

- Sciences 360 - <http://www.sciences360.com> -

## Understanding the Law of Conservation of Mass

Posted By [Ramona Taylor](#) On October 7, 2013 @ 6:35 am In [Chemistry](#) | [Comments Disabled](#)

Conservation goes beyond plastic bottles and aluminum cans. In the world of science, everything from energy to matter is governed by some law of conservation. And one of the most fundamental concepts in modern physics and chemistry is the law of the conservation of mass. While this law may appear to be a simple concept, it is nonetheless a powerful concept, because it governs the nature of chemical reactions and laid the ground work for understanding the nature of the atom.

### The Law of Conservation of Mass

Mass is that property that causes matter to have weight and to be affected by gravitational forces. It is a key part of Einstein's famous equations regarding energy-  $E=mc^2$  as well as being affected by the pull of forces, momentum, and acceleration.

This law of conservation of mass states that in chemical reactions, the mass of the products would equal the mass of the reactants. Simply put, mass cannot be created or destroyed. The law applies to closed systems and relates that over time mass in a system is constant. The particles or states of the matter may change in form or space but the over mass of the system remains constant. This basic law is the underlying principle for the first law of thermodynamics.

A visual way to explain the law of conservation of mass is this way. Consider daily life, compounds and energy use notwithstanding. Add a specific weight of iron and sulfur through chemical process. The result, iron sulfide, will be same weight of the iron and sulfur combined.

### The History of the Law of Conservation of Mass

Man's first musing regarding matter, energy and mass began as early as 300 B.C. During this time, Epicurus, a Greek philosopher, theorized on many things including the nature of atoms. Epicurus, in his Letters to Herodotus, stated that "the sum total of things was always such as it is now, and such it will ever remain." While he incorrectly believed that atoms were unsplitable, Epicurus was on the right track when it came to mass. From Epicurus, many thinkers continued to consider this principle of mass.

In the early 1700s, Russian scientist, Mikhail Lomonosov experimented and theorized that mass remain constant in chemical reactions; however, it was Antoine Laurent Lavoisier, considered the Father of Modern Chemistry, who in the late 1700s conceptualized the modern principles of law of conservation of mass.

Lavoisier, a French chemist, experimented with water and chemicals. In his work, he found that the products of a reaction maintain the same mass as the reactants. He mastered containing simple reactions in sealed environments where gas or energy could not escape. His collective work included naming elements, laying the foundation for the invention of the vacuum pump and other testing equipment, as well as proving the Law of Conservation of Mass.

### The Significance of the Law of Conservation of Mass

While modern physics was alternated by the new age concepts of general and special relativity, the Law of Conservation of Mass was also changed. Scientist realized that on the atom and larger scale the law applies, but was those subatomic reactions, the law is not consistent.

The principles of conservation of mass have lead to numerous discoveries. If not for the law of conservation of mass, the periodic table of elements may not have been deciphered or the components of the atom gleaned more than 100 years ago. The understanding of the nature of the Earth, Solar System and Galaxies has been helped by understanding the

nature of mass. The discovery of the unknown gasses as well as dark matter can all be attributed to the law of conservation of mass.

From atoms to stars, the law of conservation of mass explains the universal concept that nothing can be created or destroyed in a closed environment. It has led to numerous discoveries and helps scientists understand the nature of chemical and physical reactions. While it may not seem very intuitive to some, the law of conservation of mass is one of the most important existing scientific concepts.

If you are interested in more information regarding the law of conservation of mass, the local bookstore and library have several very interesting editions, such as Elements of Chemistry by Antoine Lavoisier or Chemistry: Concepts and Problems by Houk and Post. However, the Internet has useful resources as well. Check out the following:

<http://www.scienceworld.wolfram.com/biography/Lavoisier.html>

<http://www.mychemistrytutor.com>

<http://www.scienceclarified.com/Ci-Co/Conservation-Laws-html>

---

Article printed from Sciences 360: <http://www.sciences360.com>

URL to article: <http://www.sciences360.com/index.php/understanding-the-law-of-conservation-of-mass-2-12290/>

Copyright © 2013 Helium Inc. All rights reserved.