

TOPIC: STARS AND GALAXIES

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S3 PHYSICS
NEW CURRICULUM
X EDITION

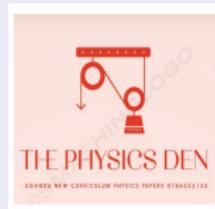
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STARS

- When you look into the sky in a clear night, you see very many stars. These appear in different sizes, brightness and color.
- These stars may appear to form some patterns.

KEY words

- Stars
- Sun
- Galaxies
- Energy (Heat and light)



Scan for connection with the Author

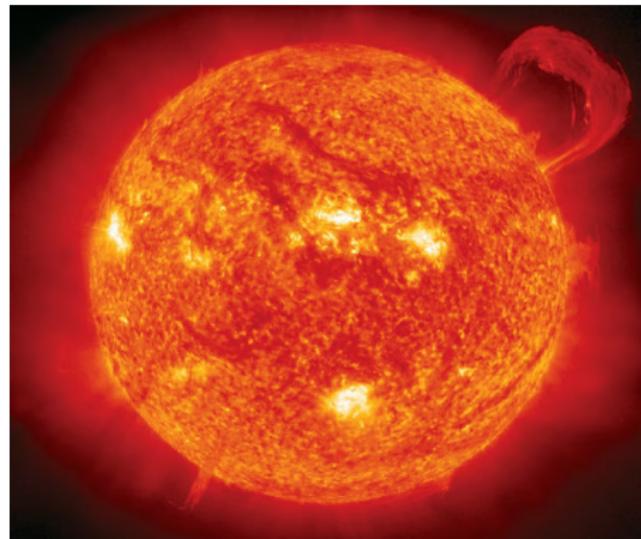
A STAR

- A star is a massive, luminous (shining) sphere of plasma (hot gas) held together by gravity.
- Made up of hydrogen.
- Source of energy - Nuclear fusion leading to temperature increase.



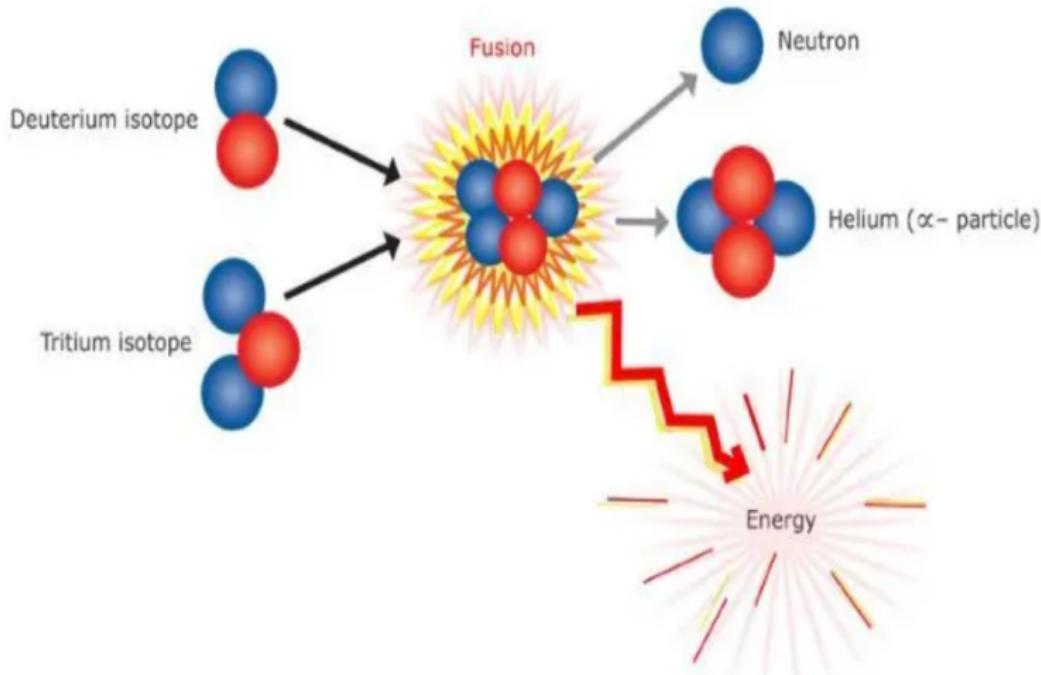
SUN

- It is a star.
- Location - Milky Way galaxy
- Largest object in the solar system.
- Nearest star to the planet earth.



