

Combined science

Key stage 4 - Atomic Structure

Uses and Hazards of Radiation (Combined Science only)

Mr van Hoek



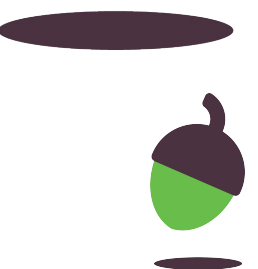
Contamination and Irradiation

1. What is meant by contamination?

Contamination occurs when radioactive _____ is
_____ the body / object

2. What is meant by irradiation?

Irradiation occurs when object is _____ radiation from
_____ of the body / object.



Is it contamination or irradiation?

Treating fruit with gamma rays to kill bacteria	Drinking tea contaminated with radioactive atoms
Using gamma rays to kill tumours	Treating dental and surgical instruments with gamma radiations
Fish living in the sea around the nuclear power station at Fukushima	Touching radioactive uranium salts
Breathing in Radon gas (an alpha emitter)	Being injected with a radioactive isotope



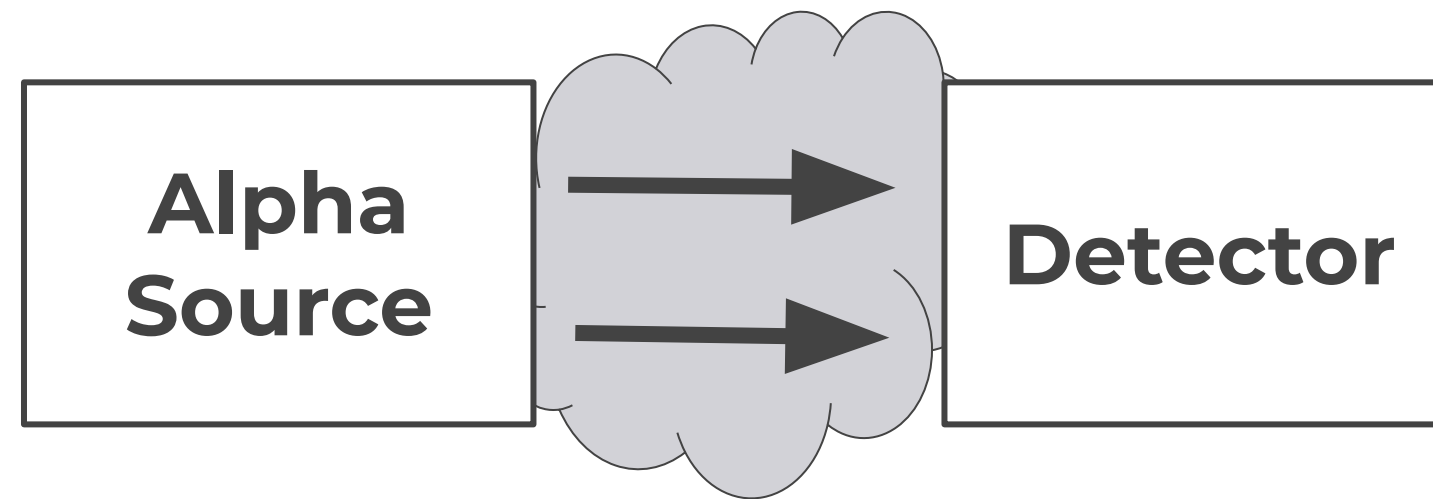
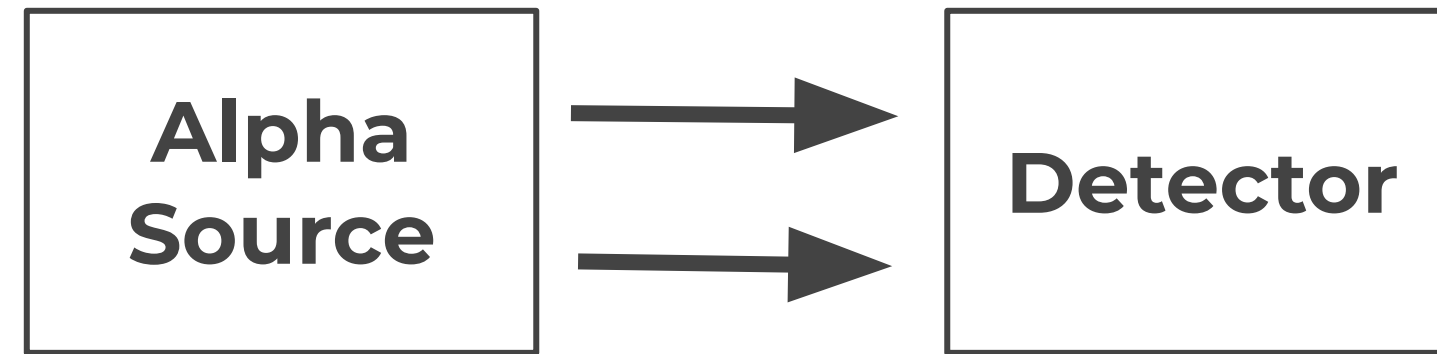
Precautions

In a hospital, radioactive isotopes are used for a variety of purposes.

