

Curiosity: Conservation depends on where you draw the boundary

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A balanced equation is an atom-accounting model. It says the same number of each kind of atom appears before and after the reaction, even when the atoms are grouped into different particles. That is why coefficients change amounts while subscripts cannot: a subscript would describe a different substance.

Mass data need a carefully chosen system boundary. A sealed vessel can include a gas after it forms; an open cup may not. If a balance reading changes, the most useful question is not “did matter vanish?” but “what matter was included in this measurement?”

Try it: $2\text{H}_2 + \text{O}_2$ has three molecules, while $2\text{H}_2\text{O}$ has two. Make an atom tally that shows why this is still a conservation model.