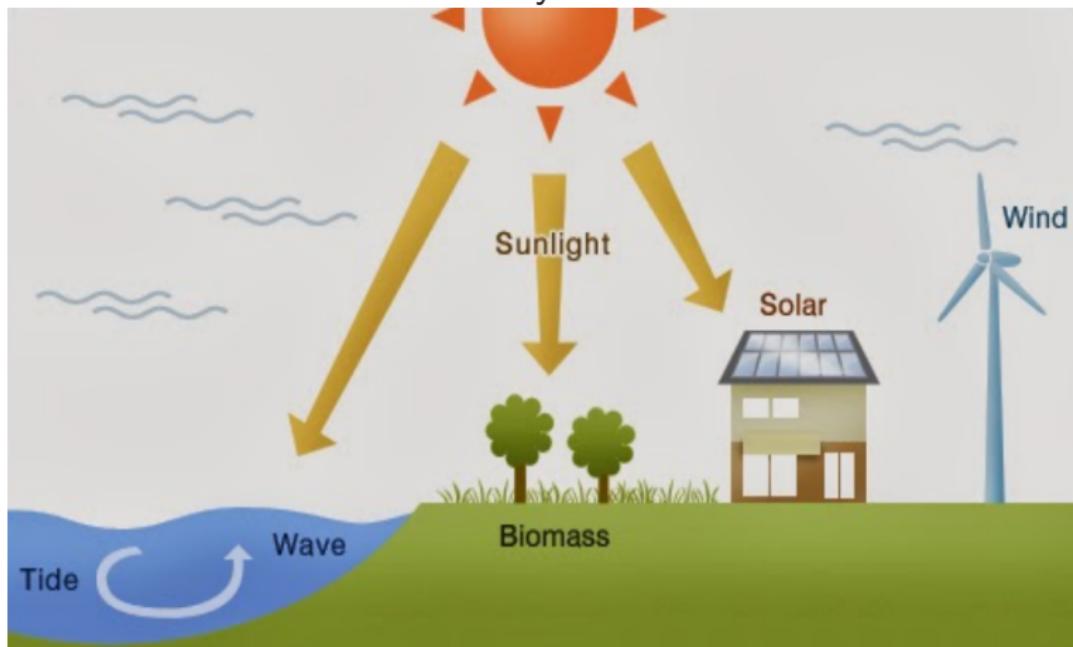
QN. How does the sun generate its energy?

- Nuclear fusion.



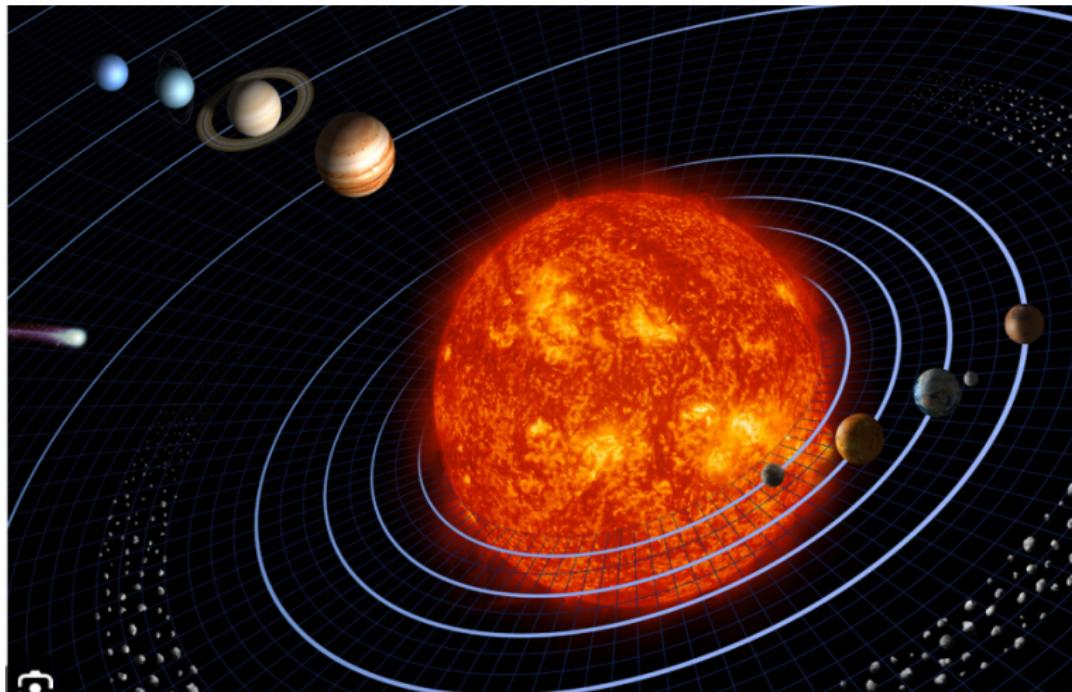
QN: Why is the sun the major source of energy on earth?

