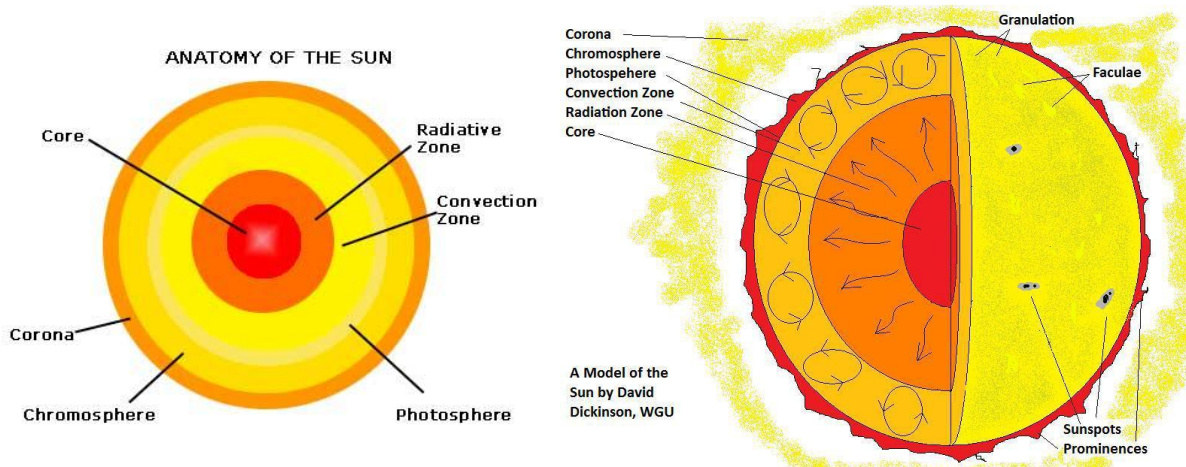


# Stars and Galaxies

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The structure of the sun can be demonstrated from the diagram below



## Sunspot

- Dark and cool region of the star
- Strong magnetic field
- Exist on the photosphere of the sun
- Changes the climate of the Earth

## Prominence

- Giant flames due to the burning of hydrogen and helium
- Bright Red
- Can extend to thousands of kilometers
- Can cause solar wind
- The charged particles disrupt the satellite and electronic devices
- Can cause climatic disturbance

## Difference between Solar Flare, Coronal Mass Ejection and Solar Wind

- Coronal Mass Ejection is plasma emission from the corona of the sun. It lifted up from the corona and travel faster than solar flare. Coronal Mass Ejection do not necessary has Electromagnetic Wave.
- Solar Wind are wind particles protons blown by the sun
- Solar Flare creates UV, X Rays and electromagnetic wave.
- Prominences are stretches of gas burning from the sun

## The Photosphere

The photosphere is the bright visible surface of the Sun. It is a shell of hot gas several hundred kilometers thick. Above the photosphere is a thick layer of cooler gas several thousand kilometers thick. When light passes through this layer, an absorption spectrum of the Sun is formed.

### **Sunspots**

Sunspots occur in elaborate groups. Some are large enough to be visible to the naked eye. Sunspots are dark in appearance compared to the bright solar disk. The sunspot is divided into two regions. The dark inner region is known as the umbra while the light outer region is called the penumbra. The number of sunspots visible changes through time. A spot may be visible for several days or weeks before it is dissolved.

### **The Chromosphere**

The Chromosphere is about 1500 km thick. It reveals a reddish glow around the rim of the Moon during a solar eclipse. The spectrum we see is referred to as the flash spectrum. The chromosphere is best studied during a solar eclipse but it can also be studied by the aid of an instrument called coronagraph which creates an artificial eclipse.

### **The Corona**

The corona, meaning crown in Latin, is above the chromosphere. Its total brightness adds up the brightness of a full moon, yet its temperature is incredibly high. The corona changes month to month. Part of the corona is the Sun's scattered light, another part are few bright emission lines which elements do not occur naturally on Earth. The hypothetical element is known as "coronium".

