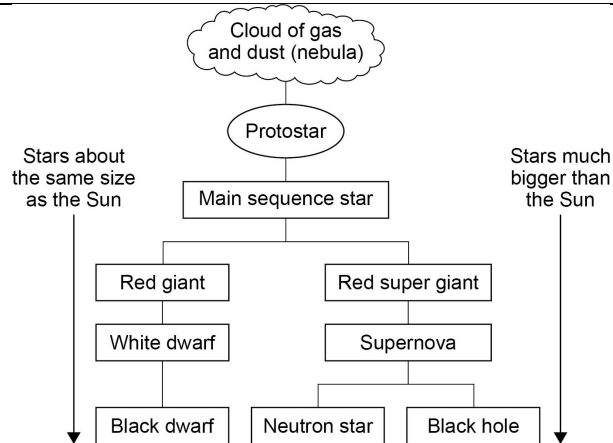


Meden School Curriculum Planning							
Subject	Physics	Year Group	11	Sequence No.	23	Topic	P8 Space

Retrieval	Core Knowledge	Student Thinking
What do teachers need retrieve from students before they start teaching new content ?	What specific ambitious knowledge do teachers need teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to development of our students thinking, encouraging them to see the inequalities around them and 'do something about them!'
<p>Y7 Solar System Planets of the solar system, planets orbits stars and satellites orbit planets. Moons are natural satellites.</p> <p>Y9 Gravity and Space Gravity between objects is linked to the mass of the objects and the distance between the objects. Life cycle of the sun and large stars. Solar system is a star and all objects orbiting it. Galaxy is a massive collection of solar system. Universe hold trillions of galaxies.</p>	<p>L1 The Solar System and Orbits Within our solar system there is one star, the Sun, plus the eight planets and the dwarf planets that orbit around the Sun. Natural satellites, the moons that orbit planets, are also part of the solar system. Our solar system is a small part of the Milky Way galaxy. The Sun was formed from a cloud of dust and gas (nebula) pulled together by gravitational attraction. Students should be able to explain:</p> <ul style="list-style-type: none"> • how, at the start of a star's life cycle, the dust and gas drawn together by gravity causes fusion reactions • that fusion reactions lead to an equilibrium between the gravitational collapse of a star and the expansion of a star due to fusion energy. <p>Gravity provides the force that allows planets and satellites (both natural and artificial) to maintain their circular orbits. Students should be able to describe the similarities and distinctions between the planets, their moons, and artificial satellites. (HT only) Students should be able to explain qualitatively how:</p> <ul style="list-style-type: none"> • (HT only) for circular orbits, the force of gravity can lead to changing velocity but unchanged speed • (HT only) for a stable orbit, the radius must change if the speed changes. <p>L2 Life Cycle of Stars A star goes through a life cycle. The life cycle is determined by the size of the star. Students should be able to describe the life cycle of a star:</p> <ul style="list-style-type: none"> • the size of the Sun • much more massive than the Sun. 	<p>Discussion point: declassification of pluto as a planet – due to 'not clearing its neighbouring region of other objects'. This is because of its small size and therefore low gravitational field strength. It is smaller than our moon.</p> <p>Artificial satellites: currently over 6,500 artificial satellites orbiting earth, only around 40% are operational. The rest are now classed as 'space junk' Could discuss the hazards of this – linking to scene from 'Gravity' when the manned satellite has a collision with some space junk</p>



Fusion processes in stars produce all of the naturally occurring elements. Elements heavier than iron are produced in a **supernova**.

The explosion of a massive star (supernova) distributes the elements throughout the universe. Students should be able to explain how fusion processes lead to the formation of new elements.

L3/4 Red-Shift and the Big Bang

There is an observed increase in the **wavelength** of light from most distant galaxies. The further away the galaxies, the faster they are moving and the bigger the observed increase in wavelength. This effect is called **red-shift**.

The observed red-shift provides evidence that space itself (the universe) is expanding and supports the **Big Bang theory**.

The Big Bang theory suggests that the universe began from a very small region that was extremely hot and dense.

Since 1998 onwards, observations of supernovae suggest that distant galaxies are receding ever faster.

Students should be able to explain:

- qualitatively the red-shift of light from galaxies that are receding
- that the change of each galaxy's speed with distance is evidence of an expanding universe
- how red-shift provides evidence for the Big Bang model
- how scientists are able to use observations to arrive at theories such as the Big Bang theory
- that there is still much about the universe that is not understood, for example dark mass and dark energy.

L6 Revision

Most well known satellite: the International space station has been continuously manned since 2000. British Astronaut Tim Peake spent 186 days aboard in 2015-2016

Sheffield born Helen Sharman was the first woman ever in space in 1991.

If Betelgeuse transitioned from red super giant to supernova, it would light up our sky for 2 months

	L8 EOTT L9 GPA	
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