Thursday, 21 May 2020

LO: What are stars ?

Developing:	Secure:	Extending:
List different types of stars.	Describe life cycle of stars.	Evaluate from given data which pathway a star will follow.

Key Vocabulary:
Star, Fusion, Main sequence, Giant, Dwarf.

Types of Star

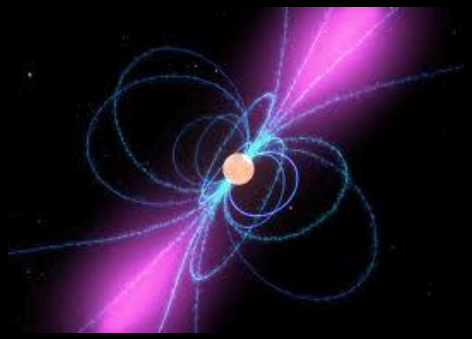
Red Dwarf

Red Giant / Blue Giant

White Dwarf

Black Dwarf

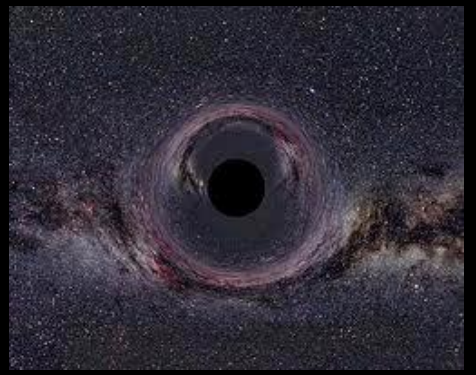
Pulsar



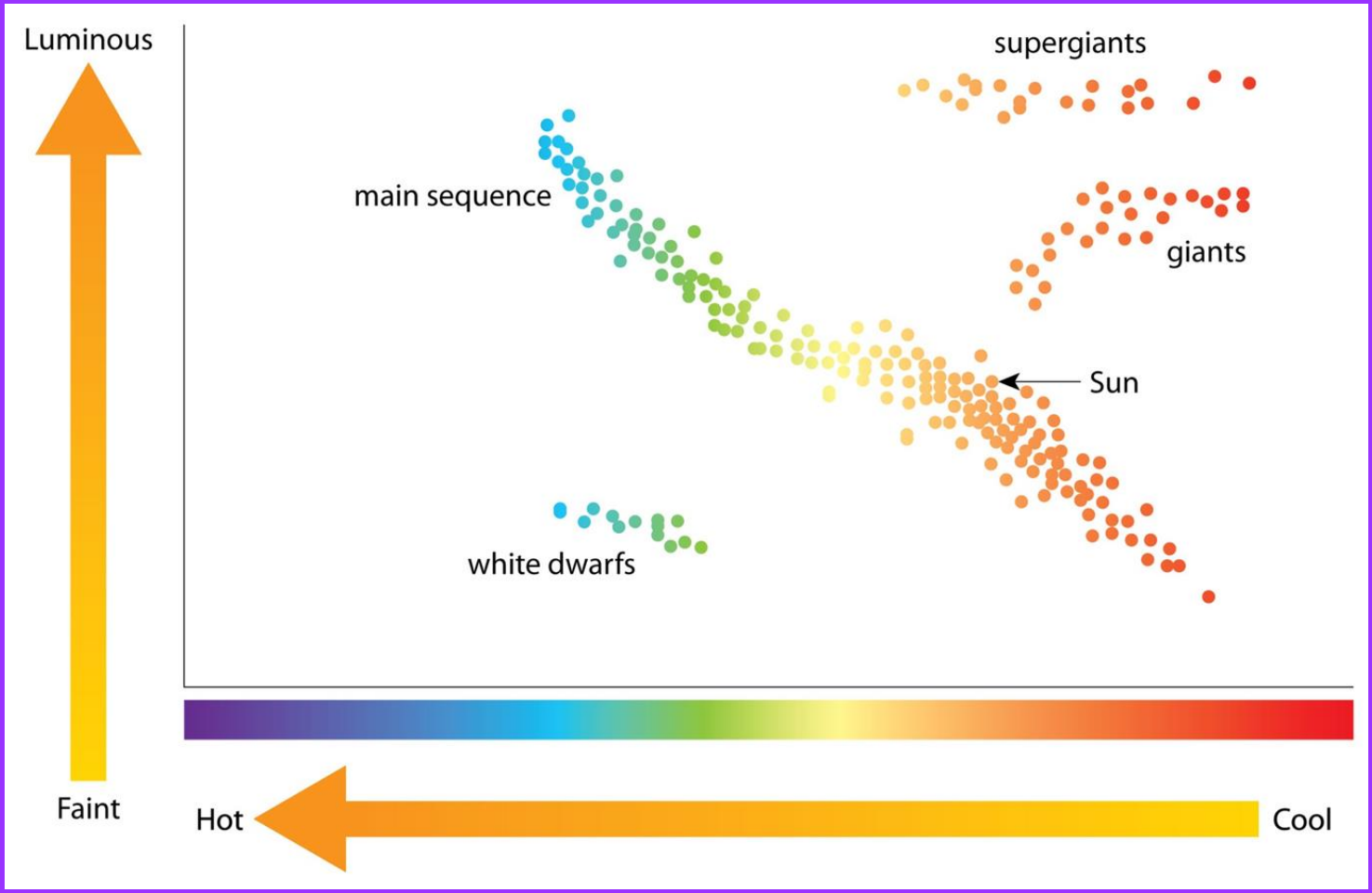
Nebula

Supernova

Black Hole

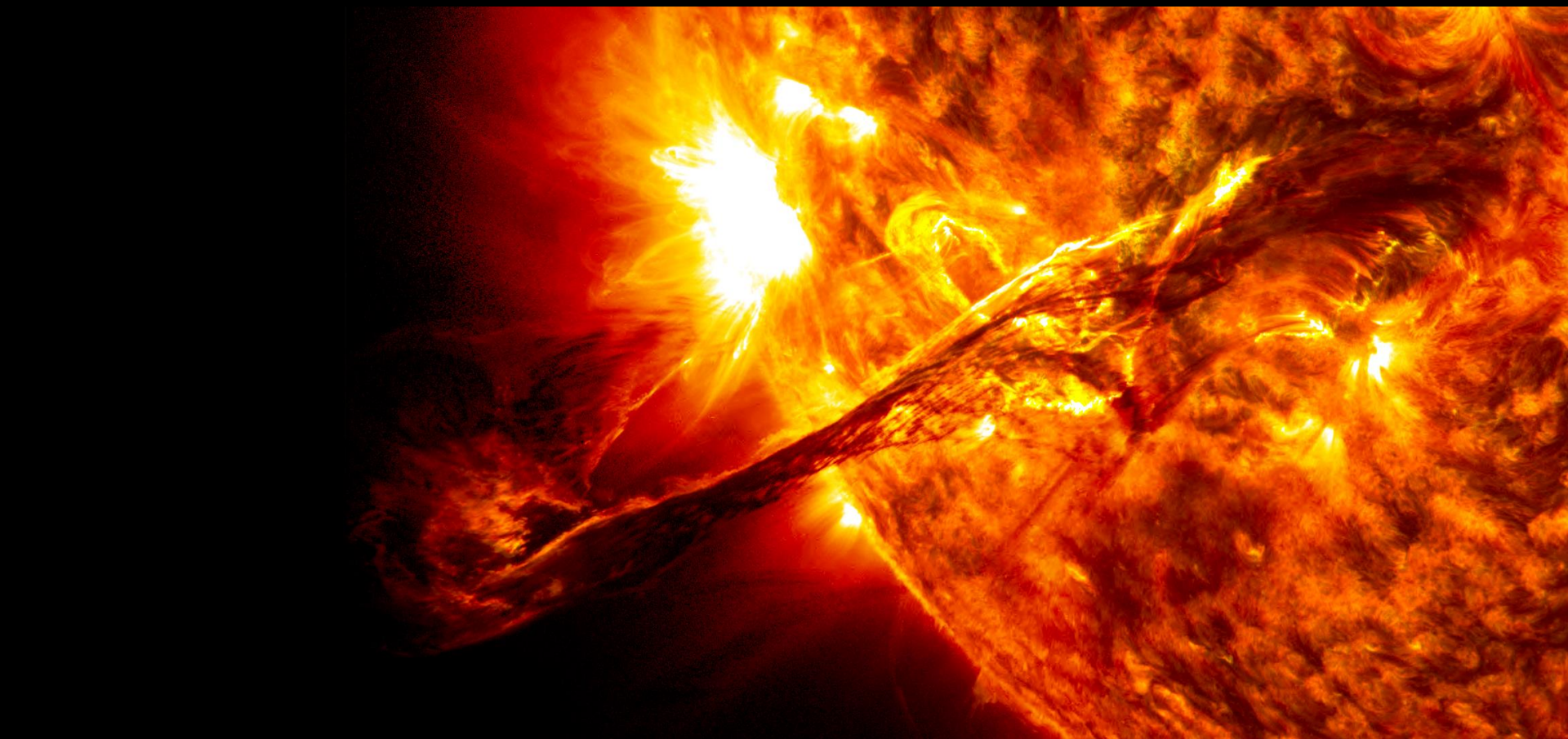


Hertzsprung–Russell Diagram



Nuclear Fusion vs Nuclear Fission

