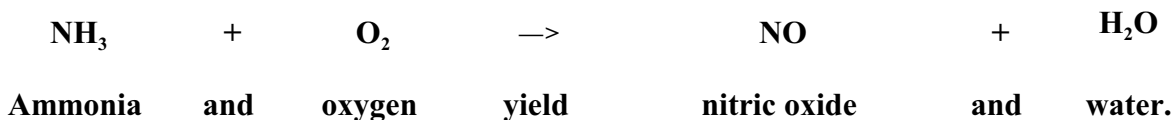


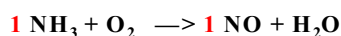
Balancing by inspection

Unbalanced equation:



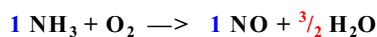
Step 1: balance nitrogen atoms

After noting that nitrogen appears in only one reactant molecule, NH_3 , and one product molecule, NO , balance the nitrogen atoms.



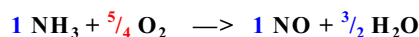
Step 2: balance hydrogen atoms

Since 3 hydrogen atoms appear in the reactants, there must be three hydrogens in the products. If the coefficient of ammonia reactant is 1, the coefficient of water product must be $\frac{3}{2}$.



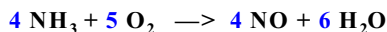
Step 3: balance oxygen atoms

There are $1 + \frac{3}{2} = \frac{5}{2}$ moles of oxygen atoms in the products. Making the coefficient of O_2 equal to $\frac{5}{4}$ will produce the same number of moles of oxygen in the reactants.



Step 4: Obtain lowest whole number coefficients

Multiply all coefficients in the result of the previous step by 4.

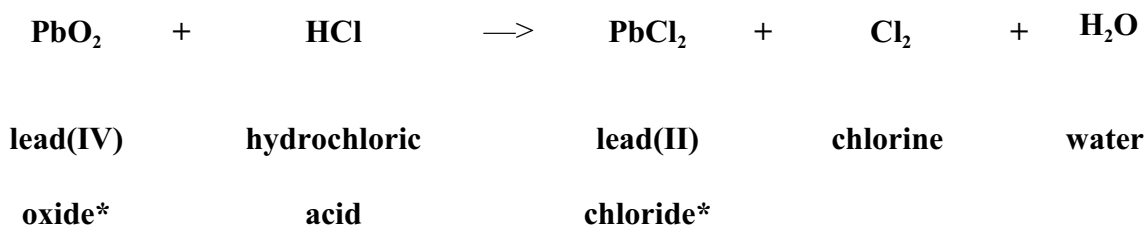


Although the above example uses the fraction method to get the final balanced chemical equation, remember that you could just as well have restarted in Step 2 while balancing the hydrogen atoms to give $2 \text{ NH}_3 + \text{O}_2 \longrightarrow 2 \text{ NO} + 3 \text{ H}_2\text{O}$.

Then, in Step 3 you would also start over when you discovered that you had 5 oxygens on the right and needed an even number on the left. The most convenient thing is to go up 2 more so that the coefficient for the NH_3 is 4, and this would give $4 \text{ NH}_3 + 5 \text{ O}_2 \longrightarrow 4 \text{ NO} + 6 \text{ H}_2\text{O}$, which is the same answer we got above through the fractions.

Another example of balancing by inspection

1. Unbalanced equation:



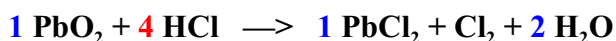
Step 1: balance lead atoms



Step 2: balance oxygen atoms



Step 3: balance hydrogen atoms

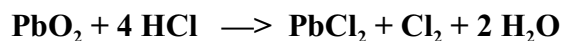


Step 4: balance chlorine atoms



Step 5: Obtain lowest whole number coefficients

(The result of step 4 is already in standard form.)



*Remember: The roman numerals are used to distinguish several existing compounds between lead and oxygen, and lead and chloride. (Chapter 4!!)