 4 light years away.
- The velocity of light is 3×10^8 ms^{-1}.
- The Universe has the same temperature everywhere.
- 95% of the Universe is invisible.

Q. If the velocity of light is 3×10^8 ms^{-1} and it takes 8 minutes 20 seconds to reach to the earth, calculate the distance of the sun from the earth.

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Galaxy:

- The matters concentrated on a large volume in some parts of the universe is called galaxy or star world.
- Galaxy is a large group of comets and stars.
- There are billions of galaxies in the universe, the centre of the galaxy releases a huge amount of heat, radiation, radio waves and x-rays.
- The solar system exists in the galaxy named Milky Way.
- The universe has many galaxies, and each carries millions of stars which are bounded by a unique force known as gravitational force.
- There are approximately 70,000 million stars in the universe.

Galaxies differ from each other in shape, size, colour and composition. There are three types of galaxies that we find in the universe.

Elliptical Galaxies

These type of galaxies are like flattened balls of old stars and contain very little gas. It also includes the most massive galaxies containing a trillion stars.

Spiral Galaxies

Spiral galaxies have a flattened the shape. They have a bulge in the centre composed of old stars surrounded by a disk of young stars and are arranged in spiral arms.

Irregular Galaxies

As its name suggests, Irregular Galaxies have no particular shape.

Stars:

Stars are celestial objects that can produce their own light.

- They are extremely hot and extremely large.
- They are mostly made up of hydrogen gas with a little helium in them.

The stars in the space are classified in three colours, such as—

1. Red: The biggest stars
2. Yellow: Medium stars
3. Indigo: Small stars

Q. Why is the sun a star?

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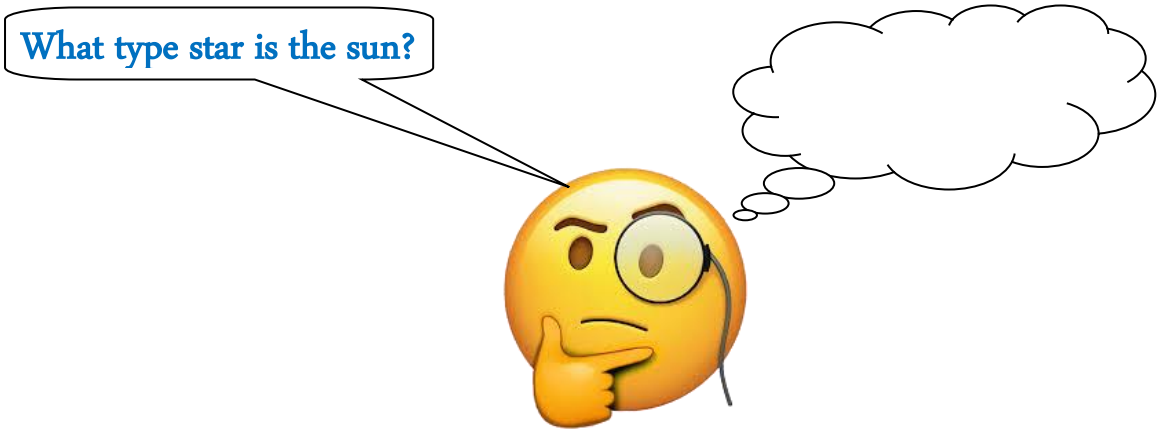

Creation of the Universe:

The Big Bang theory is the prevailing cosmological description of the development of the universe. According to estimation of this theory, space and time emerged together 13.799±0.021 billion years ago and the energy and matter initially present have become less dense as the universe expanded.

Big Bang Theory

- Alternatively called the expanding universe hypothesis.

- As per this theory, in the beginning, all matter or substance forming this universe existed at one place as a tiny ball. This tiny ball had an extremely small volume, infinite density and temperature.
- At the Big Bang, this ball blasted fiercely and forcefully and started a substantial process of expansion which continues to this day.
- Now it is accepted that this event took place 13.7 billion years ago.

Formation of Planets

The following are regarded as the stages in the planets' development:

- The stars are localized gas lumps inside a nebula (A **nebula** is a giant cloud of dust and gas in space).
- A core to the gas cloud as well as a spinning disc of dust and gas are created because of the gravitational force within the lumps.
- After this, the cloud of the gas condenses and the matter over the core is changed into tiny rounded objects.
- These small round objects develop into what are called planetesimals (a minute planet) by a cohesion process.
- The smaller objects start forming larger bodies by colliding with one another and they stick together because of gravitational force.
- In the last stage, these large number of small planetesimals aggregate to develop into a smaller number of large bodies called planets.

Q. Why is the earth a planet?

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