Nuclear fission happens in power plants and nuclear bombs – it's basically "splitting a nucleus".
Nuclear fusion happens in stars – it's basically "fusing nucleii together"



Stage 1: Nebulae

A nebulae is a collection of dust, gas and rock.

Some examples of nebulae…


Dark nebula


Emission nebula


Reflection nebula

Planetary nebula

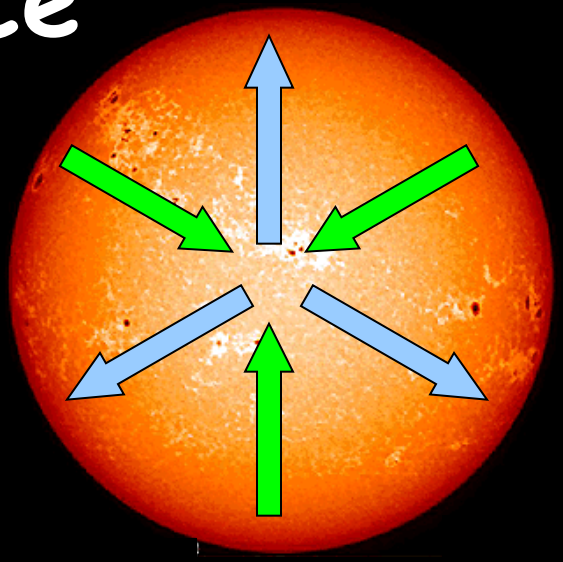
(This nebula is smaller and will only form a planet)

Stage 2: Protostar

Gravity will slowly pull these particles together…

As they move inwards their gravitational potential energy is converted into heat and a PROTOSTAR is formed

