

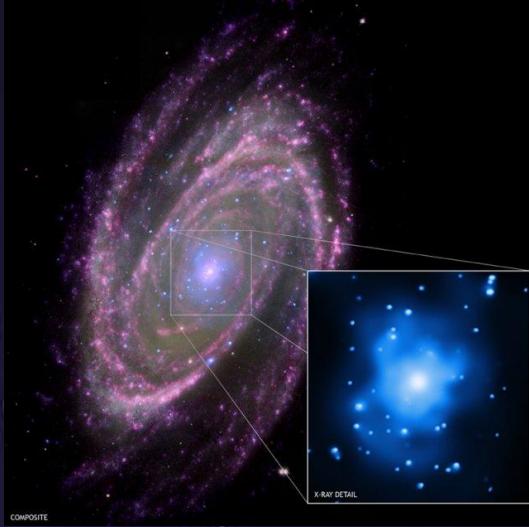


PLAN8

*Pranay Aggarwal's*

# Plan8

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# 1.What is the universe and space?

Earth is our home in the universe. The sun, the moon, the stars and everything else beyond earth are all in space. All of these things together makes up the universe.

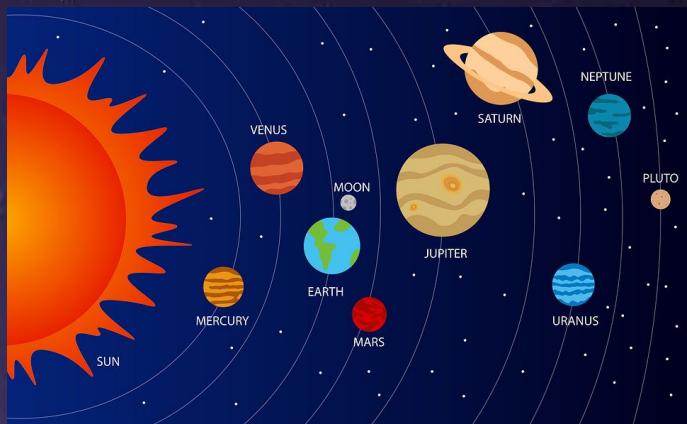
Space	Universe
Its the word used to describe everywhere that is not on earth and its surrounding layer of air. It starts from 100 km above the earth.	The universe is everything we can ever know- all of space and all of the time. Before universe, there was nothingness, no space, no time, no energy, and no matter.

***The universe was born more than 13 Billion years ago!***

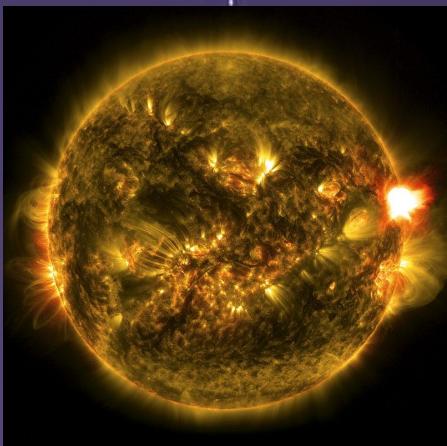


# What are different celestial bodies?

- 1) **PLANETS:** These are large balls of dust or gas or both. There are eight planets in our solar system



- 2) **STARS:** These are balls of very hot and glowing gas which emit heat and light. There are billions of stars in our universe. Our sun is a star.



- 3) **MOONS:** Some planets have small moons around them which are made up of mostly dust and ice.

