Finding Why a Daughter Count Levels Off

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

A classroom simulation tracks parent nuclei P and their daughter nuclei D. Each P that decays produces one D. Existing D nuclei can also decay into a third type that the display does not count as D. In this step model, each interval removes half of the D present at its start. D nuclei formed during an interval first become eligible to decay in the next interval.

End of interval	P count	D count
Start	80	0
1	40	40
2	20	40
3	10	Hidden

1 How many new D nuclei are produced during interval 2?

(1) 0

(2) 10

(3) 20

(4) 40

2 Explain why the D count stays at 40 at the end of interval 2 even though more D is produced. [1]

Answer and work

3 Calculate the missing D count at the end of interval 3. Show how you include both sources of change. [1]

Answer and work

4 A student uses the unchanged D reading after interval 2 to claim that the original parent isotope stopped decaying. Evaluate the claim using both records. [1]

Answer and work