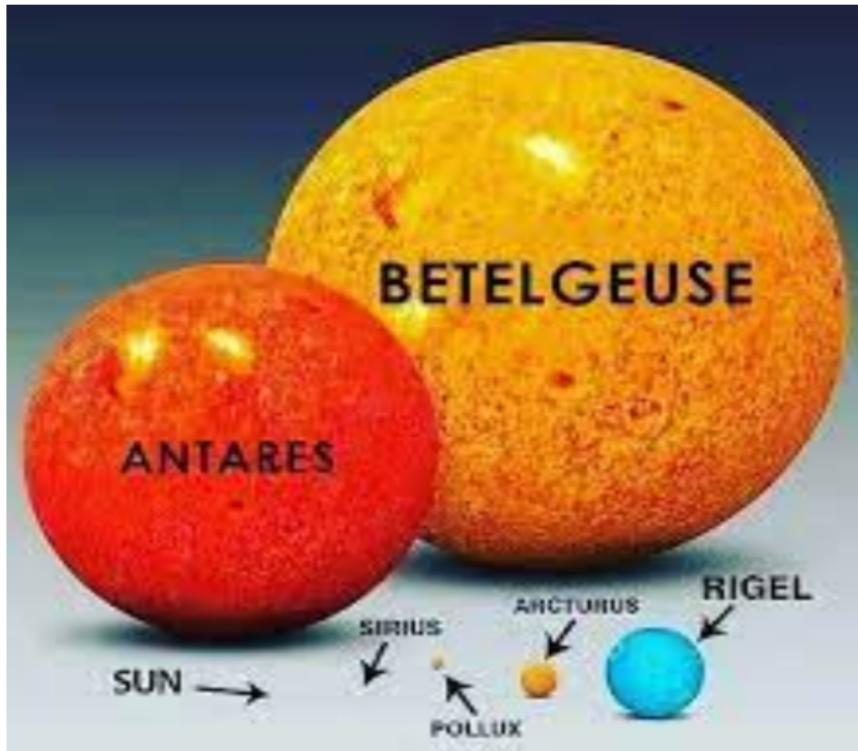
Because almost all forms of energy on earth originate directly or indirectly from it.



Size of the Sun

- The sun is 330,000 times the mass of the earth.
- The sun is an average sized star.
- Some stars are much bigger than the sun.





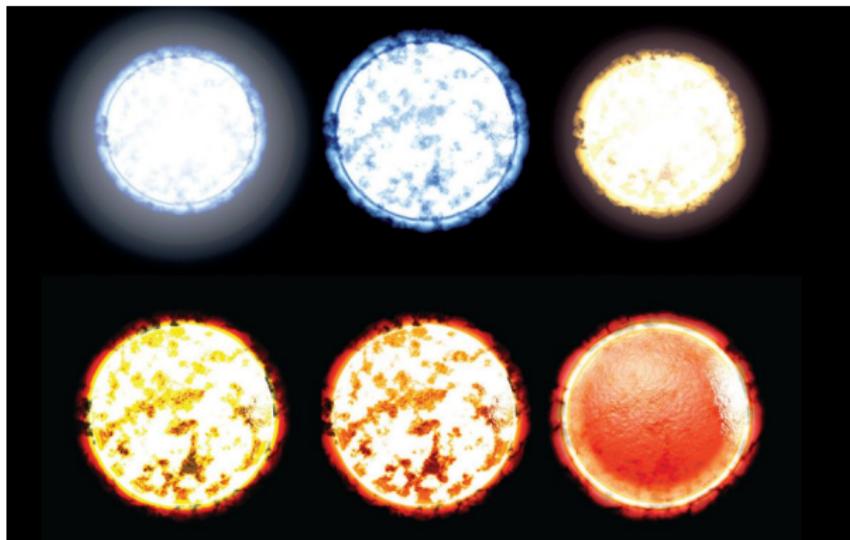
Variation in colour and brightness of stars.