## 2. How does an eclipse occur?

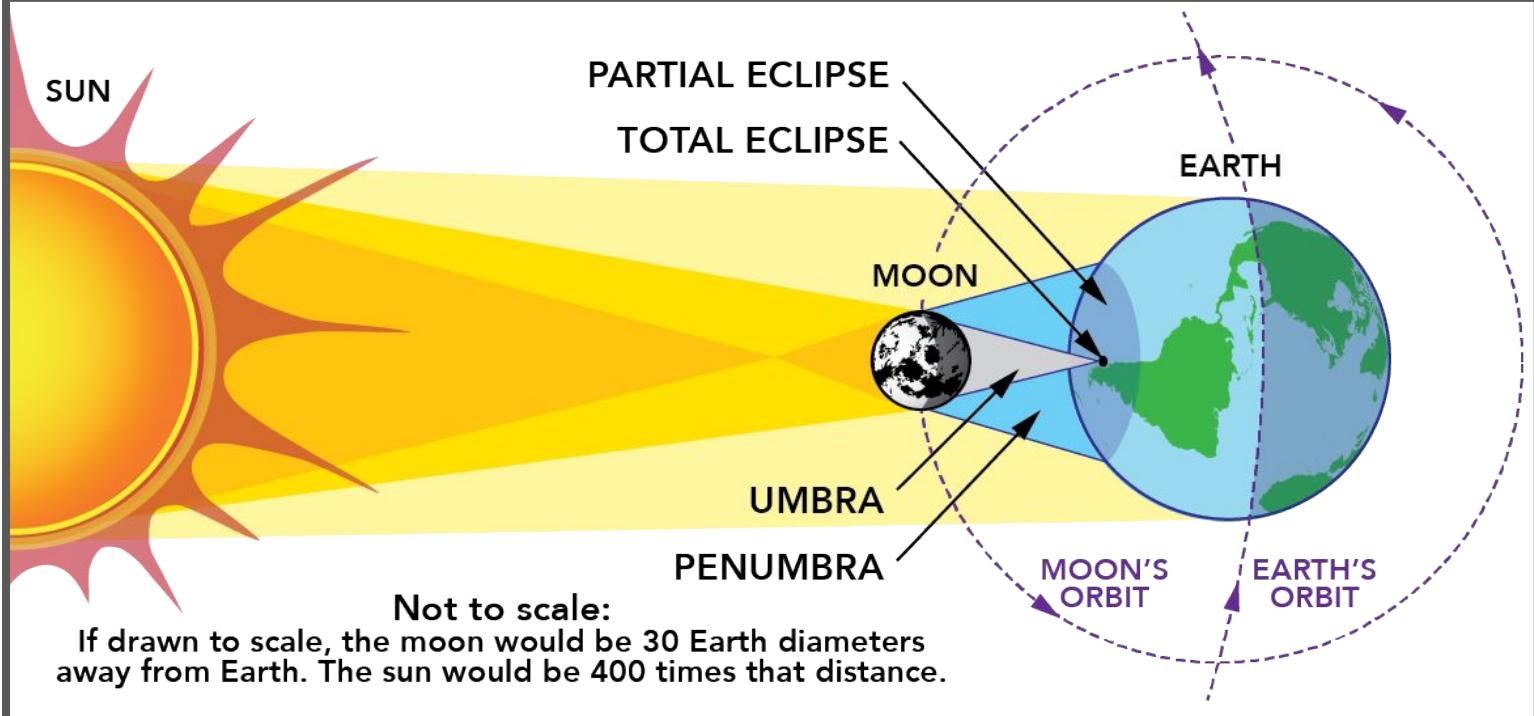
### SOLAR ECLIPSE

A solar eclipse occurs when a portion of the Earth is covered in a shadow cast by the Moon which fully or partially blocks sunlight. This occurs when the Sun, Moon, and Earth are aligned.



### LUNAR ECLIPSE

A lunar eclipse occurs when the Moon moves into the Earth's shadow. This can occur only when the Sun, Earth, and Moon are exactly or very closely aligned with Earth between the other two, and only on the night of a full moon.



