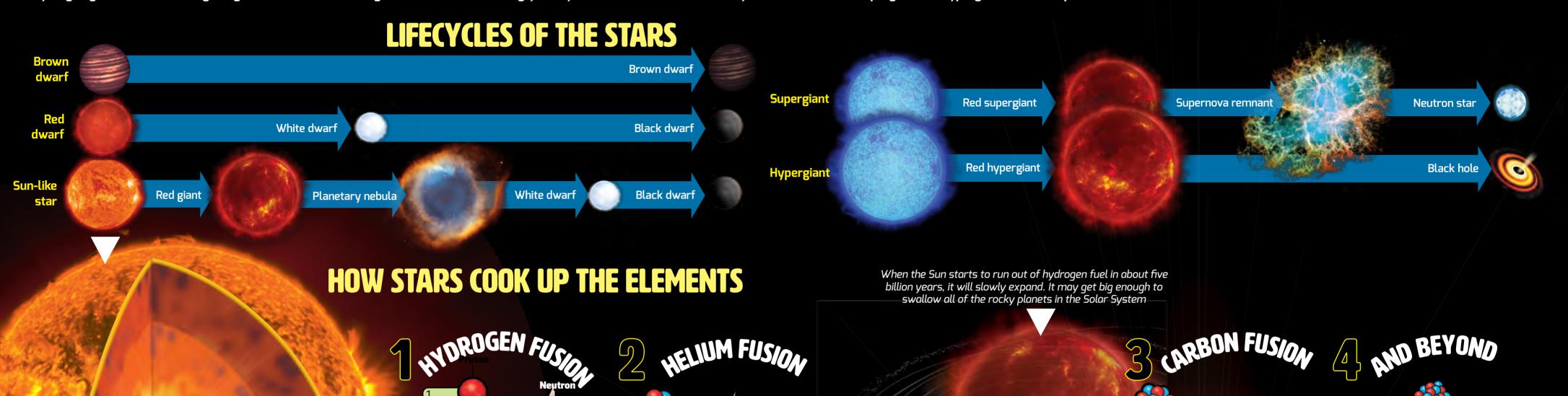
Science and Technology Facilities Council

They say that we are 'made of star stuff' and that is literally true. This is because most of the chemical elements that make up you and me and the world around us were actually cooked up in the cores of stars. These nuclear furnaces took the hydrogen gas created in the Big Bang and fused the atoms together to create increasingly heavy chemical elements.

Some stars, like brown dwarves, never get hot enough for fusion to take place. Stars the size of our Sun can continue fusion to elemens as heavy as carbon (the elements that forms the basis of life on Earth), but it takes truly massive stars, like supergiants or hypergiants to cook up the heaviest chemical elements.

Heavy elements thrown into space



 Under the extreme heat and pressure in star's core, two hydrogen gas nuclei (made up of a single proton) are fused together to create the heavier element, Helium.

fused everything it has into iron.

He

2. The next stage after hydrogen fusion is helium fusion. All the helium the star made is fused together to make elements like oxygen and carbon.

He

3. Once the star runs out helium to burn, fusion stops again. If the star is massive enough, the core will be crushed again and it will get hot enough again for carbon fusion to begin. This creates heavier elements like magnesium, aluminium and sodium.

that weren't fused into iron – a bit like an onion.

4. This process of fusion, running out of fuel, fusion stopping, core collapse and fusion restarting are repeated until, finally, iron is created. No star has enough mass to fuse iron nuclei together. So this where even the most massive stars die.

A star's colour is determined by how hot it is - really hot stars are blue, whereas cooler stars are yellow or even red. The spectrum of light emitted by a star can give us a lot of information about the star. Astronomers use seven main

classifications for stars based on their colour spectrum.

6,500 °C

 Colour
 Class
 Temperature
 Colour
 Class
 Temperature

 0
 over 30,000 °C
 G
 5,300 °C

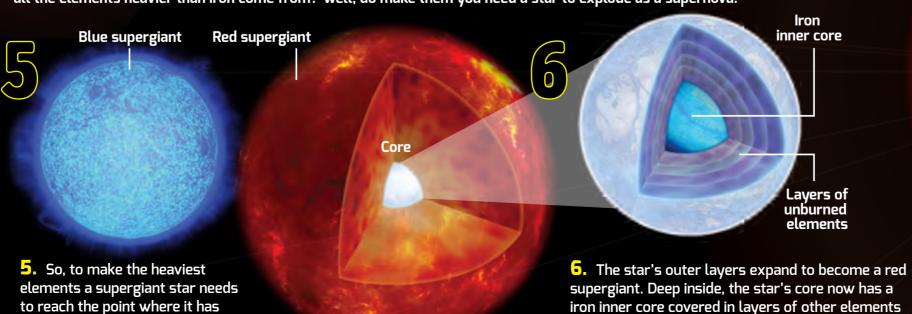
 B
 20,000 °C
 K
 4,000 °C

 A
 8,500 °C
 M
 3,000 °C

The Sun is a yellow G-class star

HOW SUPERNOVA MAKE THE REALLY HEAVY STUFF

So, if all the chemical elements are made in stars, and no star can make anything heavier than iron, where did all the elements heavier than iron come from? Well, do make them you need a star to explode as a supernoval



7. When fusion stops the core collapses, creating a violent shockwave. At the same time, the rest of the star also collapses and the two shockwaves meet. The iron and other elements are suddenly compressed and super-heated. This triggers one last wave of fusion that creates heavy elements like gold, lead, mercury, titanium and

uranium. Which are thrown

into space when star explodes.