- Brightness - Size, Temperature and Distance from the star.
- Color - Temperature



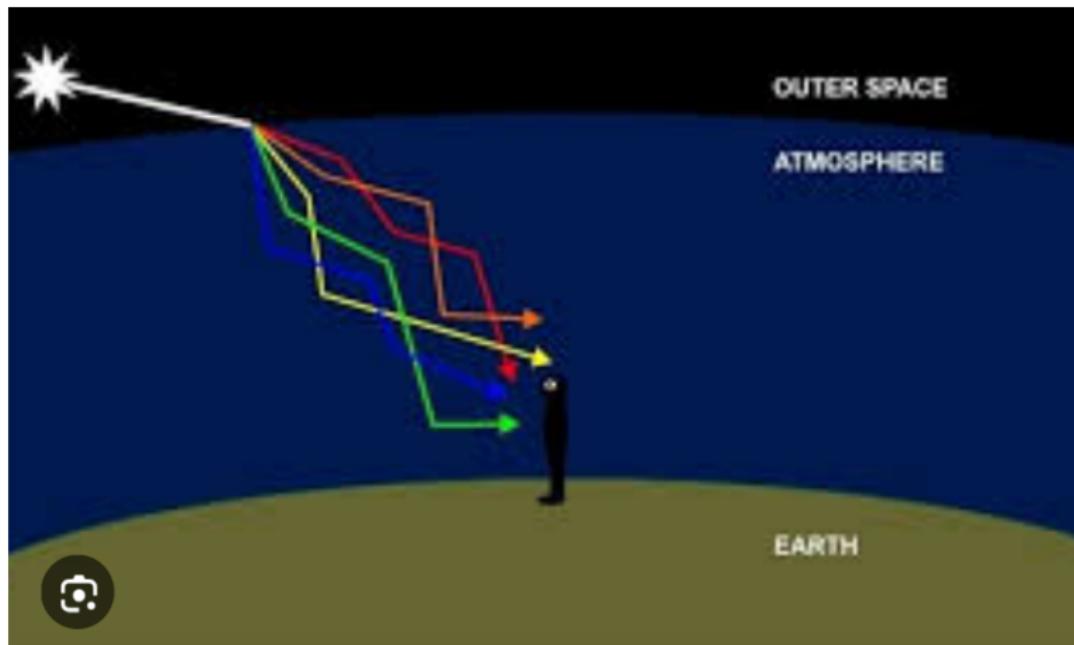
Factors that determine the brightness and colour of stars to an observer