Solar Eclipse

Lunar Eclipse

### Graphical representation - why Blood Moons are red

SUN

Blue light is scattered  
by Earth's atmosphere

MOON



Sunrays

EARTH

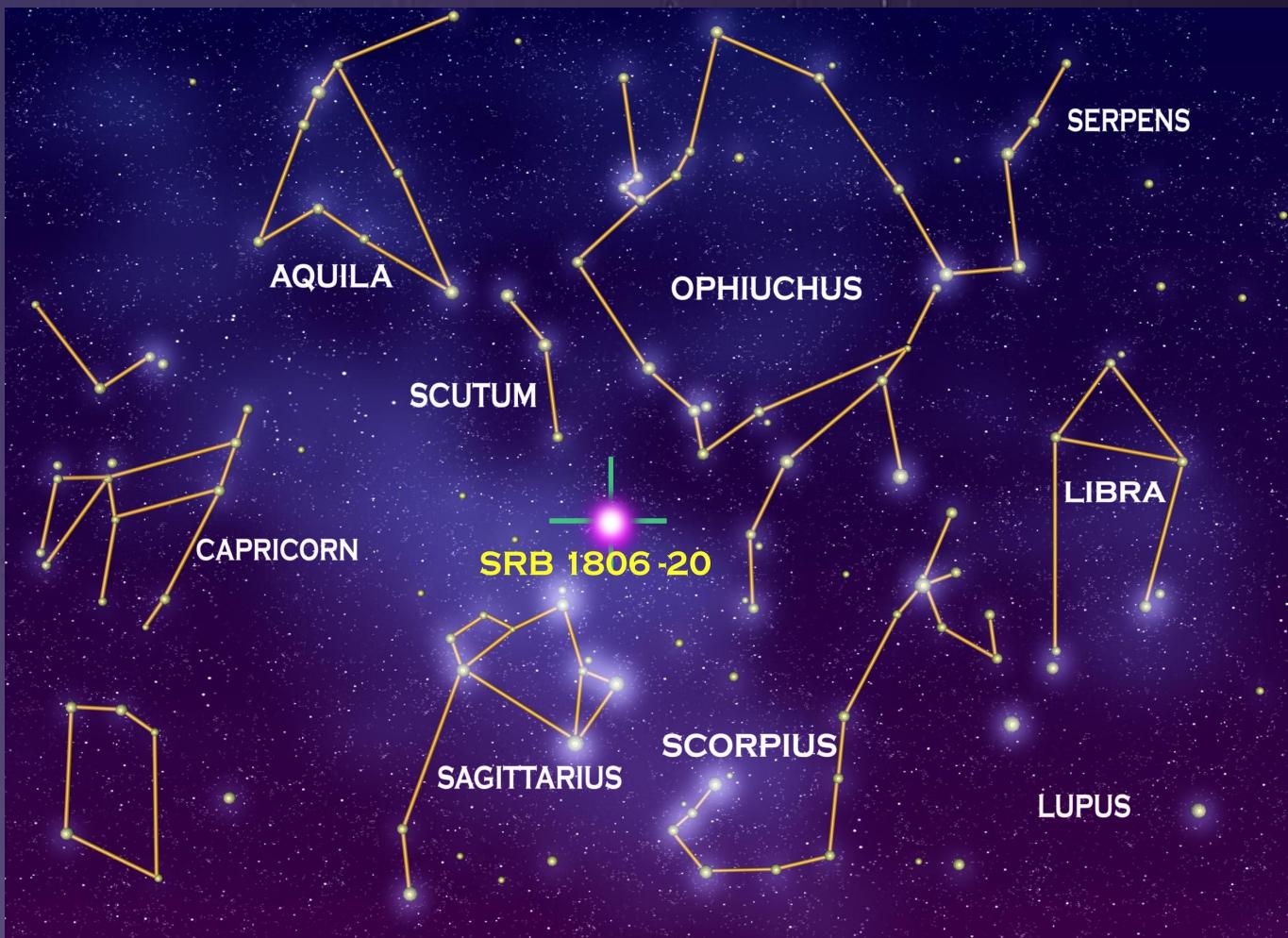
Umbra

Red light get refracted,  
passes through the atmosphere  
and falls onto the Moon

# 3.What are constellations?

An **easily** recognized group of stars that appear to be located close together in the sky and that form a picture if lines connecting them are imagined.

**Constellations** are usually named after an animal, a character from mythology, or a common object.



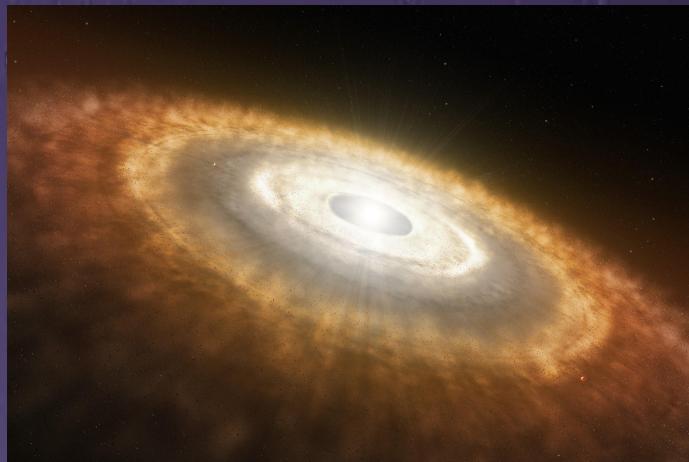
# What is the life cycle of a star?

**Stage 1-** Stars are born in a region of high-density Nebula, and condenses into a huge globule of gas and dust, and contracts under their gravity.



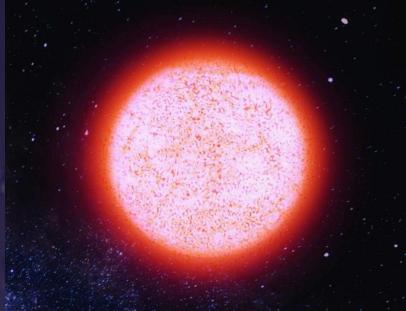
**Stage 2-** A region of condensing matter will begin to heat up and start to glow forming *Protostars*. At this temperature, nuclear reactions in which hydrogen fuses to form helium can start.

**Stage 3-** The star begins to release energy, stopping it from contracting even more and causes it to shine.

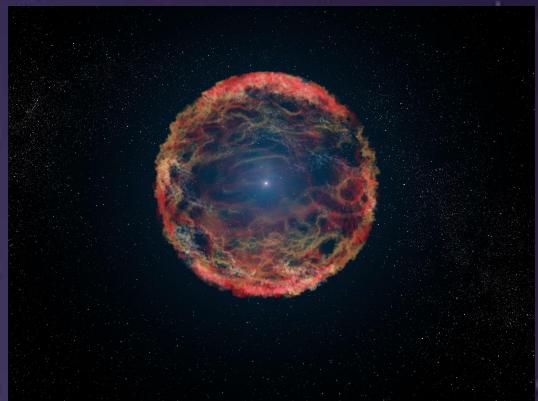


**Stage 4 -**A star of one solar mass remains in the main sequence for about 10 billion years, until all of the hydrogen has fused to form helium.

