

Sequence of balancing chemical equations:

1. $\text{NH}_4\text{NO}_3 \rightarrow \text{N}_2\text{O} + \text{H}_2\text{O}$
2. $\text{CO} + \text{H}_2 \rightarrow \text{CH}_3\text{OH}$
3. $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
4. $\text{H}_2 + \text{N}_2 \rightarrow \text{NH}_3$
5. $\text{NH}_4\text{NO}_3 \rightarrow \text{N}_2 + \text{O}_2 + \text{H}_2\text{O}$
6. $\text{Al} + \text{S} \rightarrow \text{Al}_2\text{S}_3$
7. $\text{H}_2\text{SO}_4 + \text{NaCl} \rightarrow \text{Na}_2\text{SO}_4 + \text{HCl}$
8. $\text{C}_8\text{H}_7\text{N} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{NO}$
9. $\text{CuSO}_4 + \text{NaOH} \rightarrow \text{Cu}(\text{OH})_2 + \text{Na}_2\text{SO}_4$

Intro:

Okay today we are going to talk about balancing chemical equations, and it is much like balancing equations in math. Whatever you change on one side of the "=" needs to be changed on the other side as well. In this case it is an arrow, but the same rules apply.

Do one example on the board: $\text{N}_2 + \text{O}_2 \rightarrow \text{N}_2\text{O}$

Teacher: "Any ideas?"

Students: "we could count atoms?"

Teacher: "good idea, what do you notice?"

Student: "Both sides have 2N but on the right only one O and 2 on the left"

Teacher: "Any ideas to fix that?"

Student: "Can I add one O on the right side?"

Teacher: "Nope only the chemicals you see can be added- any other ideas?"

Student: "Can I add 1 N_2O on the right side?"

Teacher: "Yes, how would you write that?"

Student: "On the right side $\text{N}_2\text{O} + \text{N}_2\text{O}$ "

Teacher: "that is possible - are we okay now?"

Student: "No, now we have too few N_2 on the left side, can we multiply with 2?"

Teacher: "Yep it looks like this: $2\text{N}_2 + \text{O}_2 \rightarrow \text{N}_2\text{O} + \text{N}_2\text{O}$ "

"The first task is this: $\text{NH}_4\text{NO}_3 \rightarrow \text{N}_2\text{O} + \text{H}_2\text{O}$ (write task on banner) - get a card and go to your group"

Maybe you want to include this tool, some of it is very good, but it tends to leave out any reflections on how it happened to be right, because groups just count and move to the next task (game):

<https://phet.colorado.edu/en/simulations/balancing-chemical-equations>

