Beckfoot

Subject: Science (Physics)	Topic: Space (Physics only)	Year Group: 11

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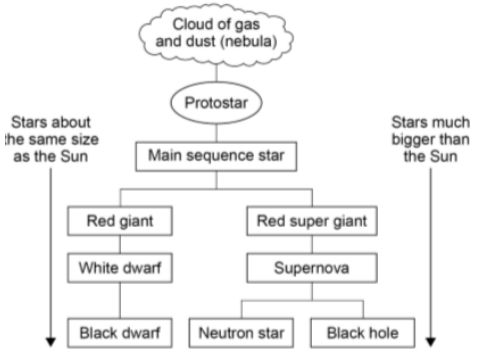
Our solar system is made up of …

1	Sun	The largest object in the Solar System. Powered by nuclear fusion.
2	Planets	They orbit the Sun. Generally, as the distance between the planet and the Sun increases, the temperature on the planet decreases and the time taken to orbit the Sun increases.
3	Moons	Natural satellites that orbit planets.
4	Dwarf planets	Unlike planets, their gravitational field is not strong enough to 'clear the neighbourhood' around it.
5	Asteroids	Move in elliptical orbits around the Sun. Made of metals and rock.
6	Comets	Orbit the Sun. Made of rock, dust and ice.

Life cycle of a star

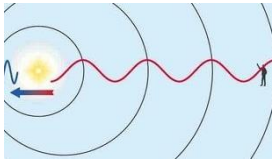
1	Stars form from nebula that collapse inwards due to gravity. This causes the dust and gas to heat up. Eventually it is hot enough for fusion to occur and a star is born.
2	A star goes through a life cycle. The life cycle is determined by the size of the star.



Orbital motion

1	Planets orbit stars. Moons and artificial satellites orbit planets. This is possible due to gravity.	
2	When moving in circular orbits objects can have a changing velocity, even if their speed is constant, as when moving in a circle their direction is constantly changing (remember velocity has size & direction).	
3	For a satellite in a stable orbit, the radius must change if the speed changes.	If it is too fast, it will move off into space. If it is too slow, it will spiral into Earth.

Red shift

1	 Absorption spectrum	White light arriving at Earth from stars has certain colours (wavelengths) missing.
2	The dark lines in the absorption spectrum from stars in distant galaxies have all been shifted towards the red end of the spectrum (red-shifted).	
3	This shift tells us that the wavelength of their light has been stretched, indicating that these stars are moving away from Earth.	
4	The more red-shifted the light from a galaxy is, the faster the galaxy is moving away from Earth. Galaxies that are further away are moving away from us fastest (shown by observations from supernovae).	
5	Red shift provides evidence that space is expanding which supports the Big Bang theory.	
6	There is still much about the universe that is not understood, for example dark mass and dark energy.	

Key Vocabulary

1	Galaxy	A system of billions of stars held together by gravitational attraction. Our solar system is in the Milky Way galaxy.
2	Nebula	A large cloud of gas and dust from which stars form.
3	Nuclear fusion	Light nuclei (e.g. hydrogen) join together to produce heavier nuclei and energy. Leads to the production of new elements.
4	Protostar	A very young star that is still gathering mass.
5	Main sequence star	The stable phase in a star's life. The gravity pulling the star inwards is balanced by the outward pressure produced by fusion.
6	Red giant	When all the hydrogen has been used up in fusion, larger nuclei begin to fuse. The star expands to become a red giant.
7	White dwarf	Nuclear reactions have finished. The star contracts under its own gravity.
8	Supernova	The explosion of a large star. Produces elements heavier than iron.
9	Black hole	A region where gravity is so strong that nothing can escape.
10	Red shift	There is an observed *increase* in the wavelength of light from distant galaxies.
11	Big bang theory	The universe began from a very small, hot, dense point.