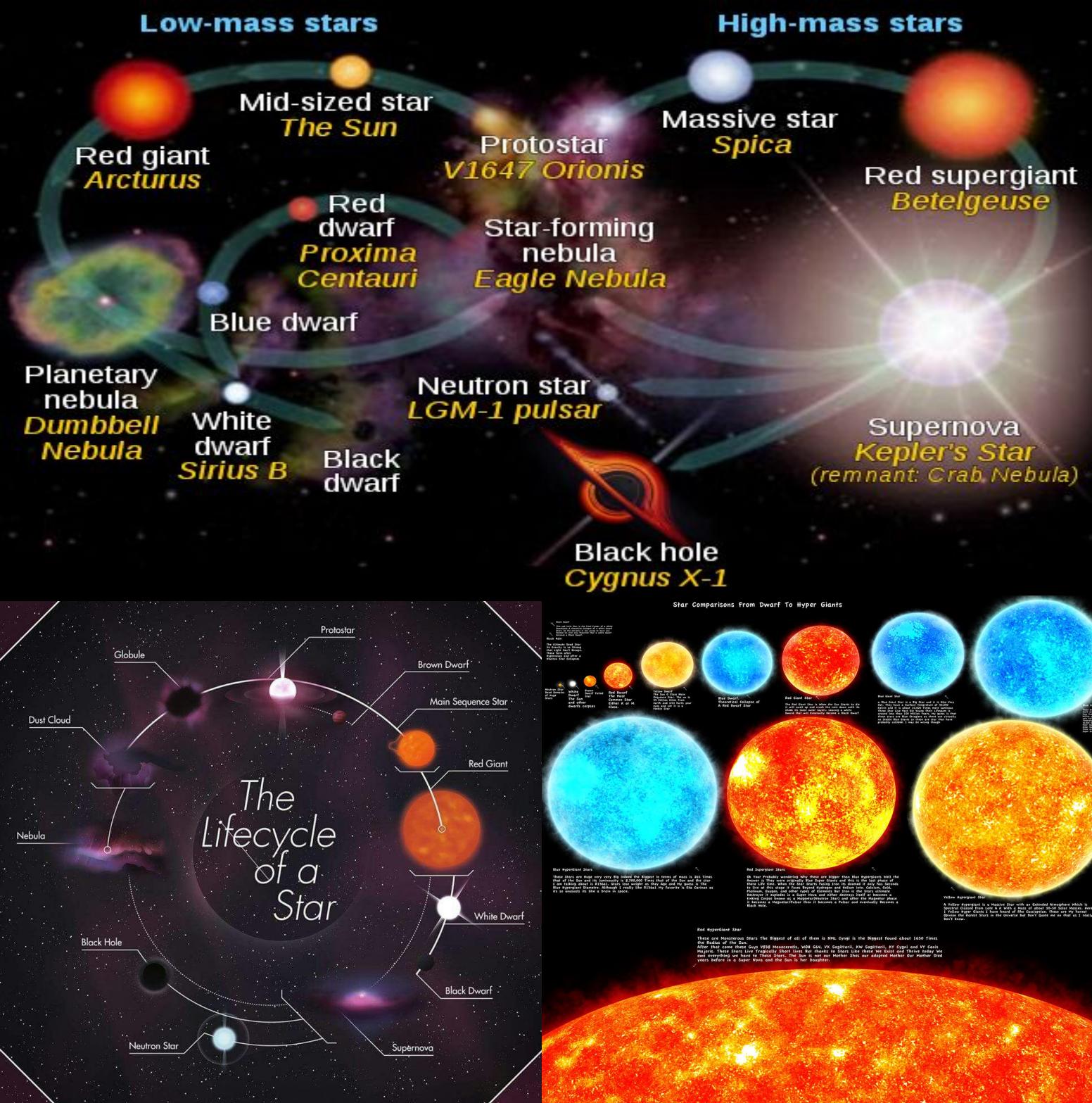
**Stage 5** -The helium core now starts to contract further and reactions begin to occur in a shell around the core. The core is hot enough for the helium to fuse to form carbon. The outer layers begin to expand, cool, and shine less brightly. The expanding star is now called a *Red Giant*.



**Stage 6** - The helium core runs out, and the outer layers drift away from the core as a gaseous shell, this gas that surrounds the core is called a *Planetary Nebula*.



**Stage 7** - The remaining core (that's 80% of the original star) is now in its final stages. The core becomes a *White Dwarf* the star eventually cools and dims. When it stops shining, the now-dead star is called a *Black Dwarf*.



## Heat Transfer of Stars

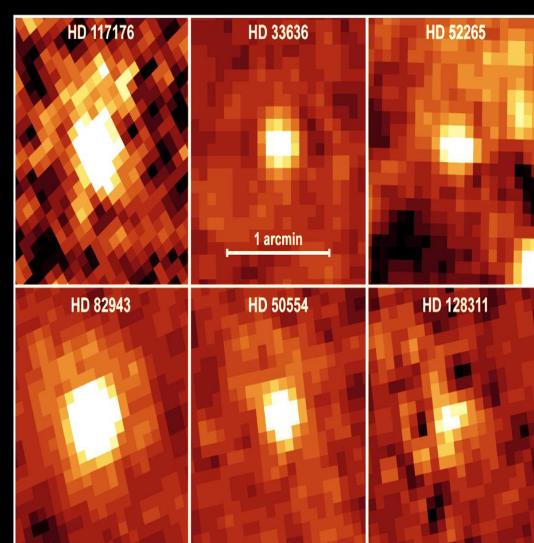
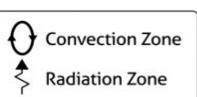
> 1.5 solar masses



0.5 - 1.5 solar masses



< 0.5 solar masses



Stars with Planets and Dusty Disks

NASA / JPL-Caltech / C. Beichman (JPL)

Spitzer Space Telescope • MIPS

ssc2004-2c

## 4. Why is the sky blue?

Gases and particles in Earth's atmosphere scatter sunlight in all directions. **Blue light** is scattered more than other colors because it travels as shorter, smaller waves. This is why we see a **blue sky** most of the time.

