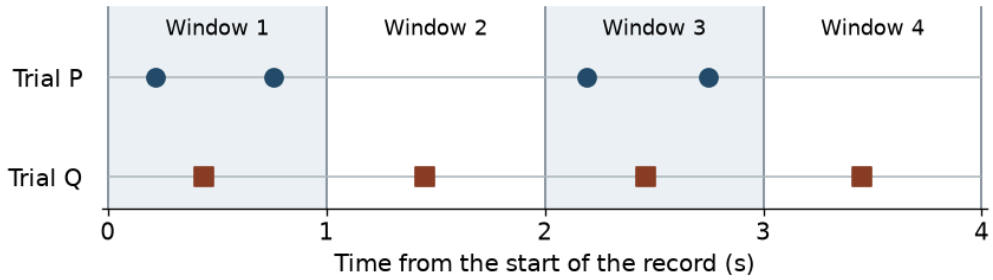
Checking Counts When Decay Events Overlap

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

A classroom nuclear simulation records one event for each parent nucleus that decays. Its display can show at most one count in each one-second window. The timeline shows the events that actually occur in two trials.



Each mark on the timeline represents one actual decay event in the model.

1 Which trial has the greater number of actual decays over all four windows?

(1) P only

(2) Q only

(3) They are equal.

(4) The event record cannot compare them.

2 Calculate the count shown by the display for each trial. Use the display rule for each window. [1]

Answer and work

3 A student says the original display proves that Q underwent twice as many decays. Explain why the display does not support that conclusion. [1]

Answer and work

The class repeats P with half-second windows. Each pair of events in the original record falls in different halves of its second.

4 Predict the new displayed total. Explain why changing the window can change that total while the simulated decays stay the same. [1]

Answer and work