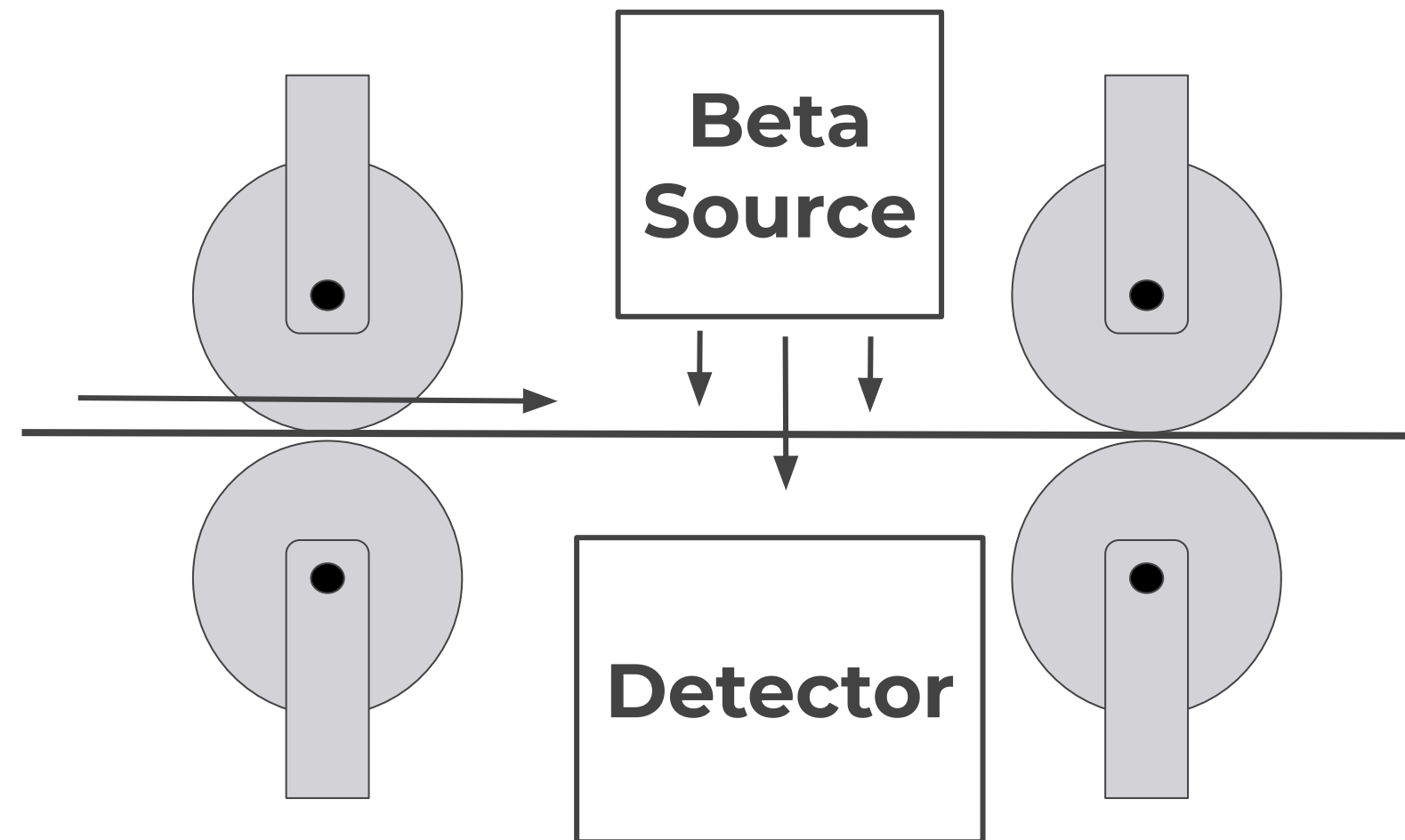
Explain how hazards presented by contamination and irradiation from these isotopes can be reduced.