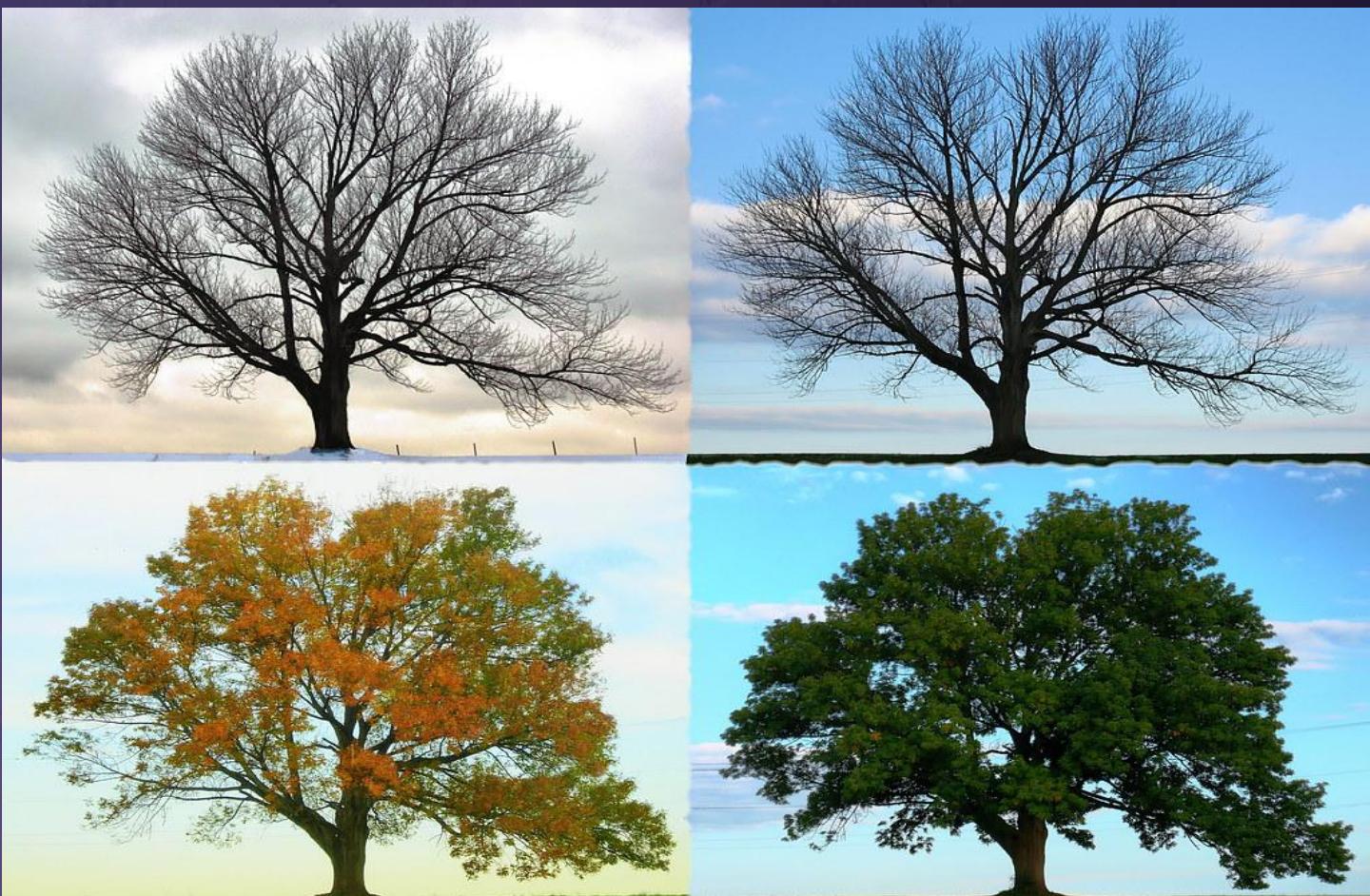


# 5.What causes seasons?

**It's all about Earth's tilt!**

Many people believe that Earth is closer to the sun in the summer and that is why it is hotter. And, likewise, they think Earth is farthest from the sun in the winter.

Although this idea makes sense, it is **incorrect**.

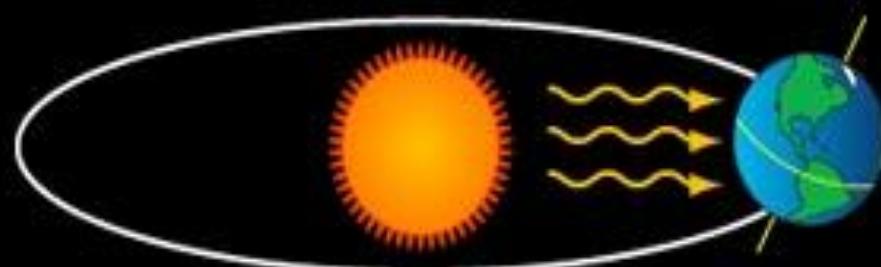


**Earth has seasons because its axis is tilted.  
Earth rotates on its axis as it orbits the Sun,  
but the axis always points  
in the same direction.**

