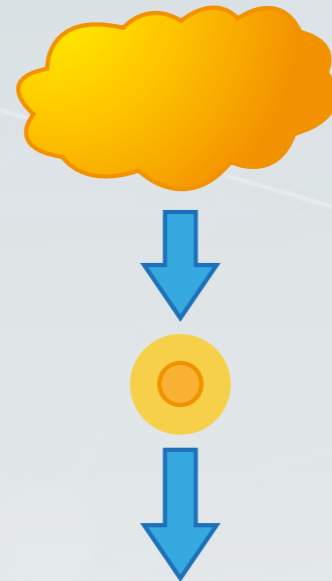


### Life cycle of stars

Stars depend on one key process, fusion of elements to release their energy. Their stability depends on two forces, **1. gravitational** acting inwards and **2. radiation and gas pressure** acting outwards.



1. Stars are formed from clouds of gas, **hydrogen and helium**, and dust.
2. **Protostars** form when gravity collects this cloud together and as it is compressed it heats up.
3. In **main sequence** stars, **hydrogen fuses to form helium**. This creates enough radiation and gas pressure to **balance** the gravitational forces.

4. The hydrogen fuel begins to run out and the star will begin to **fuse helium** into larger elements (e.g. carbon). **This increases the gas and radiation pressure**. The star will expand and become a **Red giant**.



4. The hydrogen fuel begins to run out and the star will begin to **fuse helium** into larger elements (e.g. iron). **This increases the gas and radiation pressure**. The star will expand and become a **Supergiant**.



5. The helium fuel begins to run out and the reaction will slow. **The gas and radiation pressure will decrease**. The star will shrink and become a **White dwarf**.



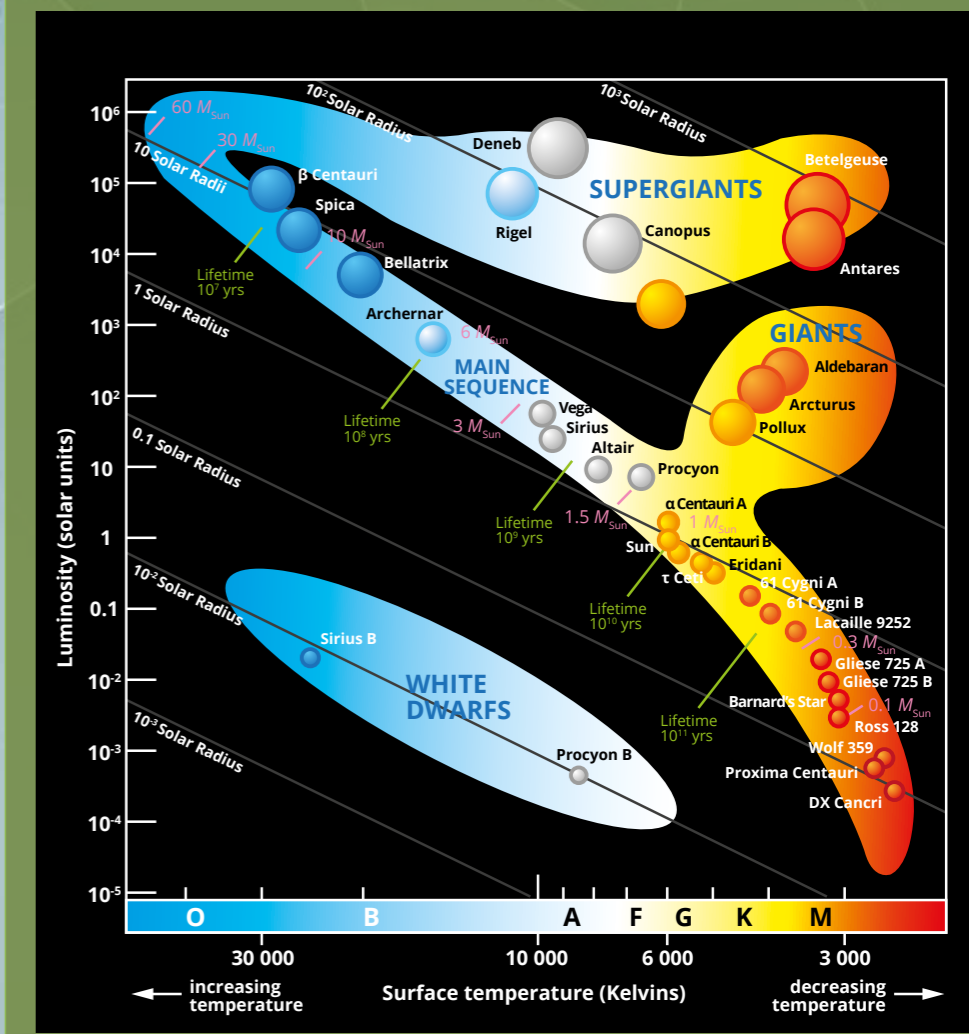
5. The helium fuel begins to run out and the reaction will slow. The star becomes very unstable and will explode in a **supernova**, throwing gases and dust out into space. The **high pressure and temperature** in a supernova will cause the fusion of the heaviest elements.



6. The remaining matter will **collapse** due to the gravitational force as the **gas and radiation pressure will be small** and shrink to form a **Neutron star** or a **Black hole**.



### H-R diagram Hertzsprung-Russell diagram



This diagram is a way of presenting a lot of information about stars, it shows their **size, temperature, colour, luminosity (brightness)** and they are grouped into the **different stages** of the star's life cycle. For example, the main sequence stars are all in a line, the red giants are grouped together.