

# The life cycle of a high mass star

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The life cycle of a high mass star, which is much larger than our Sun, includes the following stages:

1. **Nebula:** The process begins with a nebula, a vast cloud of hydrogen gas and dust.
2. **Protostar:** Gravity causes the nebula to collapse into a protostar, where density and temperature increase due to the compression of material.
3. **Main Sequence Star:** Once the temperature is high enough, nuclear fusion ignites, converting hydrogen into helium, and the star enters the main sequence phase. This is a stable period where the outward pressure from nuclear fusion balances the inward pull of gravity.
4. **Red Supergiant:** As hydrogen in the core is depleted, the star expands and cools into a red supergiant. Fusion continues in shells around the core, with heavier elements being produced (carbon and iron).
5. **Supernova:** When fusion can no longer sustain the core, it collapses and then rebounds, causing a massive explosion known as a supernova. This explosion disperses the star's outer layers into space.
6. **Neutron Star or Black Hole:** The core that remains after the supernova can form a neutron star, an incredibly dense object composed mostly of neutrons. If the core is massive enough, it will collapse further into a black hole, a point in space with gravity so strong that not even light can escape.

## High Mass Star:

- R136a1
- Ha Carinae
- Pistol Star
- WR 101e