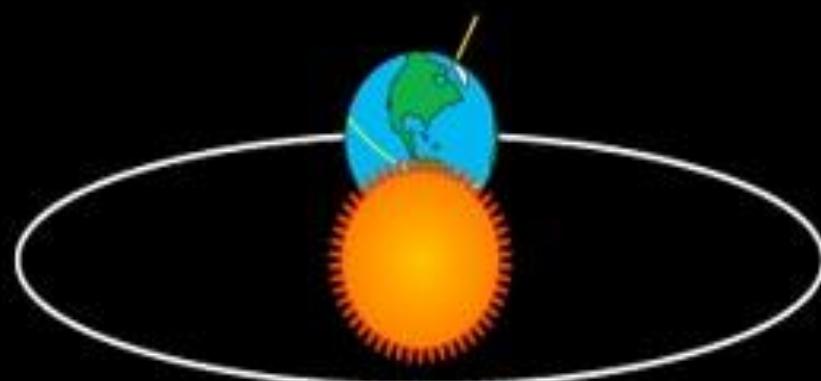


Southern Hemisphere      Northern Hemisphere

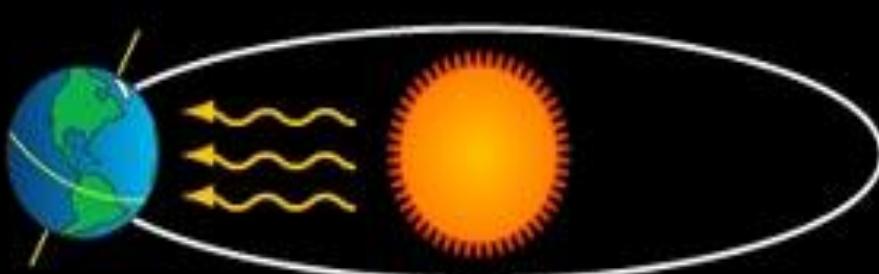
**December:**  
Summer south of the equator,  
winter north of the equator.  
The Sun shines directly on  
the Southern Hemisphere  
and indirectly on the Northern  
Hemisphere



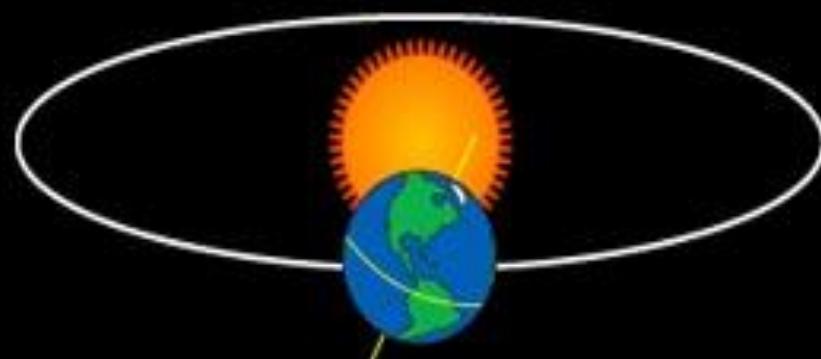
**March:**  
Fall south of the equator,  
spring north of the equator.  
The Sun shines equally on  
the Southern and Northern  
Hemispheres



**June:**  
Winter south of the equator,  
summer north of the equator.  
The Sun shines directly on  
the Northern Hemisphere  
and indirectly on the Southern  
Hemisphere



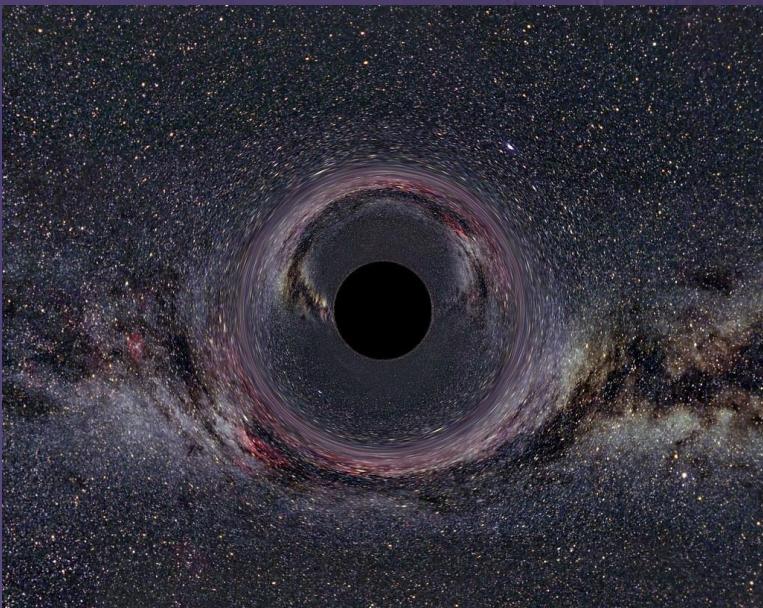
**September:**  
Spring south of the equator,  
fall north of the equator.  
The Sun shines equally on  
the Southern and Northern  
Hemispheres