- Luminosity
- Distance
- Temperature



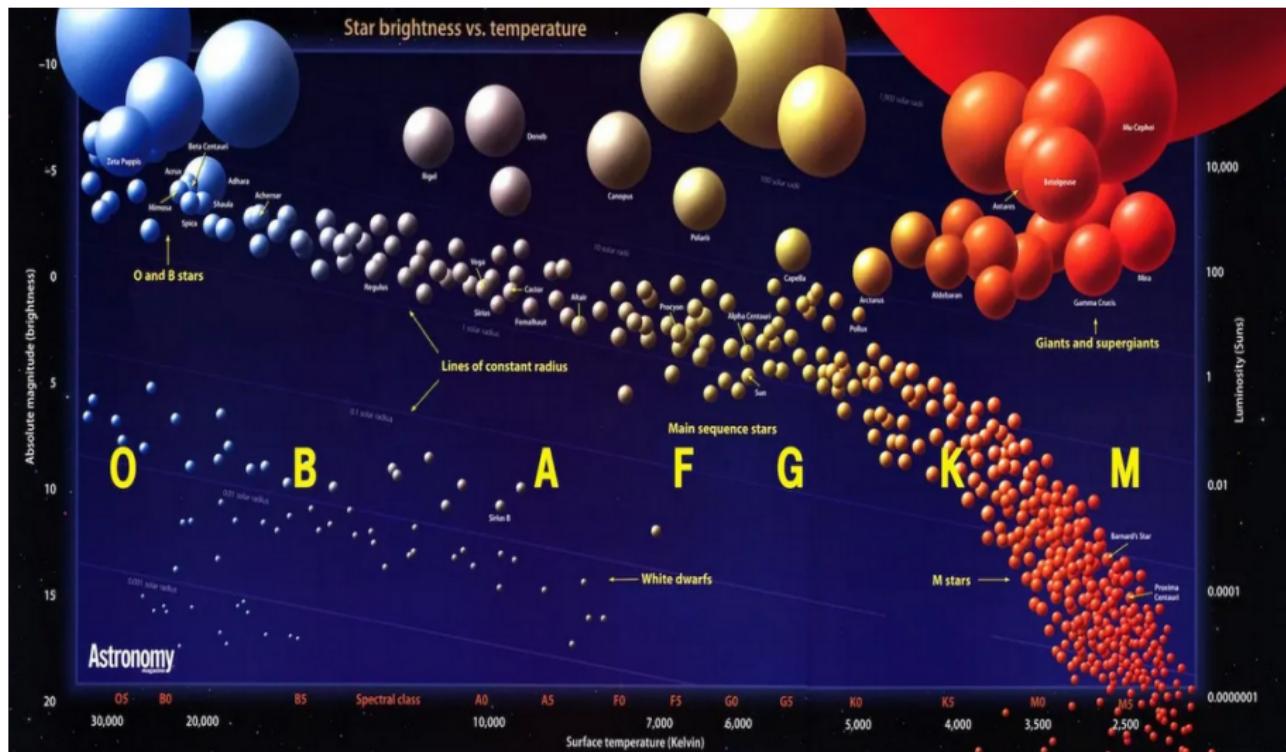
Qn. Why do stars appear to twinkle?

