

STEM from Home

Balancing Chemical Equation

Have you ever wondered what happens when you light your birthday candles? Why do they shrink in size by the time you blow them out? Investigate what happens when you drop a piece of chalk into vinegar. Chemical reaction is a process in which one or more substances interact among themselves and yield some different substances. The atoms or molecules of the interacting substances are called reactants. The atoms or molecules of the substances produced after their interaction are called products. We can see lots of examples of chemical reactions in our daily life. When you switch on the gas burner at home, gases like butane (C_4H_{10}) or propane (C_3H_8) are burnt along with oxygen. Carbon (C) and hydrogen (H) atoms in the flammable gases react with oxygen (O) atoms and produce water (contains hydrogen and oxygen atoms) and carbon dioxide (contains carbon and oxygen atoms) molecules.

The method of writing this reaction using chemical symbols of the substances used in reaction is called a chemical equation. Reactants are written on the left and products on the right, separated by a single arrow between them. So, the chemical equation for the above stated chemical reaction should look something like this:

Propane	+	Oxygen	→	Water	+	Carbon Dioxide
C_3H_8		O_2		H_2O		CO_2

But there is something more than this. Have a look at the number of atoms of carbon, hydrogen, and oxygen on both sides.

Are they equal in number? If there is a difference (increase or decrease) in number of atoms on both sides of the equation, then where have some atoms gone or come from? The law of conservation of matter states that all atoms of each element on left must appear on the right. Their arrangements and combinations may change. This is called balancing of chemical equation.

Now have a look at the following table. Just count the atoms of each element on both sides of the equation and check if the numbers are equal. If yes, then it is called a balanced chemical equation.

Propane	+	Oxygen	→	Water	+	Carbon Dioxide
C_3H_8		$5O_2$		$4H_2O$		$3CO_2$

It is important to understand why and how chemical equations are balanced. You can go through the following links to learn more about Balancing Chemical Equations.

[Balancing Chemical Equations](#)

[Balancing Equations Tutorial](#)

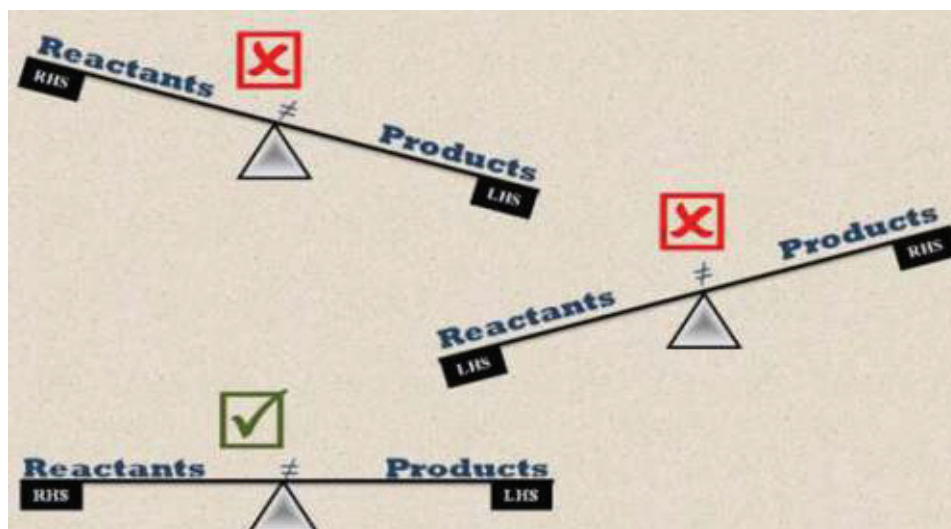
or

[5 steps for Balancing Chemical Equation](#)

It will be interesting to know about chemical reactions happening around us every day. Have a look at some examples of chemical reactions in our daily life.

[Chemical Reactions in Everyday Life](#)

Today's experiment focuses on learning how to balance a chemical equation and to identify that the number of atoms of each element is conserved in a chemical reaction.



Main Activity: Learn How to Balance a Chemical Equation

Introduction

In this activity you will use a simulation program to ensure that the number of atoms of each element is conserved in a chemical reaction.

What You Will Learn

How to balance a chemical equation

What You Will Need

Hardware

A computer connected to the internet.

Software

A modern web browser like Microsoft Edge, Chrome, or Firefox.

Getting started

You can access [guidelines for the activity](#) here.

Bonus Activities:

Activity 1: More About Balancing a Chemical Equation

Before proceeding to start working on this activity, you are advised to go through the links provided at the beginning of this document and practice the experiments provided in the main activity.

Hardware and software requirements are the same as the main activity.

You will experiment with balancing of many more chemical equations in this activity.

You can access [guidelines for the activity](#) here.

Challenge Activity: Balancing Chemical Equations

Now is the time to test what you have learnt using the simulation programs. You are required to solve few chemical equations to balance them properly.

You can work on [Main](#) and [Bonus](#) activities again and again till you feel confident that you can solve more complex chemical equations.

Print the [Worksheet](#) and solve the equations on your own.

Crosscheck with the [Key to Worksheet](#) once you have solved all the equations.