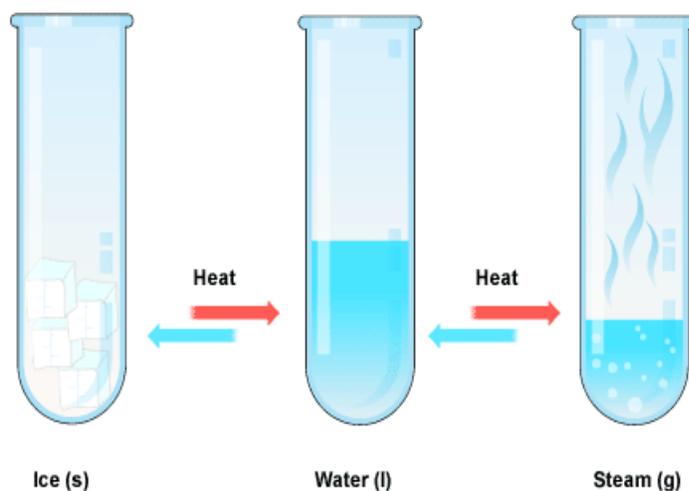


## A Closer Look At...

# CHEMICAL PROPERTIES AND CHANGES

We have learned that physical properties are those that can be observed without changing the object/matter. Examples include color, texture (how it feels), density (mass/volume), luster (ability to reflect light), brittleness (easily broken), solubility (ability to be dissolved), polarity (state of attraction to an item, i.e. like metal to a magnet) and state (solid, liquid, or gas).

Physical changes can occur by altering the size, shape, or state of matter but leaving the chemical (molecular) composition of a substance the same. Remember, physical changes are reversible. For example, when water is frozen, it changes from a liquid to a solid. This does not change the water into a new substance. It is still water, only in solid form. Melting the water can easily reverse this change.



## Let's Look at Chemical Properties

Chemical properties are any of the properties of matter that may only be observed and measured by performing a chemical change or chemical reaction. Chemical properties cannot be determined by touching or viewing a sample, they can only be observed by changing the substance.

Here are some examples of chemical properties.

|                                    |  |                             |  |
|------------------------------------|--|-----------------------------|--|
| 1. Reactivity with other chemicals |  | 4. Toxicity                 |  |
| 2. Flammability                    |  | 5. Oxidation                |  |
| 3. Chemical stability              |  | 6. Chemical bonds that form |  |

## What Is a Chemical Reaction?

A **chemical reaction** is the process by which one or more substances change to one or more new substances. In the reaction, chemical bonds break. The atoms of elements are rearranged, and new chemical bonds are formed. The new substance, called the product, will have new physical and chemical properties.

## What Are the Signs that a Chemical Reaction Has Occurred?

There are several signs that indicate a chemical reaction is occurring. These signs are a change in color, odor, or temperature. Chemical reactions can also produce light and/or a precipitate or gas. A precipitate is a solid substance that can be deposited from a solution. When gas escapes from a chemical reaction, it can often be seen as bubbles during the reaction.

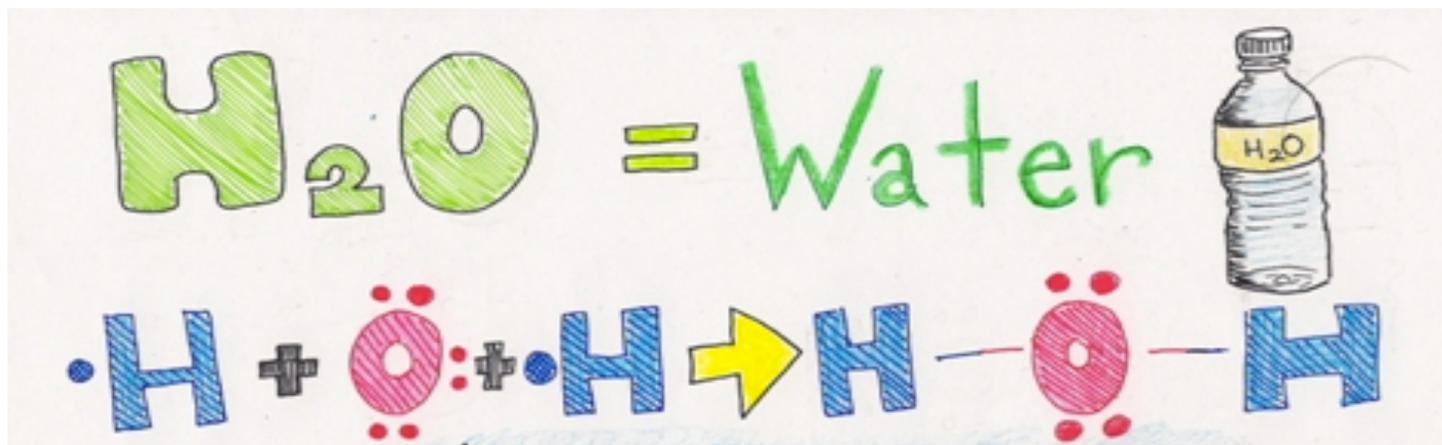
*\* Misconception: Chemical Reactions Are Always Violent and Explosive.*

In fact, many chemical reactions are slow and can pass virtually unnoticed. For example, rusting iron is a gradual, nonexplosive chemical reaction.

## What Is the Law of Conservation of Mass?

The law of **conservation of mass** states that matter cannot be created or destroyed. However, matter can change form. This law is one of the most important ideas in chemistry. The law of conservation of mass is important to an understanding of chemical reactions because the total mass of the products of a reaction will always equal the total mass of the original substances.

For example:



Courtesy of <http://chemwiki.ucdavis.edu/>

When hydrogen molecules collide with oxygen molecules, they rearrange to form water molecules. This helps us visualize the Law of Conservation of Mass. Matter cannot be created or destroyed. It only changes from one form/state to another.

Some Information via

<http://www2.rps205.com/Parents/Academics/Learning/Science/Documents/PhysicsFirstTextbook/Chapter8.pdf>