- Atmosphere

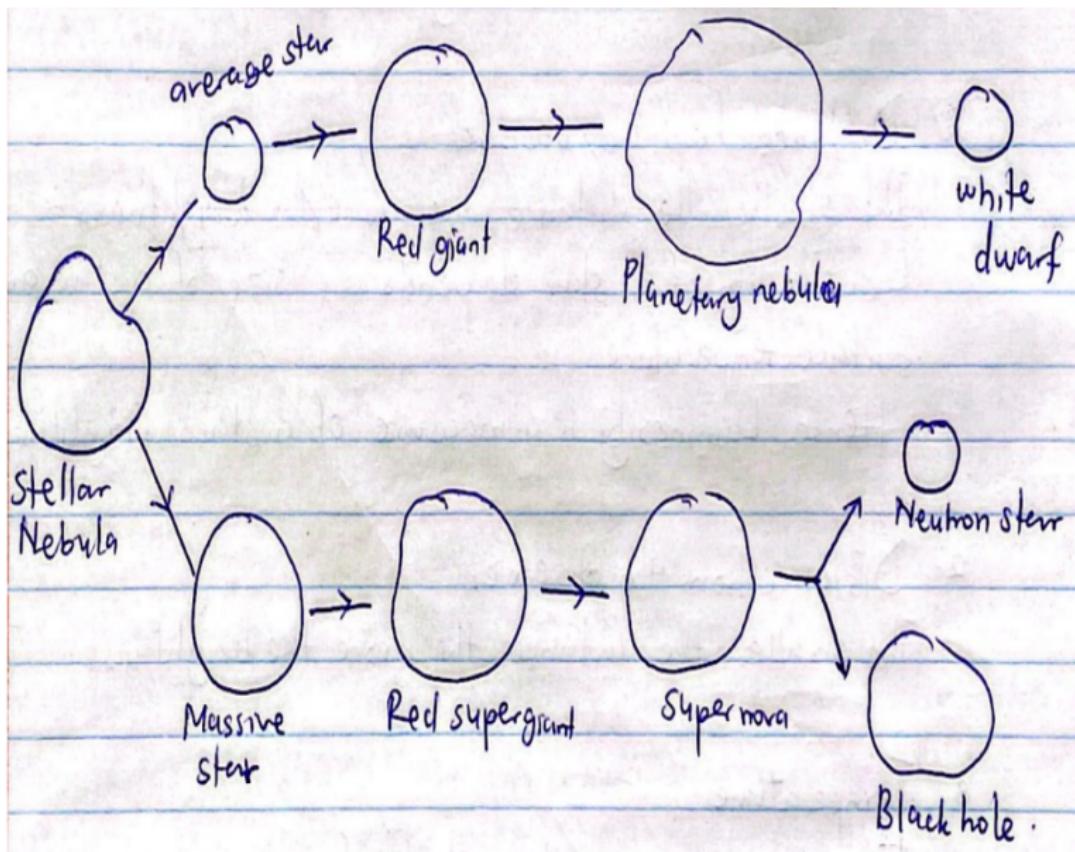


TYPES OF STARS

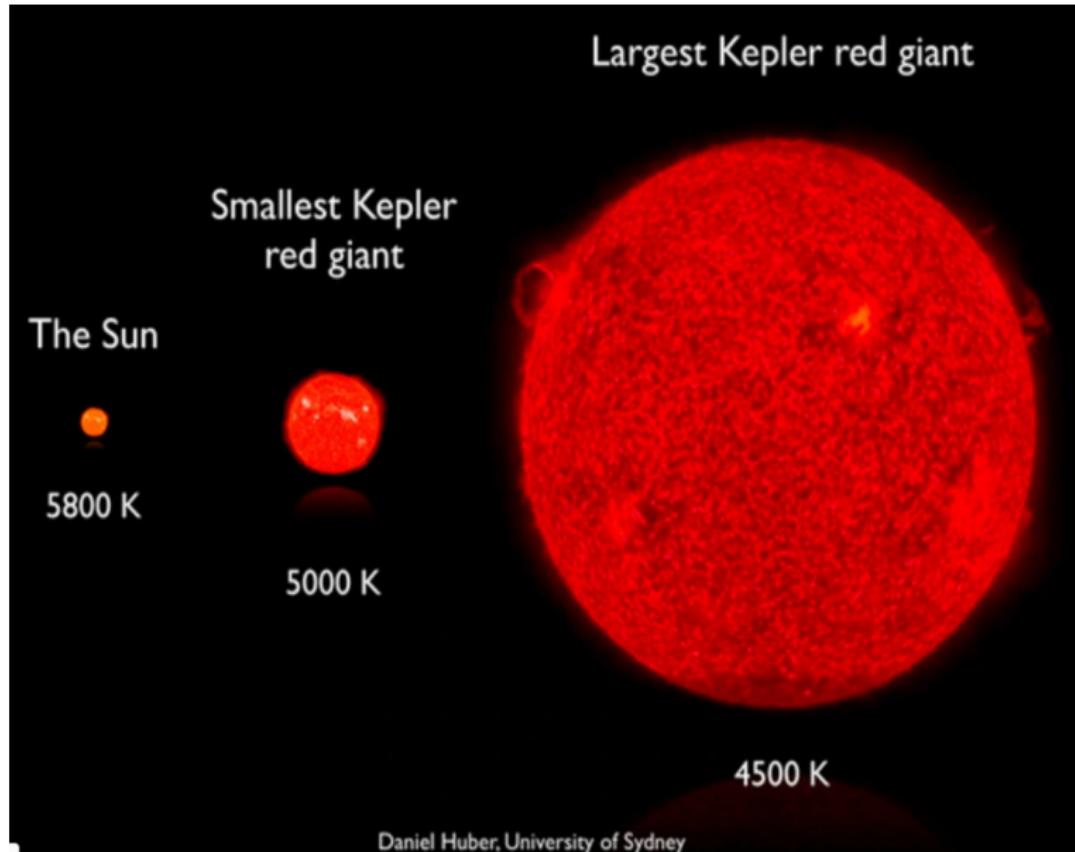
- O B A F G K M
- O - blue
- M - Red
- Sun - G star