Stage 3: Main Sequence



In a main sequence star the forces of attraction pulling the particles inwards are _____ by expansion forces due to nuclear _____ reactions and the high temperature.

Stars are basically _____ reactors that use _____ as a fuel. During its main sequence a star will release energy by converting hydrogen and helium (light elements) into _____ elements and this is why the universe now contains a number of heavier elements.

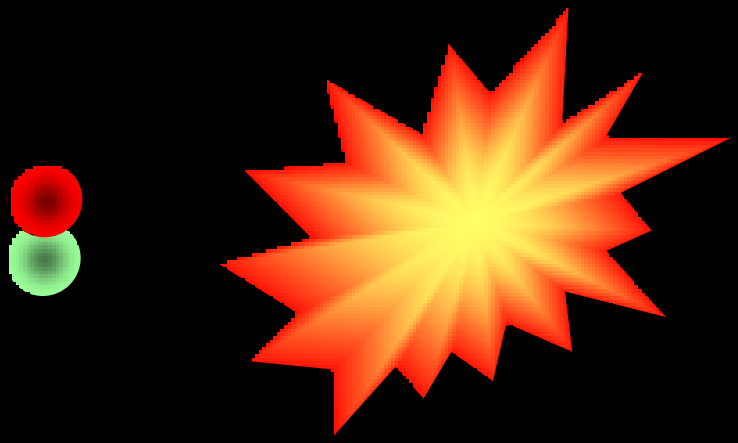
Our sun is an example of a main sequence star – it's in the middle of a 10 billion year life span