### **The Solar Wind**

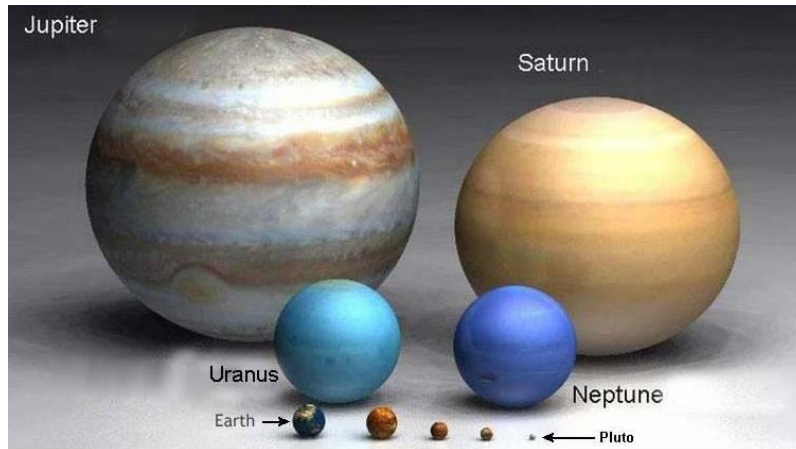
The solar wind is the flow of protons, electrons and helium nuclei. It is the outer most extension of the sun's atmosphere. The particles of the solar wind travels along open magnetic field lines through coronal holes but not from all parts of the Sun

# Galaxies

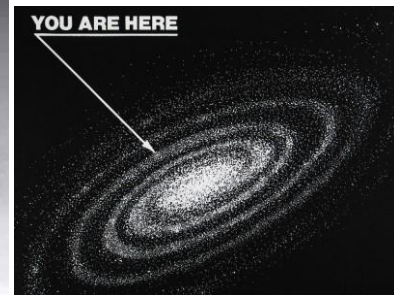
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Galaxy is a cluster of millions of stars moving in the galaxy.

Our solar system is situated in the Milky Way. There are 10 000 000 000 stars in the Milky Way

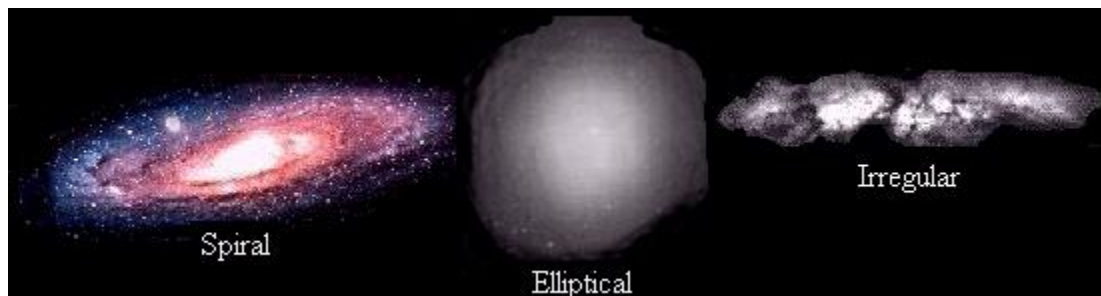


Planets in Solar System except Pluto



Milky way

There are few types of Galaxy



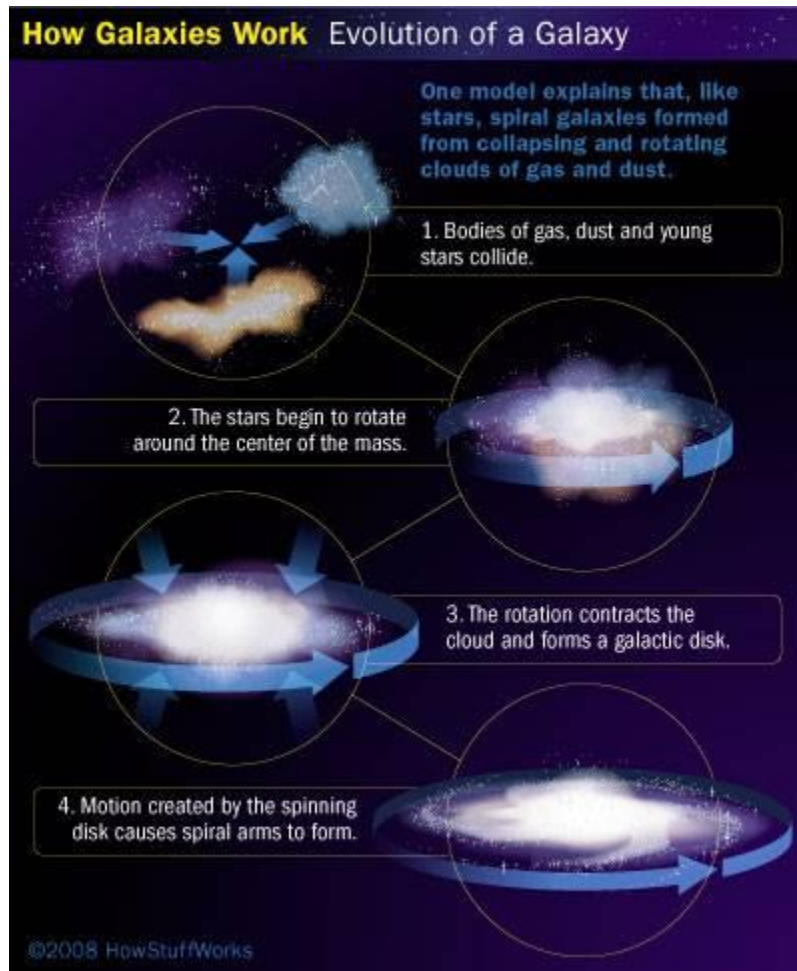
There are 3 types of galaxies in the universe