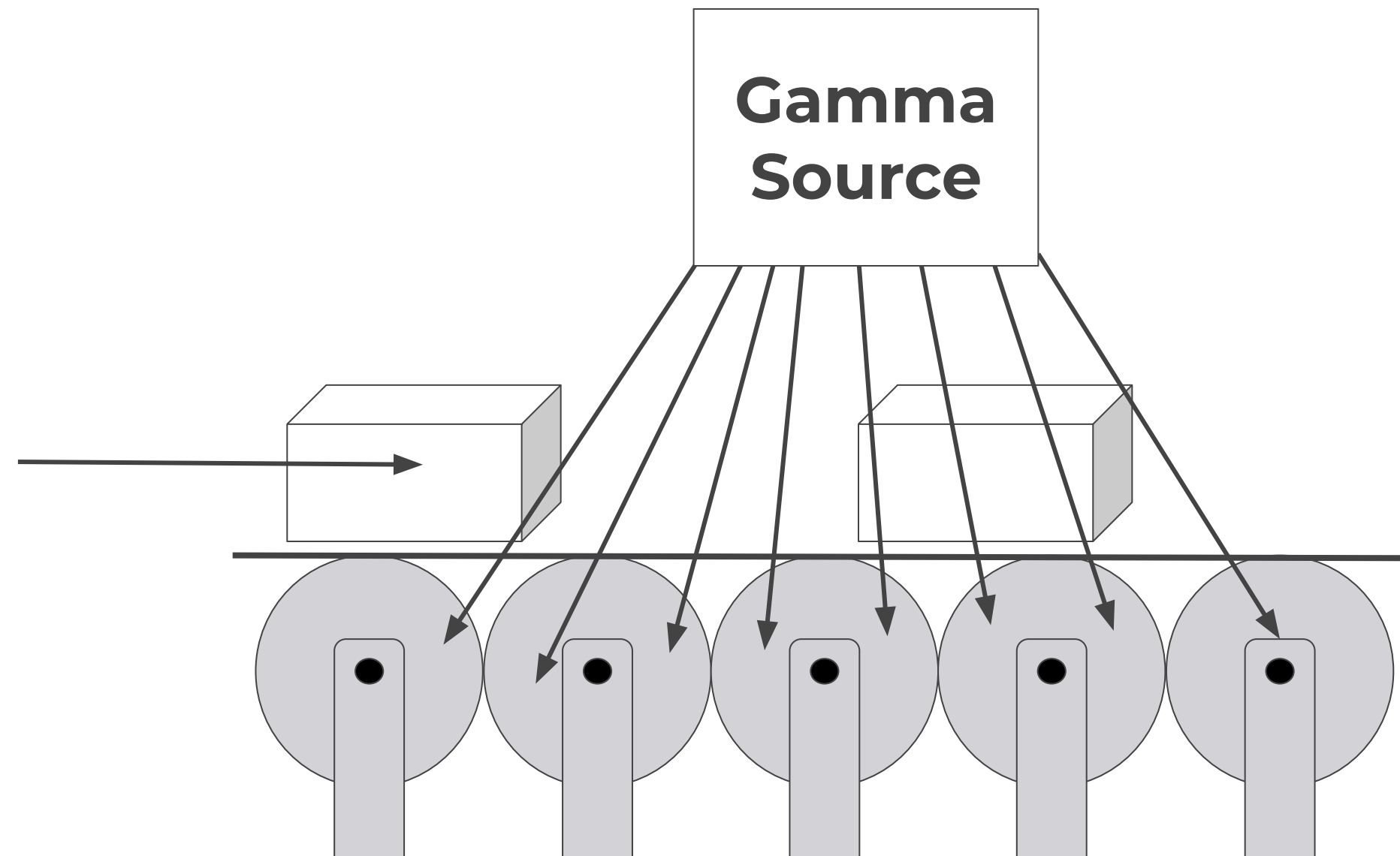
Uses - alpha in a smoke detector



Uses - beta in paper production



Uses - gamma in food production

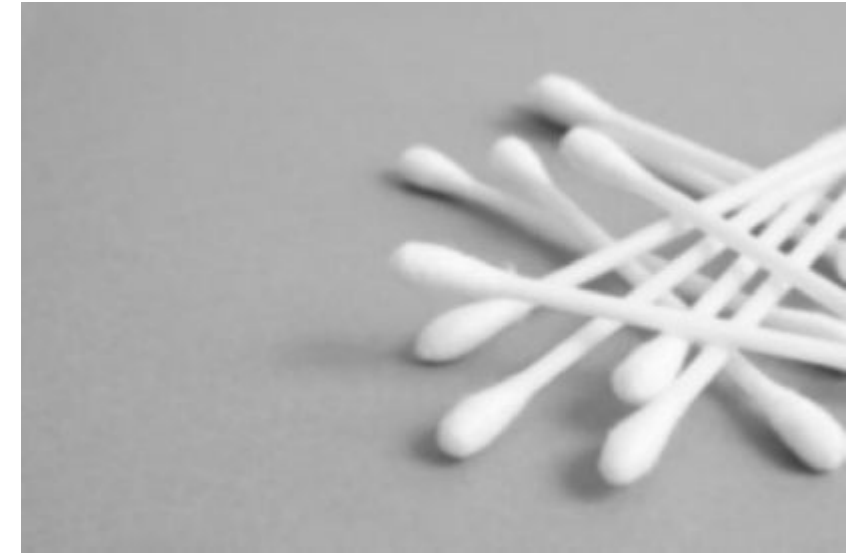


Exam Question - Irradiation and Contamination

These cotton wool buds have been treated with gamma rays.

The cotton wool buds have been **irradiated** but not **contaminated**.

Describe the difference between irradiated and contaminated.



[3 marks]

OCR, Specimen, J250/06



Exam Question - Irradiation and Contamination

Greg is in hospital for some medical tests using a radioactive tracer.

He tells his friends about his tests.

Here are three things he says.

Statement 1 : “They gave me a radioactive drink which was giving out gamma radiation.”

Statement 2 : “Then a radiographer used a detector to measure the radiation on the outside of my body.”

Statement 3 : “Now that I have taken some radioactive drink I will always be highly radioactive.”

Which of his statements could be correct and which must be incorrect?

Explain why.

[3 marks]

OCR, June 2016, B722/01



Exam Question - Precautions

