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## Structure of Sun:

### Sun:-

The Sun is central part of Solar system. It accounts for 99.8% of the mass of the entire solar system.

The energy in sun is due to nuclear fusion, composed mainly of super heated hydrogen and helium gases mixed in ratio 3:1. The sun has a 27 day solar rotation period, and its speed of revolution is 18 km/sec.

### Composition of Sun:-

The sun is mainly composed of Hydrogen (71.2%), Helium (27.7%) and others (0.1%).

### Physical constants of Sun:-

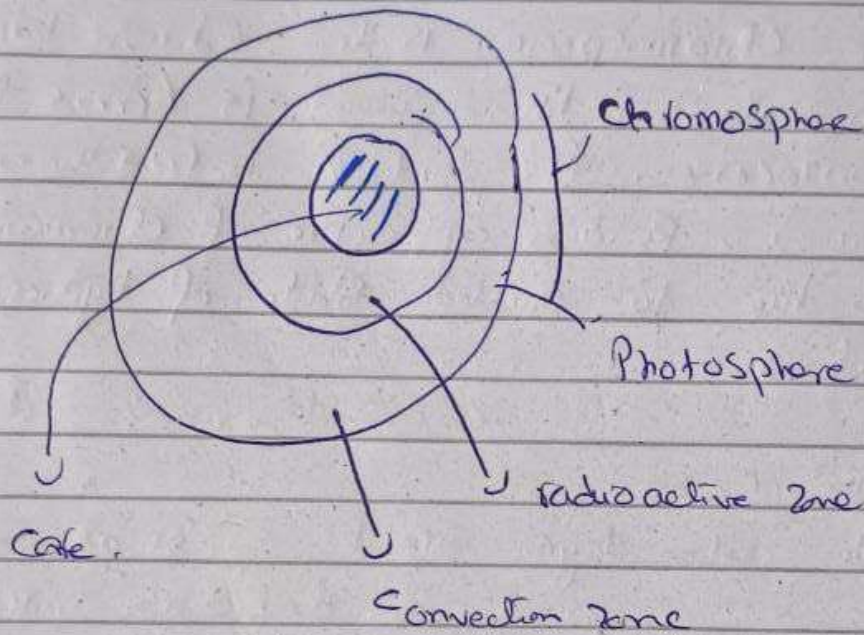
Mass =  $2 \times 10^{30}$  kg (330,000 times of earth)

Diameter = 104 million km

Distance = 1.5 million km

Average density = 1.4 g/cm<sup>3</sup>

## Structure of Sun:-



### The core:-

The temperature is tremendously high in the core of the sun. Here the temperature is roughly 15 million centigrade. At such a high temperature nuclear fusion reaction occurs. Hydrogen nuclei fuse

### The Photosphere:-

Photosphere is known as lower atmosphere of the sun. Its thickness is about 300 miles. Temperature in photosphere is 5500°C

## The Chromosphere:

The Chromosphere is the reddish layer. Temperature in this region is  $6000^{\circ}\text{C}$  to  $509000^{\circ}\text{C}$ . Its thickness is few thousand miles. Reddish appearance of Chromosphere is due to excited state of hydrogen atoms.

## The Corona:

The outer layer of the Sun's atmosphere is known as corona. It extends millions of miles from Sun's surface. The temperature of this region is around 1 million centigrade.

## Solar wind:-

Solar wind is a stream of wind charged particles. These winds are generated due to presence of plasma and extend upto the whole solar system. It takes solar wind 5 days to reach earth with velocity of  $800\text{ km/sec}$ .

## Sun spots:-

They are cool dark patches on Sun's surface. These spots are caused by disturbance in the Sun's magnetic field. The larger sunspots are wider than the earth. Sunspots have about half the temperature of the surroundings.

## Auroras

### Aurora:-

An aurora, also commonly known as polar lights or northern lights, is a natural display in Earth's sky, predominantly seen in high latitude regions.

### Reason:-

Auroras are formed due to interaction between Earth's magnetic field and charged particles of Sun. The Sun constantly emits a stream of charged particles mainly electrons and protons, known as solar wind. When the solar wind reaches the Earth, it encounters Earth's

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magnetic field, which is generated by the movement of molten iron within in planet's outer core.

The interaction between solar wind and Earth's magnetic field leads to a process called magnetic reconnection. During this process, the charged particles from sun get trapped and guided along Earth's magnetic field lines towards polar regions. As these particles move towards the poles, they collide with atoms molecules in the Earth's upper atmosphere, primarily oxygen and nitrogen:

When the charged particles collide with the atoms and molecules, they transfer energy to them. The atoms and molecules, in turn, become excited and temporarily move to higher energy states. As these excited particles return into normal energy states, they release the excess energy in form of light. This light we observe as the beautiful colors of auroras.

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Different colors are produced depending on type of atom or molecule that is excited and the altitude at which collision occurs. Oxygen atoms typically produce green and red colors, while nitrogen atoms contribute to blue and purple hues.

### Aurora Borealis:-

The Aurora Borealis are also known as Northern lights. The Aurora Borealis gets its name from Roman goddess of dawn, Aurora and Greek name for earth, the north wind, Boreas. It is predominantly visible in high altitude regions close to the arctic, such as Alaska, Canada, Scandinavia, and Iceland.

### Aurora Australis:-

The Aurora Australis or Southern lights is a natural phenomenon that mirrors Aurora Borealis but occurs in southern Hemisphere. The Aurora Australis are most commonly observed in high altitude

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regions near Antarctica, New Zealand,  
and parts of Australia and South  
America.