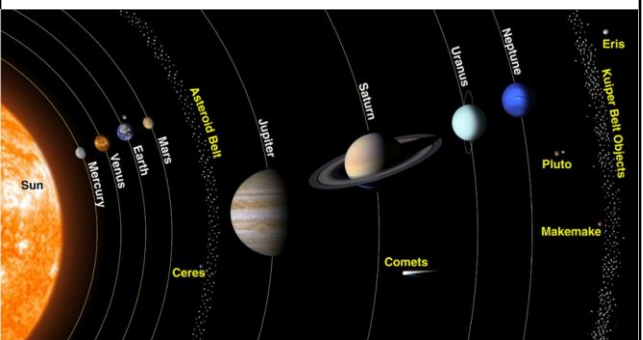


## The Solar System

Our star the sun is orbited by planets, dwarf planets, asteroids and comets. Moons orbit the planets. These are all natural satellites.

The sun was formed from a nebula pulled together by gravity 5 billion years ago.



## Life-cycle of a star

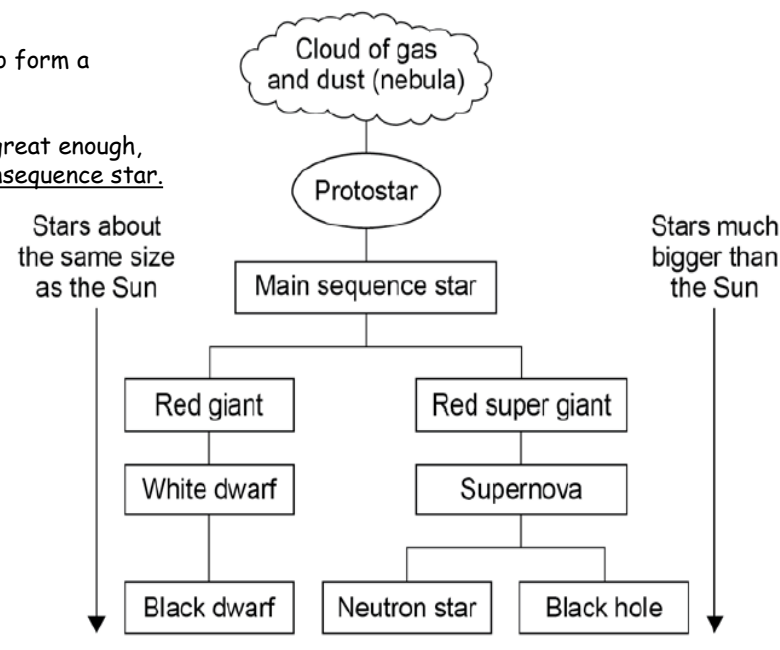
\* Gravity pulls dust together in a nebula to form a Protostar.

\* When the temperature and pressure is great enough, nuclear fusion begins turning it into a mainsequence star.

\* When the hydrogen runs out the star collapses as gravity is greater than the pressure from fusion. Heavier elements start to fuse expanding the star to form a red giant.

\* When the heavier elements run out the star becomes either a white dwarf or explodes in a supernova depending on its size.

\* The very largest mainsequence stars will eventually become black holes. Slightly smaller stars become neutron stars.



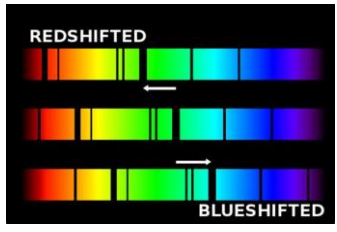
## Making Elements

All elements up to iron are made through the fusion of smaller elements in the cores of stars. The larger and hotter the star the heavier the elements it can fuse.

All elements heavier than iron are fused during a supernova explosion. This then distributes these elements across the Universe.

## Redshift

Light from a star or galaxy can be used to produce an absorption spectrum. This includes absorption lines, which indicate the elements present.



If a star or galaxy is moving towards us then the light from it shows a blueshift.

If the star or galaxy is moving away from us then it shows a red-shift.

**ALL GALAXIES SHOW RED-SHIFT**

**The further away a galaxy is the faster it is moving away from us.** We know this as it shows more redshift.

**This proves that the universe is EXPANDING, this provides evidence for the BIG BANG theory.**

## The Big Bang theory

The Big Bang Theory suggests that the Universe started with a very small hot, dense region and has been expanding ever since.

This is supported by evidence from the red-shift of galaxies, observations of certain types of supernova and CMBR.

**Cosmic Microwave Background Radiation (CMBR)** is the left over radiation from the Big Bang and provides further evidence for the theory.

### Evidence

Measurements have shown that the expansion of the Universe is increasing in speed.

Theories about Dark Mass and Dark Energy help to explain these observations, however more evidence is needed to confirm these ideas.

## Objects in Orbit

All objects in orbit are accelerating and their velocity is changing, this is because their direction is always changing. If it is a circular orbit then the speed will be constant.

If the speed of the object in orbit increases then the radius of the orbit must increase in order to keep it stable. If the speed reduces the radius must also reduce.