Tracking Neon Isotopes Between Model Cells

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

A classroom display models two cells connected by a gate. The cells contain atoms of two neon isotopes. No atoms enter or leave the display. The detector can identify the isotope of each atom. The model records the counts before the gate opens and after it closes again. The atoms do not change isotope during the test.

Record	Neon-20 in cell A	Neon-22 in cell A	Neon-20 in cell B	Neon-22 in cell B
Before	40	0	0	20
After	20	10	20	10

1 What evidence shows that some atoms traveled from cell B to cell A?

(1) A contains 30 total atoms after the test.

(2) A contains 10 neon-22 atoms after the test and had none before.

(3) B contains 30 total atoms after the test.

(4) B still contains 10 neon-22 atoms after the test.

2 Complete the table to show the fewest crossings in each direction. Then give the minimum total number of crossings. [1]

Isotope	From A to B	From B to A
Neon-20		
Neon-22		

Minimum total crossings

A simpler counter shows only the total number of atoms in each cell, without distinguishing isotopes.

3 Explain why the simpler counter could make the exchange look like 10 atoms traveling in just one direction. [1]

Answer and work

4 Use the periodic table to explain what differs inside neon-20 and neon-22 nuclei even though both belong to the same element. [1]

Answer and work