1. Spiral Galaxy
2. Elliptical Galaxy
3. Irregular Galaxy

# Formation of Galaxy

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First of all ... the formation of galaxy happens after Big Bang. When gas and dust collide then the stars begin to spin or rotate around the centre of the mass. As this happens the centre of the galaxy gets hot and the forms stars.



# Formation of Stars

Stars are form from great amount of hydrogen. Stars come into existence in the vast clouds, dust and gas through space. It started when stars gas particles esp Hydrogen. The existence of massive amount of Hydrogen gas is called nebulae or molecular clouds.

The hydrogen is pulled into the centre due to gravity. As the pressure in the centre increases, eventually the nuclear reaction will take place. As soon a the fusion takes place, the thermal energy pushes outwards preventing further collapse of the hydrogen to the core. This is a process where Hydrogen is burnt and converts into Helium.

Star is classified by

1. Temperature
2. Color
3. Brightness
4. Size
5. Composition
6. Density and Mass

**TABLE 17.1 Stellar Colors and Temperatures**

<b>B flux V flux</b>	<b>Approximate Surface Temperature (K)</b>	<b>Color</b>	<b>Familiar Examples</b>
1.3	30,000	blue-violet	Mintaka ( $\delta$ Orionis)
1.2	20,000	blue	Rigel
1.00	10,000	white	Vega, Sirius
0.72	7000	yellow-white	Canopus
0.55	6000	yellow	Sun, Alpha Centauri
0.33	4000	orange	Arcturus, Aldebaran
0.21	3000	red	Betelgeuse, Barnard's Star

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# Death of Stars

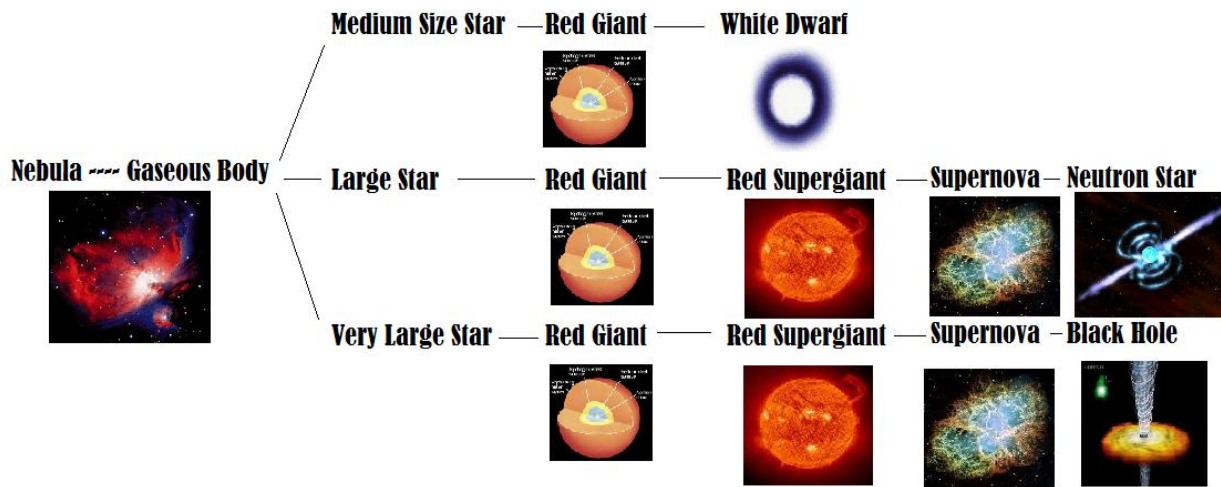
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Death of the stars happens when the core of the sun is burnt by fusion.

As the sun core keeps burning the core will shrink and the outer layer of the sun will expand and become brighter. At this stage call the sun **RED GIANT**.

The fate of the sun will be determined by its mass. It will turn to be

1. White dwarf
2. Neutron Star
3. Black Hole



Interesting fact

Neutron star is very dense. The size of the neutron star is estimated as large as Penang Island. The core of the sun is compress and collapse into its core and the density increases tremendously. The neutron star will spin very fast which create pulsar( 100 spin a second)