Polly and Oliver were talking about the factory that is near their home.

Polly said that the factory produces dangerous radioactive waste.

Oliver said that if the waste was put into thick aluminium cans it could be stored safely.

Is Oliver correct? _ _ _ _ _

Explain your answer.

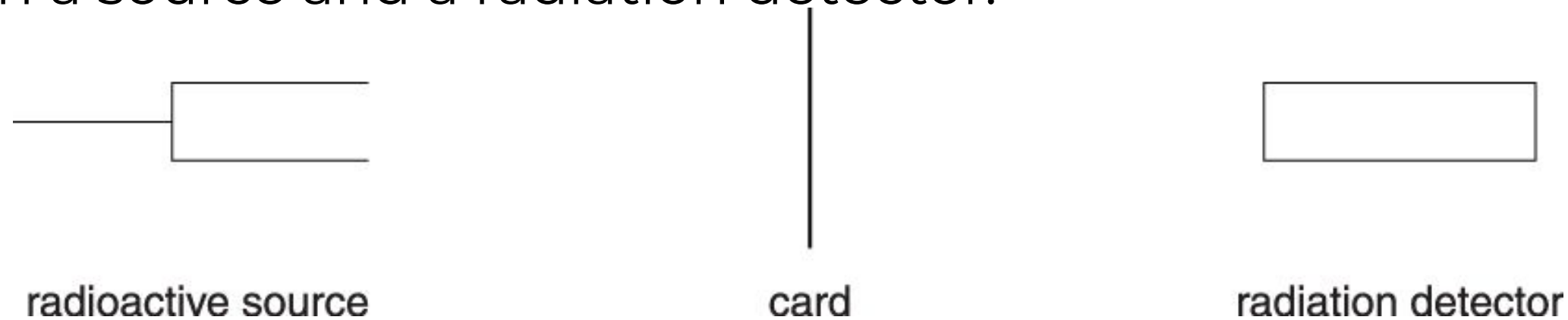
[2marks]



Exam Question - Paper thickness monitoring

Katy investigates how the count rate from radioactive sources changes when different thicknesses of card are placed between a source and a radiation detector.

Look at the diagram.



Look at the table of results.

Radioactive source	Radiation detected in cpm for different thicknesses of card				
	0.05 mm	0.10 mm	0.15 mm	0.20 mm	0.25 mm
A	2008	1995	2012	2010	1992
B	3	4	2	3	4
C	2001	1252	808	612	452



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It shows the count rate at the radiation detector in counts per minute (cpm) for three radioactive sources, **A**, **B** and **C**.

A card manufacturer uses radioactive source **C** to monitor the thickness of card.

Explain why.

[2 marks]

OCR, Specimen, J250/06 paper 6