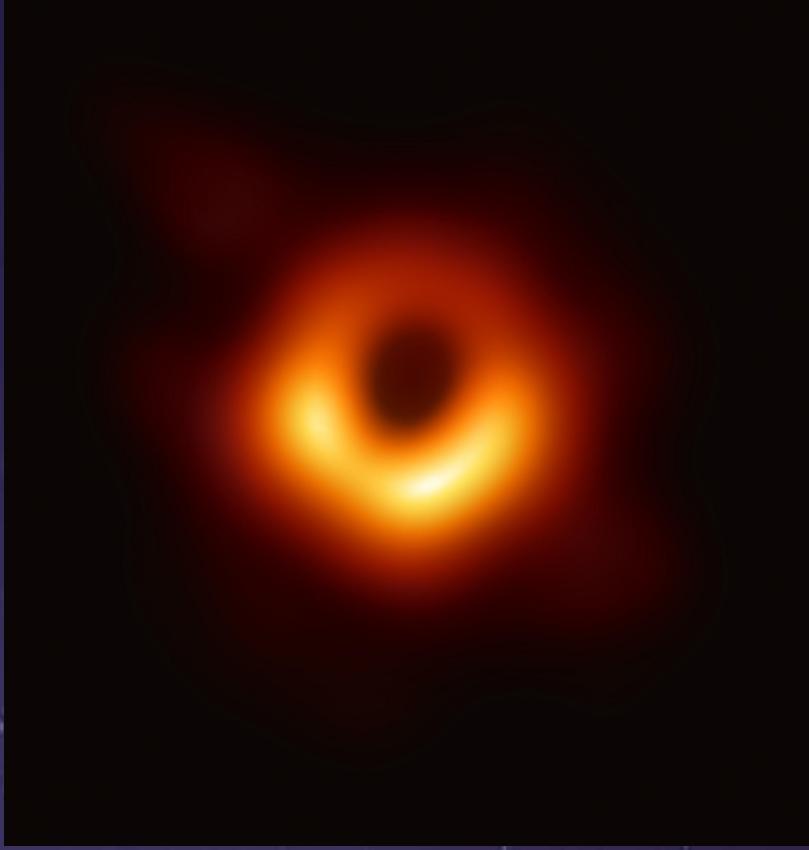
# 6.What is a black hole?

When a very large star dies, it explodes into a supernova and leaves behind a black hole instead of a white or a black dwarf. It is a place in space in which gravity is so strong that not even light can escape from it. They are very tiny but have a mass of a mountain.

Since light cannot escape from it, we can never see it through a naked eye or an optical telescope. We use very big and advanced tools which help us detect their presence in space.



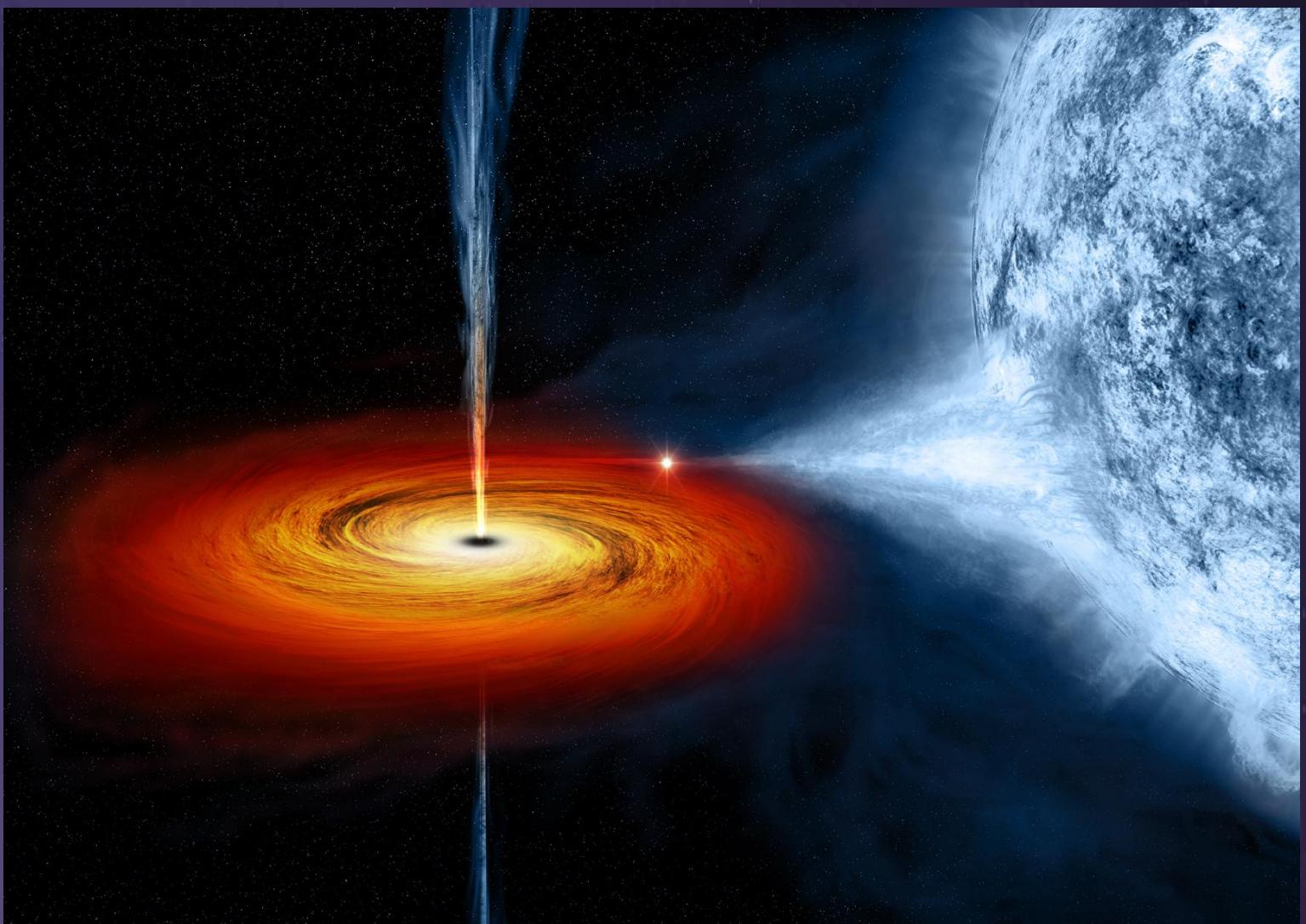
Black hole called GRS 1915+105, located about 35000 light years away is spinning at a rate of more than 950 times per second



