



## About Sir Isaac Newton

English natural philosopher, generally regarded as the most original and influential theorist in the history of science. In addition to his invention of the infinitesimal calculus and a new theory of light and color, Newton transformed the structure of physical science with his three laws of motion and the law of universal gravitation. As the keystone of the scientific revolution of the 17th century, Newton's work combined the contributions of Copernicus, Kepler, Galileo, Descartes, and others into a new and powerful synthesis. Three centuries later the resulting structure - classical mechanics - continues to be a useful but no less elegant monument to his genius.



Isaac Newton

## Scientific Achievements

**Mathematics** - The origin of Newton's interest in mathematics can be traced to his undergraduate days at Cambridge. Here Newton became acquainted with a number of contemporary works, including an edition of Descartes Geometries, John Wallis' Arithmetic infinitorum, and other works by prominent mathematicians. But between 1664 and his return to Cambridge after the plague, Newton made fundamental contributions to analytic geometry, algebra, and calculus. Specifically, he discovered the binomial theorem, new methods for expansion of infinite series, and his 'direct and inverse method of fluxions.' As the term implies, fluxional calculus is a method for treating changing or flowing quantities. Hence, a 'fluxion' represents the rate of change of a 'fluent'--a continuously changing or flowing quantity, such as distance, area, or length. In essence, fluxions were the first words in a new language of physics.

Newton's creative years in mathematics extended from 1664 to roughly the spring of 1696. Although his predecessors had anticipated various elements of the calculus, Newton generalized and integrated these insights while developing new and more rigorous methods. The essential elements of his thought were presented in three tracts, the first appearing in a privately circulated treatise, De analysi (On Analysis), which went unpublished until 1711. In 1671, Newton developed a more complete account of his method of infinitesimals, which appeared nine years after his death as Methods fluxional et serierum infinitarum (The Method of Fluxions and Infinite Series, 1736). In addition to these works, Newton wrote four smaller tracts, two of which were appended to his Optics of 1704.

## Quotation by Sir Isaac Newton

1. "I do not know what I may appear to the world; but to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."
2. "If I have seen further [than certain other men] it is by standing upon the shoulders of giants."
3. "No being exists or can exist which is not related to space in some way. God is everywhere, created minds are somewhere, and body is in the space that it occupies; and whatever is neither everywhere nor anywhere does not exist. And hence it follows that space is an effect arising from the first existence of being, because when any being is postulated, space is postulated."
4. "I frame no hypotheses; for whatever is not deduced from the phenomena is to be called a hypothesis; and hypotheses, whether metaphysical or physical, whether of occult qualities or mechanical, have no place in experimental philosophy."
5. "I keep the subject of my inquiry constantly before me, and wait till the first dawning opens gradually, by little and little, into a full and clear light." If I have ever made any valuable discoveries, it has been owing more to patient attention, than to any other talent."