AQA GCSE Space Physics

Our Solar System Notes and Questions

Our solar system contains one star, called the Sun. The Sun is at the centre of the solar system and gives out light and heat energy.

Eight planets orbit the Sun. These are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. The planets are kept in orbit by the force of gravity.

There are also dwarf planets in the solar system. Pluto is the most famous example. Dwarf planets orbit the Sun, but they are smaller than planets and do not fully clear their orbital path.

Moons are natural satellites. This means they are objects that orbit planets. Earth has one Moon, but some planets, such as Jupiter and Saturn, have many moons.

The solar system is only a tiny part of the Milky Way galaxy. The Milky Way contains billions of stars, as well as dust and gas. Our Sun is just one of those stars.

The Sun formed from a huge cloud of dust and gas called a nebula. Gravity pulled the particles of dust and gas together. As more material was pulled in, the cloud became smaller, denser and hotter.

Most of the material was pulled into the centre. This centre became extremely hot and dense. Eventually, the temperature and pressure became high enough for nuclear fusion to begin.

Nuclear fusion happens when hydrogen nuclei join together to form helium. This releases a very large amount of energy. This is the energy that makes the Sun shine.

Fusion reactions release energy from the centre of the Sun. This energy produces an outward pressure that pushes the star outwards.

At the same time, gravity pulls all the material in the Sun inwards. Gravity tries to make the star collapse in on itself.

The Sun is stable because these two effects are balanced. The inward pull of gravity is balanced by the outward pressure caused by fusion energy.

This balance is called equilibrium. It means the Sun does not collapse inwards or expand outwards. It stays stable for billions of years.

The Sun is currently in the main sequence stage of its life cycle. During this stage, it spends most of its time fusing hydrogen into helium and releasing energy.

A simple way to remember it is this: gravity pulls in, fusion pushes out. When these are balanced, the star is stable.

Ramped Questions

1. Name the star at the centre of our solar system.
2. Name the galaxy that contains our solar system.
3. The Moon is called a natural satellite. What does this mean?
4. Give two differences between a planet and a moon.
5. The Sun formed from a nebula. What is a nebula made from?
6. Describe what gravity does to the dust and gas in a nebula at the start of a star's life cycle.
7. Explain why the centre of the nebula becomes hotter and denser as gravity pulls the material together.
8. Describe what happens in nuclear fusion in the Sun.
9. Explain why fusion reactions stop the Sun from collapsing inwards.
10. A main sequence star is stable for billions of years. Explain how the inward pull of gravity and the outward pressure from fusion energy keep the star in equilibrium.