

## Earth in Space

Relative positions of the Earth, Moon, Sun, planets and other bodies in the Universe

Gravitational forces determine the movements of planets, moons, comets and satellites

Stars evolve over a long time scale

Some of the ideas used to explain the evolution of the Universe

### The Solar System

Be able to distinguish between planets, moons, stars, comets, meteors, galaxies and other objects in the Universe and be aware of their relative sizes and positions.

Know that the Sun has acted as a continuous source of energy over a very long time.

Know that life in other parts of the Universe would depend on the existence of planetary systems round other stars

- Know how small changes in position or brightness of stars may give evidence of planets

Know that radio astronomers watch for unusual signals from space

Know that stars and planets are formed over very long periods from clouds of gases and dust in space

Know that if the mass is large enough, fusion of hydrogen and helium atoms generates energy to form a star

Know that, eventually, formation of heavier elements may begin

### The History of the Universe

Understand that the eventual fate of stars depends on their mass and may lead to formation of a red giant, white dwarf, supernova, neutron star or black hole.

- Know the significance of the presence of particular lines in stellar spectra
- Know that the 'red shift' of lines in stellar spectra provides evidence for an expanding universe
- Understand the timescale involved in the evolution of the universe
- Understand how the big bang theory is used to explain the evolution of the universe into its present state

### Rockets Satellites and Gravity

- Understand that gravity is an attractive force between two objects which decreases with separation distance and increases with their mass

Know that when two bodies interact the forces they exert on each other are equal and opposite

Understand that the mass of an object is a measure of how much material it contains and that its weight is the force of gravity on the object

Recall and use the quantitative relationship between mass, weight and gravity

Know that falling objects are accelerated downwards by gravitational attraction

Know that the air resistance increases as the velocity of an object increases

Know that the terminal velocity is reached when the forces on an object are balanced

Understand that an inward force is needed to keep an object in circular motion

Understand that gravity provides the inward force for satellites

- Understand what is meant by 'geostationary orbit'