Reading Decay Counts Over Different Intervals

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A simulation predicts detector counts for a sample with a constant half-life. Each row gives the expected count from the sample alone over a short recording. For this model, treat the rate as constant during each recording and proportional to the parent nuclei remaining.

Elapsed time (h)	Counting interval (min)	Emissions counted
0	2.0	80
4	4.0	80

1 Calculate the count rate in emissions per minute at each elapsed time. [1]

Answer and work

2 Which half-life best fits the change in the model’s count rate?

(1) 2 h

(2) 4 h

(3) 6 h

(4) 8 h

The class wants to predict the expected count for a new three-minute recording eight hours after the start. Continue using the same model.

3 Predict the expected count in that recording. Show how the elapsed time and the recording duration are used. [1]

Answer and work

4 A student says the first two rows prove no decay occurred because both show 80 emissions. Explain why the recording intervals matter. [1]

Answer and work