First ever image of an  
actual black hole called  
“MESSIER 31”



Artist's impression of a  
black hole:



# 7. How do we go to space?

A rocket's job is to take spacecraft and people to space. A rocket is used only once and it takes months to build one. They can be as tall as 15 story building.

Satellites are small machines that are put into the orbit of a planet or a moon by rocket. Its job is to send pictures and perform difficult research work which could not be performed on earth. They are also used in GPS navigation and to send mobile network signals.



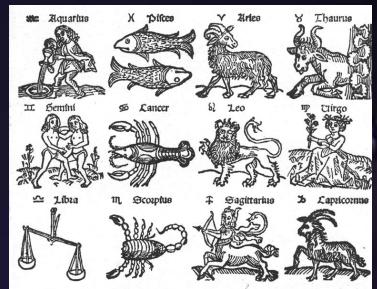
# Is life possible on mars?

The atmosphere of Mars is mostly carbon dioxide, the surface of the planet is too cold to sustain human life, and the planet's gravity is a mere 38% of Earth's. Plus, the atmosphere on Mars is equivalent to about 1% of the Earth's atmosphere.

It takes about 260 days to reach mars when mars and earth are closest. Mars lacks a magnetic field and thus is unprotected from the sun's harmful emissions.

Therefore as of now, mars is not habitable. But our scientists are working hard and with combined global cooperation, mars could soon be filled with humans and booming with life.





## 8. Astronomy vs Astrology

**Astronomy** is the study of everything in the universe beyond Earth's atmosphere. That includes objects we can see with our naked eyes, like the Sun, the Moon, the planets, and the stars. It also includes objects we can only see with telescopes or other instruments, like faraway galaxies and tiny particles

Astrology is the idea that stars, and other celestial bodies in our night sky can in some way affect our lifestyle, our future and our past. This includes zodiac and other similar beliefs.

However many people use both these terms interchangeably, both are very different, astronomy represents a field of science whereas astrology is an ancient way of describing certain events.

There is no scientific evidence supporting astrology.

"ONE OF THE BASIC RULES OF  
THE UNIVERSE IS THAT  
**NOTHING IS PERFECT.**  
**PERFECTION SIMPLY DOESN'T EXIST...**  
WITHOUT IMPERFECTION,  
NEITHER YOU NOR I  
WOULD EXIST."

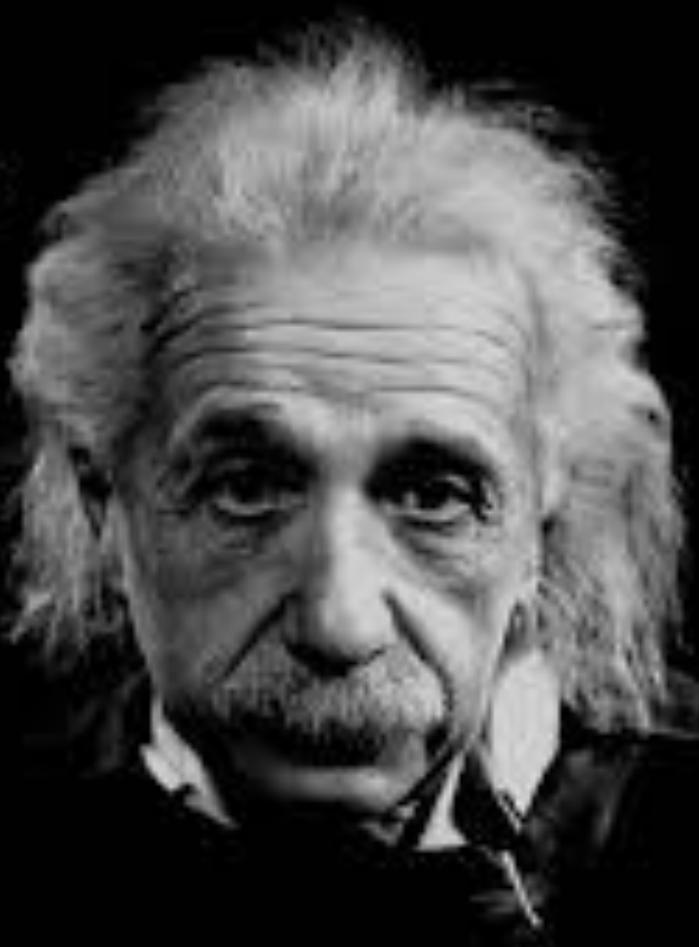
-STEPHEN HAWKING



HUFF  
POST

"Two things are infinite. The universe  
and human stupidity.

...and i'm not so sure  
about the universe."



...“Also earth is not flat. For sure!”...