Words – heavier, balanced, hydrogen, nuclear, fusion

Nuclear Fusion in stars

Proton

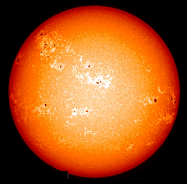
Neutron



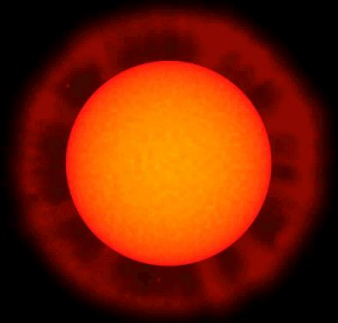
Nuclear fusion happens in stars and leads to the formation of new elements. It's not possible to use it in power stations yet as it needs temperatures of around 10,000,000°C and seriously high pressure.

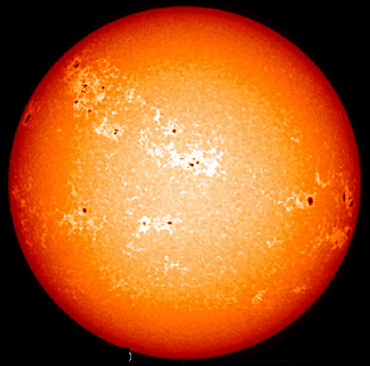
Stage 4: Red Giant

Eventually the hydrogen and helium will run out. When this happens the star will become colder and redder and start to swell…

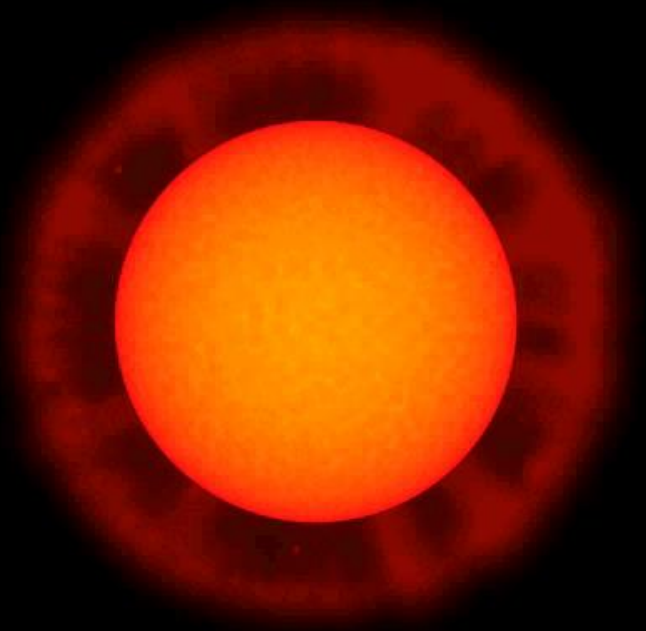


If the star is relatively small (like our sun) the star will become a RED GIANT





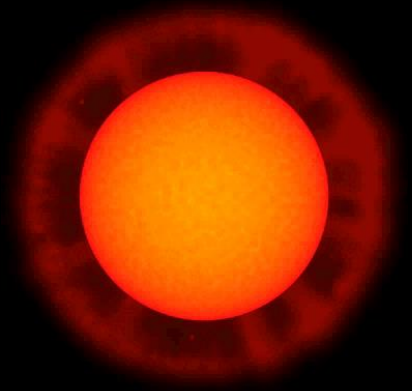
If the star is big (at least 4 times the size of our sun) it will become a RED SUPERGIANT



