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| Step | Details |
| 1) Determine what elements are involved in the equation | CH4 + O2 🡪 CO2 + H2O  Contains carbon, hydrogen, oxygen |
| 2) Use the subscripts and coefficients to count the atoms of each element on the reactant side of the equation  NOTE: Subscripts tell you how many of each atom is in a molecule  NOTE: Coefficients tell you how many of each molecule you have: | Macintosh HD:Users:davis_rachel:Desktop:Screen Shot 2013-10-03 at 5.27.30 PM.png  Example: 2 CuO means two molecules of CuO |
| 3) Use the subscripts and coefficients to count the atoms of each element on the product side of the equation | Reactants Products  Carbon 1 1  Hydrogen 4 2  Oxygen 2 3 |
| 4) Compare the number of atoms of reactants and products for each element – are they the same or different? If you have the same number of atoms for each element, then your equation follows the Law of Conservation of Matter. Congratulations – you’re done! | Carbon = same in both  Hydrogen = 2 less atoms in products  Oxygen = 1 more atom in products |
| 5) If they are different, then your equation does NOT follow the Law of Conservation of Matter, and it’s wrong. You need to try to balance it. | The equation does not follow the LCM because there are different numbers of atoms in the reactants and products when the LCM says matter is not created or destroyed in a reaction, only transferred. |
| 6) Choose an element to try to balance first – pick one that is only in one compound in the reactants and one compound in the products. Figure out what coefficient you could add to balance the element so it has the same number of atoms on both sides of the equation. | Start with hydrogen since it’s only in CH4 as a reactant and H2O as a product –  Add a 2 to make 2 H2O molecules (4 hydrogen atoms and 2 oxygen atoms)  CH4 + O2 🡪 CO2 + 2 H2O |
| 7) Adjust your atom counts if needed (for example: by changing the number of CO2 molecules, there was an increase in oxygen atoms in the products) | Reactants Products  Carbon 1 1  Hydrogen 4 ~~2~~  4  Oxygen 2 ~~3~~ 4 |
| 8) Add coefficients until you have the same number of atoms for every element in both the reactants and products | Need 2 O2 to balance 4 oxygen atoms in the product (2 from CO2 + 2 from 2 H2O)  CH4 + 2 O2 🡪 CO2 + 2 H2O |