

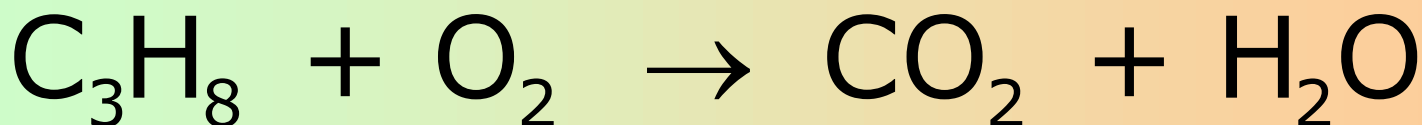
How to balance a chemical equation

Let's suppose we want to balance the equation of combustion of propane (C_3H_8).

We are going to explain the process of balancing the equation step by step.

First of all, we will write the equation (not balanced).

Then, we must count the number of atoms in each side (reactants and products). We have to do it element by element (as shown below).



Reactants	
C	3
H	8
O	2

Products	
C	1
H	2
O	3

How to balance a chemical equation

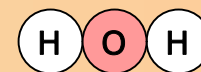
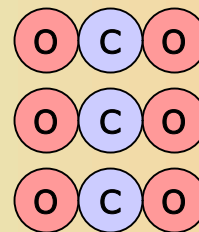
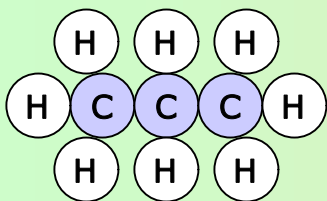
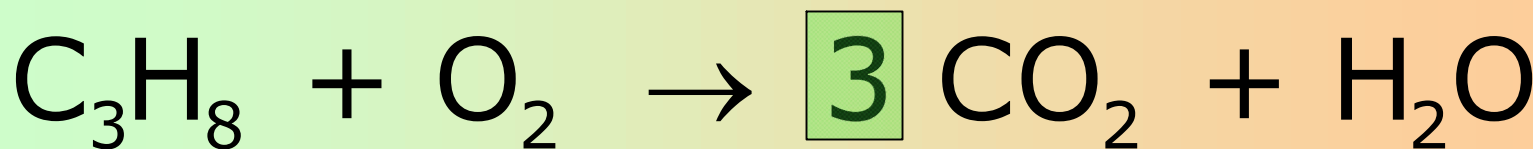
Let's start balancing. The first element will be carbon (the order of the elements is irrelevant).

We see that there are less atoms of carbon on the products side; we fix that by adding more carbons in order to balance both sides.

But, in order to add carbons we cannot change the given formula; the only thing we can do is to add more molecules (of CO_2 in this case).

As you can see below, we have added two more carbon dioxide molecules (three in all): the "3" coefficient means that 3 molecules are added.

Every time we add molecules, we have to recount the number of atoms again, in order to update them.



Reactants	
C	3
H	8
O	2

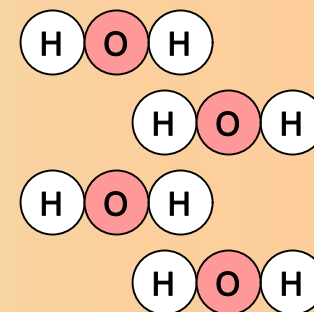
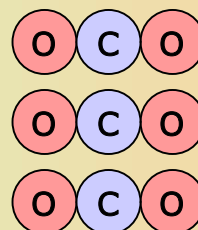
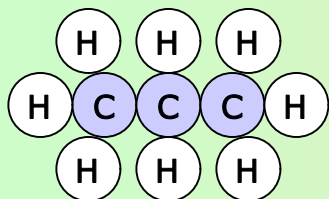
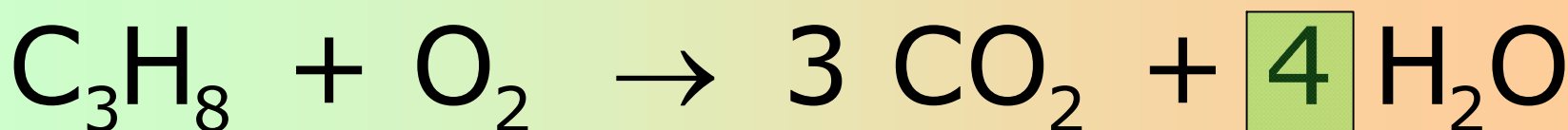
← balanced!!! →

Products	
C	3
H	2
O	6

How to balance a chemical equation

Now, we are going to balance the number of hydrogen atoms. As we did before, we will add more atoms to the side in which are less (three more molecules of water on the products side), in order to balance the number of atoms of hydrogen.

After that, we have to recount again.



Reactants	
C	3
H	8
O	2

← balanced!!! →

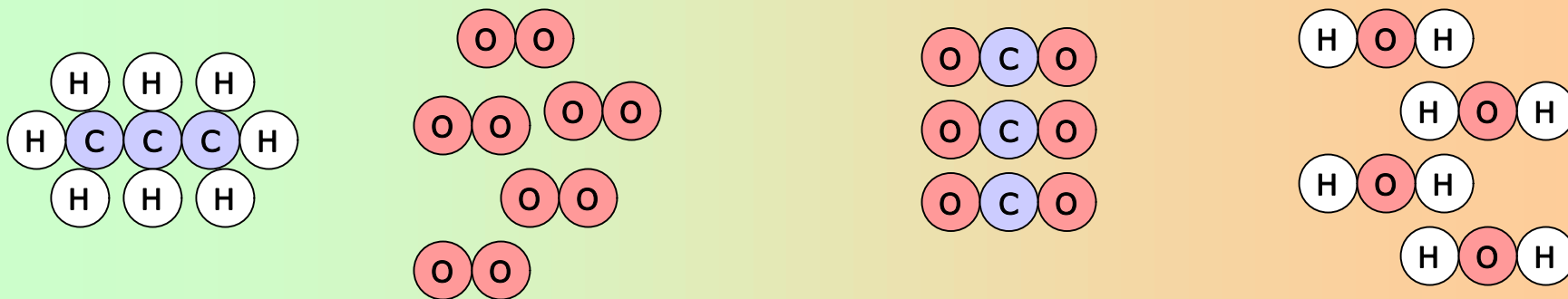
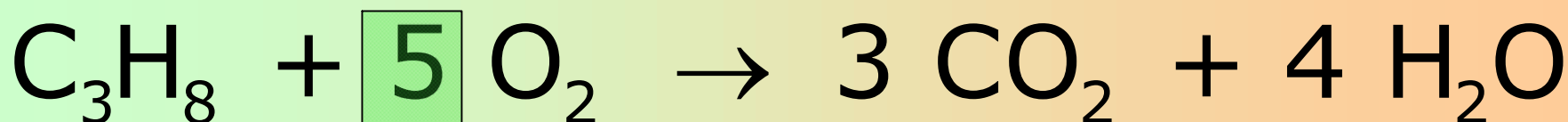
← balanced!!! →

Products	
C	3
H	8
O	10

How to balance a chemical equation

Finally, we will balance the oxygen. On the reactants side there are less atoms of oxygen, so we will add enough atoms to balance both sides (4 more molecules).

Now we see that all elements have been balanced: the chemical equation is balanced.



Reactants			Products	
C	3	← balanced!!! →	C	3
H	8	← balanced!!! →	H	8
O	10	← balanced!!! →	O	10