MR SULLY UNFOLDS PHYSICS

The electromagnetic spectrum

AQA 4.6.2.1–4.6.2.4
Waves · Paper 2
Foundation & Higher

Name _____ Class _____ Date _____

Electromagnetic waves are transverse waves that transfer energy from a source to an absorber. They all travel at the same speed in a vacuum.

KEY IDEAS

- Order (long → short wavelength): radio, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays.
- All EM waves travel at 3×10^8 m/s in a vacuum. Our eyes only detect visible light.
- UV, X-rays and gamma rays can **harm body tissue**. X-rays and gamma rays are **ionising**: they can cause gene mutations and cancer.

Section A · Recall

Grade 4–5

1 Give one use of each type of EM wave. [7]

Type	Use
Radio	
Microwaves	
Infrared	
Visible light	
Ultraviolet	
X-rays	
Gamma rays	

2 Which type of EM wave has the highest frequency? [1]

Section B · Explain

Grade 5–6

3 State one hazard of each: ultraviolet; X-rays and gamma rays. [2]

4 A radio station broadcasts at 100 MHz. Calculate the wavelength. ($v = 3 \times 10^8$ m/s) [3]

Section C · Stretch

Grade 7+

5 Explain why microwaves are used for satellite communications. (Higher) [2]

6 Explain how radio waves can be used to produce a signal in an aerial. (Higher) [2]

Exam-style question

AQA style

7 X-rays are used in hospitals to take images of broken bones.

a Explain how X-rays can be used to form an image of a bone. [3]

b Explain why the radiographer stands behind a screen while the X-ray is taken. [2]

c What is the unit of radiation dose? [1]

Total: _____ / 23

How confident am I?	Not yet	Nearly	Got it
I can list the EM spectrum in order	☐	☐	☐
I can give uses of each EM wave	☐	☐	☐
I can explain the dangers of ionising EM radiation	☐	☐	☐