

MR SULLY UNFOLDS PHYSICS

Nuclear radiation and nuclear equations

AQA 4.4.2.1–4.4.2.2
Atomic structure · Paper 1
Foundation & Higher

Name _____ Class _____ Date _____

Unstable nuclei give out radiation to become more stable. The three main types are alpha, beta and gamma.

KEY FACTS

Radiation	What it is	Ionising	Stopped by
Alpha (α)	2 protons + 2 neutrons	Strongly	Paper / few cm of air
Beta (β)	Fast electron from the nucleus	Moderately	Few mm of aluminium
Gamma (γ)	EM radiation	Weakly	Thick lead / concrete (reduces)

Section A · Recall

Grade 4–5

1 Which type of radiation is the most ionising? [1]

2 Which type of radiation is an electromagnetic wave? [1]

3 Radioactive decay is random. What does this mean? [1]

4 Define activity and give its unit. [2]

Section B · Nuclear equations

Grade 5–6

5 Complete each statement. [3]

6 Radium-226 (atomic number 88) decays by alpha emission into radon. Give the mass number and atomic number of radon. [2]

7 Carbon-14 (atomic number 6) decays by beta emission into nitrogen. Give the mass number and atomic number of nitrogen. [2]

Section C · Stretch

Grade 7+

8 Explain what happens inside the nucleus during beta decay. [2]

Exam-style question

AQA style

9 A teacher tests an unknown radioactive source with a detector, placing different absorbers between them.

Absorber	Count-rate (counts/min)
No absorber	520
Paper	515
3 mm aluminium	140
5 cm lead	25

a The background count is 25 counts/min. Use the results to identify the radiation(s) emitted. Explain your answer. [4]

b Suggest one safety precaution the teacher should take. [1]

Total: _____ / 19

How confident am I?

	Not yet	Nearly	Got it
I can compare alpha, beta and gamma	☐	☐	☐
I can write and balance nuclear equations	☐	☐	☐
I can use absorber data to identify radiation	☐	☐	☐