

## Background Radiation

Do not write  
outside the  
box

- 1 The table shows the average background radiation received by a person living in Britain.

Source of background radiation	Average amount each year in dose units
Buildings	50
Food and drink	300
Medical treatments (including X-rays)	
Radon gas	1250
Rocks	360
Space (cosmic rays)	250
<b>TOTAL</b>	<b>2500</b>

- 1 (a) (i) Calculate the average amount of background radiation received by a person from Medical treatments.

2500 - 2210 [1 mark]

290 [1 mark]

As always, you might get full marks for just putting the answer, but show your working just in case you made an error.

(2 marks)

- 1 (b) Compare the dose received from Radon gas with the amount received from space.

5 times [1 mark]

Higher [1 mark]

A good strategy is to look at the numbers and make comparisons of amounts, e.g. double, half or even 'much higher' if applicable.

(2 marks)

- 1 (c) The average amount of background radiation varies in different parts of the country. Suggest a reason for this.

Types of rock or material that buildings are made from [1 mark]

(1 mark)

**Total (5 marks)**

2 Some elements exist in different forms called isotopes. What are isotopes?

Forms of the same element [1 mark]

Different number of neutrons [1 mark]

Same number of protons (and electrons) [1 mark]

A standard description. Very important to learn this as it is in chemistry and physics.

(2 mark)

2 (a) The table shows the average dose of radiation a person receives from background radiation.

Source	Dose in millisieverts (mSv)
Food and drink	0.28
Buildings and soil	0.4
Cosmic rays	0.4
Radon	0.72

2 (a) (i) Calculate the proportion of natural background radiation that comes from Radon

Show your working clearly.

0.72 / 1.8 [1 mark]

0.4 or 40% or 4/10 [1 mark]

Proportion of radon .....  
(2 mark)

2 (a) (ii) The minimum dose of radiation that has evidence of causing cancer is 50 mSv. The dose from all background radiation in a certain country is double the total received from Britain.

Should there be concern about traveling to that country?

Explain your answer.

No with a reasonable reason explained

Total exposure well under lowest limit for causing cancer [1 mark]

Or Yes with a reasonable reason explained

All levels of radiation are (potentially) hazardous [1 mark]

Or low doses could still cause cancer

Or all levels affect you

Harm caused by lower doses may not have been recorded [1 mark]

Or evidence may not be complete

Or insufficient research into effect of small doses

(1 mark)

(Total 6 marks)