Stage 5: The Death

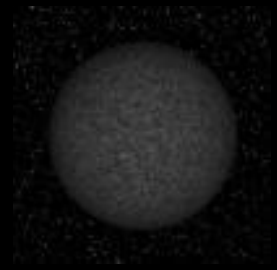
What happens at this point depends on the size of the star…

1) For SMALL stars the red giant will collapse under its own gravity and form a very dense white dwarf:



Red giant

White dwarf



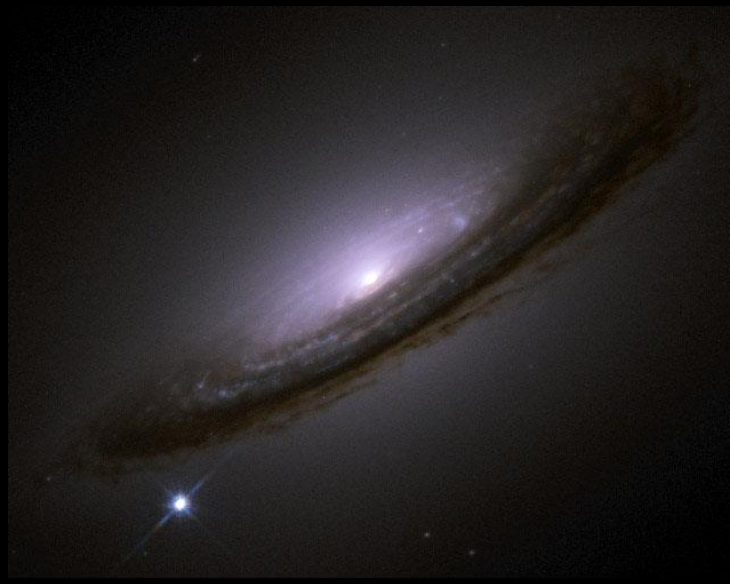
Black dwarf

Stage 5: The Death

2) If the star was a RED SUPERGIANT it will shrink and then EXPLODE, releasing massive amounts of energy, dust and gas.

Before

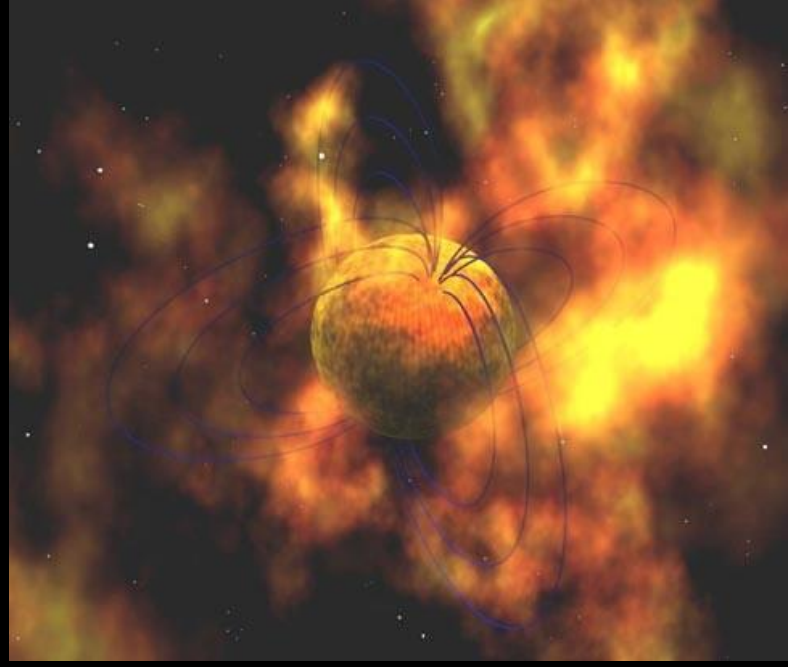
After



This explosion is called a SUPERNOVA

Stage 5: The Death

The dust and gas on the outside of the supernova are thrown away by the explosion and the remaining core turns into a NEUTRON STAR.



If the star is big enough it could become a BLACK HOLE instead.

