

# OCR (A) Physics A-level

## PAG 07.1 - Observing the Random Nature of Radioactive Decay

### Practical Flashcards

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What safety precautions must be taken when working with a radioactive source?



## What safety precautions must be taken when working with a radioactive source?

- Limit the time of exposure
- Warning signs should be displayed so people are aware that a radioactive source is in use
- Keep an arm's length away at all times, and only ever handle the source using long-handled tongs



How should a radioactive source be handled safely?



How should a radioactive source be handled safely?

Long-handled tongs should be used to handle a radioactive source, and you should remain at least an arm's length away from it at all times.



How should a radioactive source be stored safely?



How should a radioactive source be stored safely?

Radioactive sources should be locked away in a sealed lead container. A hazard symbol should be visible on the container as well as at the location where it is stored.



# What is the inverse square law of radiation?





What is the inverse square law of radiation?

The intensity of radiation is inversely proportional to the square of the distance from the source. As the distance doubles, the intensity quarters.



What device can be used to measure a radioactive count rate?



What device can be used to measure a radioactive count rate?

A Geiger Counter or Geiger Muller Tube connected to a scalar.



Why is Cobalt-60 a suitable source for this experiment?



## Why is Cobalt-60 a suitable source for this experiment?

Cobalt-60 is safe for use in schools and has a half-life of around 5 years, meaning it can be reused for a number of years. The activity is low enough to be safe, but high enough for measurements to be taken easily.



When measuring the count-rate, what advantage comes with measuring over a longer period of time?



When measuring the count-rate, what advantage comes with measuring over a longer period of time?

The longer the period of time over which it is recorded, the lower the uncertainty will be.



What preliminary recording should be taken before bringing the radioactive source into the lab?





What preliminary recording should be taken before bringing the radioactive source into the lab?

Before bringing the radioactive source into the lab, the background radiation count should be taken.



How should the background radiation count be accounted for in the experimental data?



How should the background radiation count be accounted for in the experimental data?

The background count should be subtracted from the count to produce a corrected count ( $C'$ ).



How do you convert from a count to a count rate?



How do you convert from a count to a count rate?

The count should be divided by the length of time over which it was taken to produce a count rate.



Why may an old gamma source be unsuitable for this experiment?



Why may an old gamma source be unsuitable for this experiment?

Depending on the source's half-life and its age, the activity of the source may have fallen to a level that is too low to obtain easily recordable counts.



What is meant by the random nature of radioactive decay?





What is meant by the random nature of radioactive decay?

Radioactive decay is a random process meaning you cannot predict which nuclei will decay next, or when the next decay will occur.

