BETELGEUSE - SPACE

NEWS: Research has uncovered surprising findings about Betelgeuse, which is one of the brightest stars in the night sky.

WHAT'S IN THE NEWS?

About

- They are Red giants 100,000 times brighter and 400 million times larger than the Sun.
- It is the second-brightest star in the Orion constellation, with irregular brightness changes debated by researchers. (Note: Orion's brightest star is Rigel).
- Astronomers found the stage of the red giant star Betelgeuse by studying the pulsations.

Pulsations in the Betelgeuse

- It has two pulsation cycles, one over a year and another around six years.
- Pulsations in the star suggest Betelgeuse is approaching a supernova explosion.

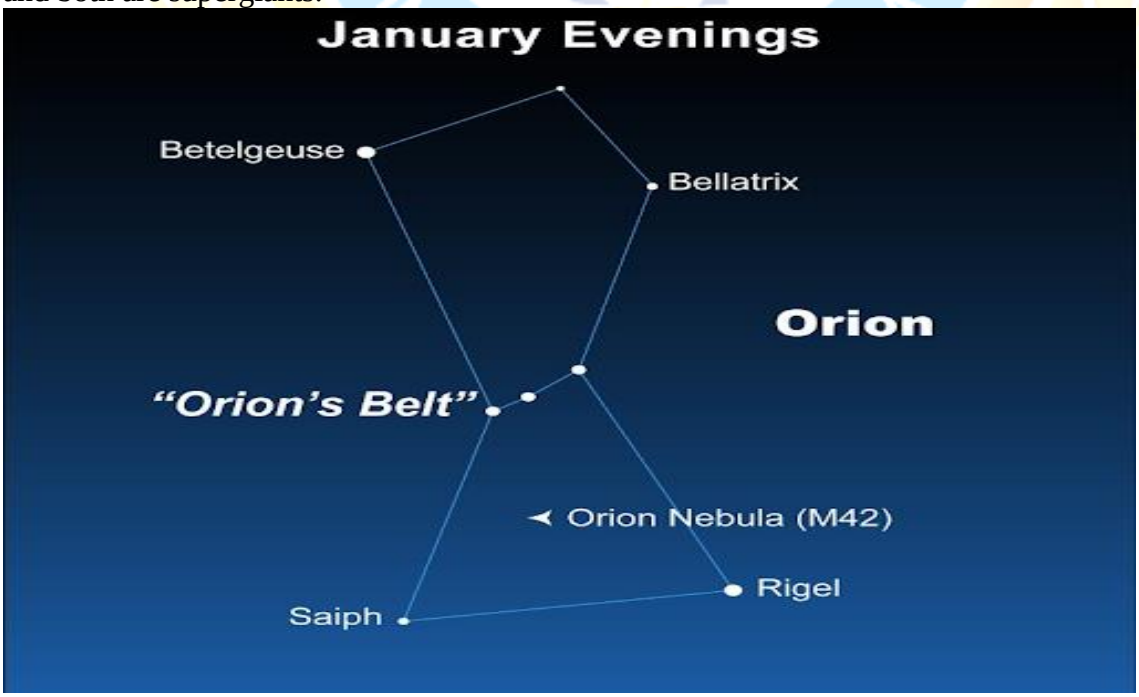
Pulsation in stars is the periodic expansion and contraction of the outer layers of a star, which causes change in luminosity.

Orion constellation

Orion is a **set of stars which are seen during winter in the northern hemisphere. It is one of the 88 constellations in the modern day**.

It is named to mean a hunter in Greek mythology.

Its two brightest stars are Rigel and Betelgeuse. Both are among the brightest stars in the night sky and both are supergiants.

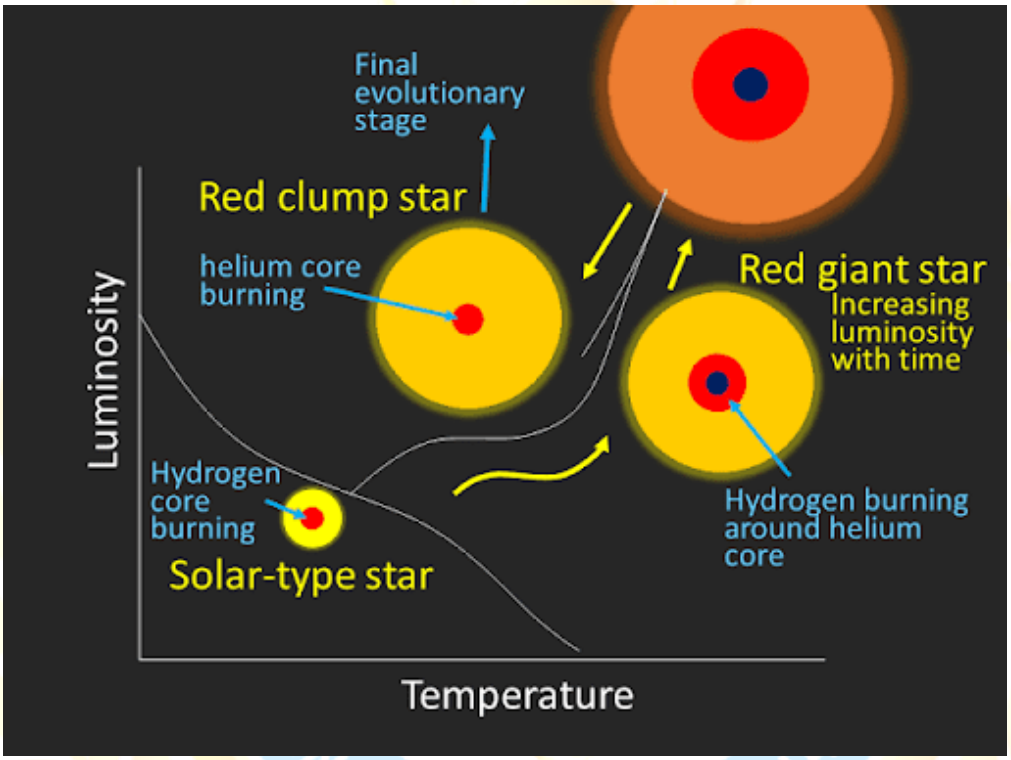


Red giants

They are stars **which have run out of hydrogen fuel for nuclear fusion which are fusion of two hydrogen isotopes to form helium in stars.**

The core of the star collapses, and the plasma shell around the core warms up enough to fuse hydrogen.

This extra heat causes the dramatic expansion of the star's outer layers making it a giant red star.



Stages of Evolution:

- **Stars like Betelgeuse fuse hydrogen into helium during their initial stages**, which helps **maintain a balance between gravity and energy release.**
- Massive stars like Betelgeuse **run out of hydrogen fuel in a few crore years,** when they switch to using helium to make carbon. Helium runs out in about **10 lakh years.**
  - As each stage progresses, the **burning of elements becomes faster, with carbon burning in a few hundred years** and silicon burning in about a day.
  - Afterwards **red giants briskly consume one by one the elements of the periodic table**, until finally their core brims with iron.
  - Once the core is rich in iron, the temperature and pressure within the star drop. With nothing to stop it, **gravity compresses the core and turns it into a neutron star or a black hole.**

Betelgeuse's late-carbon stage signifies the terminal phase before the star's imminent collapse.

Source: https://www.indiatoday.in/science/story/betelgeuse-the-star-that-could-explode-in-front-of-our-eyes-is-not-alone-2621163-2024-10-22