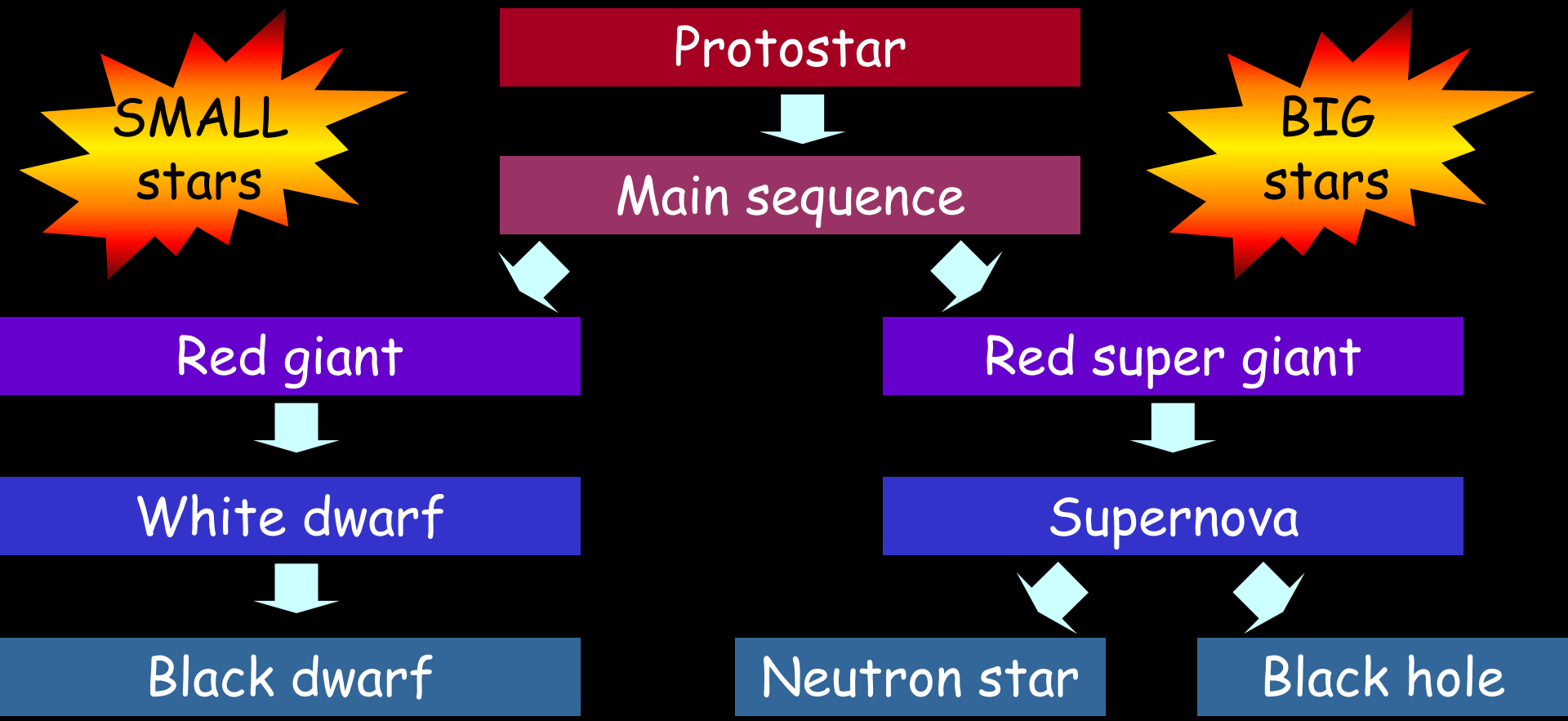
Stage 6: Second generation stars

The dust and gas thrown out by a supernova can be used to form a new star…

Our sun is believed to be a "_____ _____ star" – this is because it contains some _____ elements along with hydrogen and _____. These heavier elements would have been produced by a _____ and thrown out when the star exploded. These heavier elements are also found on planets, indicating that they might have been made from remains of previous _____ as well.

Words – helium, heavier, second generation, stars, supernova

The Life Cycle of a Star summary



Basically, it all depends on the size of the star!

Life Cycle of a Star