

## **CHANGING MATTER PROPERTIES**

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Objects, of course, are made of matter. Scientists study many different kinds of matter. They begin with their senses. Then they do tests and perform experiments to learn more. Matter is changing all around us all the time. For example, ice melts, toast burns, glass breaks, milk sours. Each change gives the substance new properties. Not all changes result in the formation of a new substance, however.

A change occurs when glass breaks or water freezes. But the substance does not change into another substance. The broken glass is still glass. And ice is still water. Glass breaking and water freezing are examples of physical changes. A physical change is a change that does not produce a new substance.

What happens when milk is left out in the open too long? The milk curdles and has a terrible odor! What happens when bread is left in a toaster too long? The bread becomes a black, brittle substance. Milk souring and bread burning are examples of chemical changes. A chemical change is any change of a substance into one or more other substances. In chemical changes, the chemical properties as well as the physical properties of a substance change. A chemical change is also called a chemical reaction. Chemical changes are often harder to reverse than physical changes. For example, you can easily melt ice into liquid water. Melting reverses the physical change of freezing. But you cannot easily reverse many chemical changes. You cannot “unspoil” milk or “unburn” toast [1].

Density is a very important physical property. For example, we have a plastic cube and a lead one. Both of them have the same volume. Each one takes up the same number of cubic centimeters. A cubic centimeter is a standard unit of volume. The plastic cube floats in the water. The lead cube sinks to the bottom. The two cubes behave differently because of their difference in density. The latter is the mass of a substance contained per unit of volume. If the density of an object is less than the density of a liquid, the object will float in that liquid. If the object is more dense than the liquid, it will sink in the liquid. To find the density of an object, you must first measure its mass and its volume. And then divide the mass by the volume.

There is an old story about how density was used to catch a dishonest jeweler. A king had given a jeweler enough gold to make a crown. The jeweler decided to keep some of the gold. He melted the rest of the gold together with copper, a cheaper metal. Then he used the mixture of metals to make the crown. The latter looked like a pure gold. But a wise man in the king's court suspected the trick. He knew that if the gold was mixed with another metal, the crown would not have the same density as pure gold. First, he found the mass and volume of the crown. And he found the volume of an equal mass of pure gold. Then he calculated their densities. He discovered that the crown's density was less than that of pure gold. Density proved that the crown was not pure gold!

## References

1. Difference Between Physical and Chemical Properties [Electronic resource]. – Mode of access: <https://www.thoughtco.com/difference-between-physical-and-chemical-properties-604142>. – Date of access: 13.03.2023.
2. Density and its Uses [Electronic resource]. – Mode of access: <https://chem1.com/acad/webtext/pre/pre-2.html>. – Date of access: 23.03.2023.