THE LIFE CYCLE OF A STAR



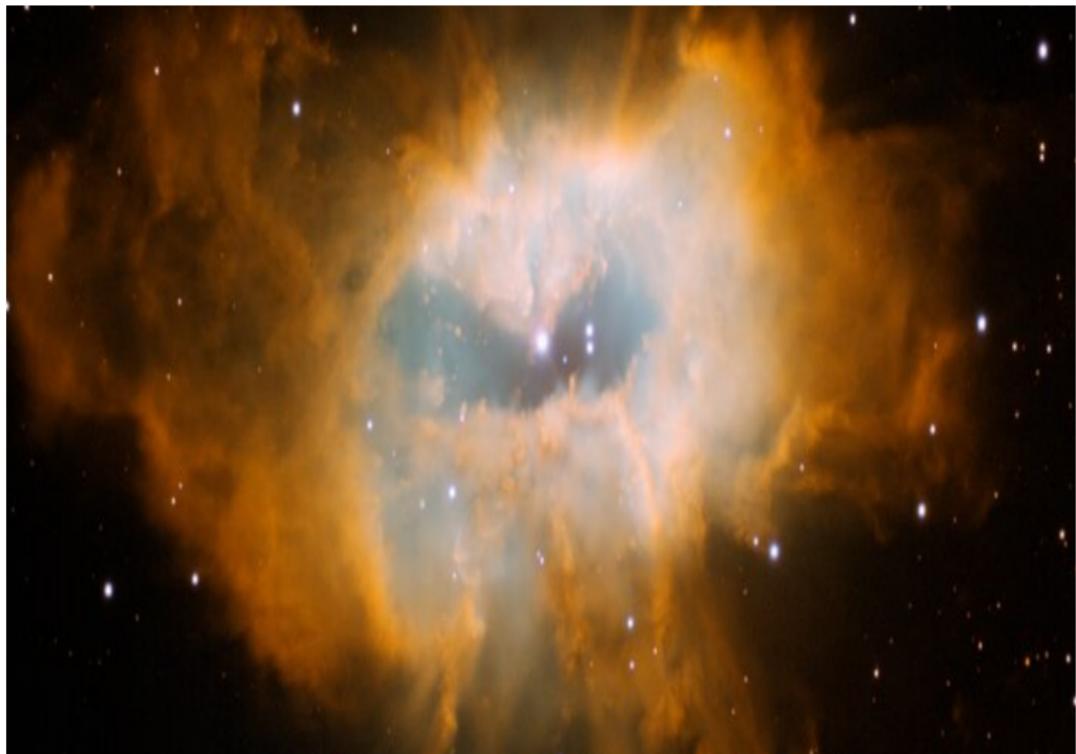
Red giant and red super giant



Daniel Huber, University of Sydney

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Planetary nebula



white dwarf



supernova



supernova



neutron star



black hole



- **Qn. What is the difference between Red giant and Red supergiant star?**

A red supergiant is bigger, brighter and older than compared to a red giant. A red supergiant is formed from a massive star while a red giant is formed from average stars.

A red super giant is formed from a massive star while a red giant is formed from average stars.

- **Qn Explain why stars get hotter as they age.**

The core contracts after hydrogen depletion → gravitational potential energy converts to thermal energy hence temperature rises.

- **QN Explain how the nuclear reactions that provide the energy in stars change as they grow older?** As stars grow older, their nuclear reactions shift from fusing lighter elements to heavier elements because the core gets hotter and denser.

Young stars (main sequence) fuse hydrogen into helium in their cores.
Red giant: Helium to carbon.

Massive star (late stages): Carbon to oxygen to neon to silicon to iron

GALAXIES

- Galaxy - nebulae + stars + star clusters.
- Milky Way galaxy, Andromeda galaxy
- NB: In a galaxy, very many stars are arranged in recognizable shapes called constellations.
- Elliptical, Spiral, Irregular.

Types of Galaxies



Barred Spiral



Irregular



Spiral



Peculiar



Elliptical



Lenticular

Types of Galaxies



END