# Physical and Chemical Changes

# The main difference between a physical and chemical change is that physical changes are reversible and create no new product. Whereas, chemical changes are non-reversible and new products are formed.

##### Transformation is happening all the time, everywhere. Scientists have classified types of modifications in the same way that they have classified chemical elements. Changes can take two forms: physical and chemical.

##### Definition of Physical and Chemical Change

A physical change is a change in a material’s physical qualities that is transient and reversible. It is a phenomenon where a substance’s physical qualities, such as form, size, quantity, appearance, colour, condition, and so on, alter without changing its chemical composition. The blazing of an electric bulb, the dissolution of iodine, the burning of wax, the dissolving of sulfur, and the evaporation process are all examples of physical changes.

To better understand, let’s look at how water changes as it boils or cools. Ice melts and water evaporates as the temperature rises. Water vapour starts to cool to produce water, and water freezes to make ice as it cools. This is a reversible transformation in which the shape of water changes when the circumstances are reversed. A similar change occurs in the condition when the wax and butter melt.

A chemical change is described as a procedure of rearranging or combining the atoms of one or even more materials to generate a new component. When a material undergoes a chemical change, its chemical characteristics shift and it is transformed into a new material with a distinct chemical structure.

To understand this phenomenon better, let us take the example of the conversion of milk to curd. When some amount of curd is added to the milk, the lactobacillus bacteria convert all the milk into curd, and this phenomenon cannot be reversed. This is an example of a chemical change because, here, milk’s molecular composition is changing.

## Difference in respect of Energy Absorption

In case of physical change, let us take the example of stretching a rubber band. When we stretch it, it uses the energy provided by the person to stretch it and when we release it the energy goes back out from the rubber band. However, this scenario does not take place in a chemical change. During a chemical change, energy is either required or expelled out from the reaction (the endothermic and exothermic processes). In the case of endothermic, energy is required to change chemical composition which gets utilised by the reaction. And in endothermic, the energy gets expelled out due to the generation of energy during the change.

### Characteristics of physical changes

* There is change only in the physical qualities of any material
* There is no other material created.
* As we all know, physical changes are reversible, and thus can be reversed
* To separate two mixtures mostly a physical change is used
* The weight of the material does not get changed

### Characteristics of a Chemical Change

* New chemicals will be created here Chemical alterations cannot be reversed by basic physical techniques
* The molecular formula of the material gets altered
* The bonds of the material get altered
* The formation of some new substance takes place in case of a chemical change
* The weight of the material or substance may change

To sum up, Physical and Chemical changes are entirely different from each other. Physical change is the phenomenon of change in the properties of a substance such that the process can be reversed. And in the case of a chemical change, the process can not be reversed and entirely new substances are formed. Moreover, the atoms, molecules and bonds combining the atoms also get altered in case of chemical change. Which does not happen in the case of physical change.

Exercise 1: Read the text below and underline in different colors the physical and chemical changes.

Kensuke woke up happy. It was the first day of summer vacation, and he had to prepare for the revetlla of Sant Joan. He went to the kitchen to prepare something for breakfast. There was one brik of milk out of the fridge. He picked up a cup and poured out its contents. In doing so he smelled an unpleasant odor. They had left the milk outside the fridge and it had turned sour. He took a new one. Now yes, he put it in the microwave for a minute to heat the milk, then he dissolved two full spoons of ColaCao and sat down to breakfast.

- Hurry Kensuke!-shouted the father. He had just set up a colony, and a strong odor reached kensuke.

Kensuke and his father were in the car on their way to the firecracker shop. The car must have had some kind of problem since as it consumed petrol it released a very black smoke through the pipe exhaust. The car smelled faintly of apples coming from an air freshener hanging on the front window. They spent quite a while queuing at the stall to buy a lot of firecrackers and rockets for the magical night. Time was running out. Kensuke's father was part of the committee of the neighborhood, and had a lot of work to complete the preparations for the revetlla. Kensuke went to give some help to his father. There was a stage, where an orchestra would play. They had finished setting up the light focus and it was necessary to test that they worked well. Dad turned them on and they started broadcasting the light correctly by passing electric current through them. Then he tried the system of carbonic snow to produce white smoke during the show. Carbon dioxide is carbon dioxide liquid below -80ºC, also called dry ice, which when at room temperature produces

the showy white smoke.

While the father took care of the stage details, Kensuke helped with the decorations.

He was inflating balloons, when suddenly, he inflated one too many and it burst.

At last, night fell. Kensuke stared intently as the great fire sparkled. He had a glass of Coca-Cola in his hand with the outer walls very wet.

Although time seemed to have stopped for Kensuke, slowly, the inner ice cubes were diminishing, becoming a liquid that mixed with the Coca-Cola. His friend Hideo, distracted him:

- Come on Kensuke, let's throw firecrackers.

Hideo and Kensuke lit a wick that would slowly burn through the night.

With it, they lit the first firecracker of the night, which exploded producing a strong explosion.

Exercise 2: As you know there are five states of matter: solid, liquid, gas, plasma and bose-einstein. The bose-einstein is the rarest. It is the opposite of plasma. We will leave it aside. However, the other four states of matter (solid, liquid, gas and plasma) have different characteristics, so make a comparison table with the different characteristics of each state.