

MR SULLY UNFOLDS PHYSICS ANSWERS

The solar system and the life cycle of stars

AQA 4.8.1.1–4.8.1.2
Space · Paper 2
Physics only

Name _____ Class _____ Date _____

Stars form from clouds of dust and gas. What happens at the end of a star's life depends on its mass.

KEY IDEAS

- Our solar system: one star (the Sun), eight planets, dwarf planets and natural satellites (moons). It's a small part of the Milky Way galaxy.
- A main sequence star is stable because the outward force from fusion balances the inward pull of gravity.
- Elements up to iron are made by fusion in stars; elements heavier than iron are made in supernovas.

Section A · Recall

Grade 4–5

1 What is a nebula? [1]

A cloud of dust and gas (where stars form).

2 Put the stages for a Sun-sized star in order: red giant, nebula, white dwarf, main sequence, protostar, black dwarf. [2]

Nebula → protostar → main sequence → red giant → white dwarf → black dwarf

3 Name the galaxy our solar system is part of. [1]

The Milky Way

Section B · Explain

Grade 5–6

4 Explain why a main sequence star is stable for billions of years. [3]

Fusion in the core releases energy, creating an outward force (pressure).

Gravity pulls inwards.

The two are balanced, so the star stays the same size (equilibrium).

5 Describe the stages in the life of a star much more massive than the Sun, after the main sequence. [3]

Red super giant

Supernova

Neutron star, or a black hole if massive enough

Section C · Stretch

Grade 7+

6 Explain how the elements found on Earth were produced. [4]

Fusion in stars joins light nuclei (hydrogen → helium),

then heavier elements up to iron.

Elements heavier than iron are made in supernovas.

The supernova distributes them through the universe, where they form new stars and planets.

Exam-style question

AQA style

7 The Sun formed about 4.6 billion years ago.

a Describe how the Sun formed. [3]

A nebula of dust and gas was pulled together by gravity.

It became denser and hotter, forming a protostar.

When hot enough, fusion of hydrogen began: a main sequence star.

b Explain why the Sun will not become a black hole. [2]

It isn't massive enough;

only much more massive stars go supernova and can form black holes.

Total: _____ / 19

How confident am I?	Not yet	Nearly	Got it
I can describe our solar system	☐	☐	☐
I can describe the life cycle of stars of different masses	☐	☐	☐
I can explain how elements are made in stars	☐	☐	☐