

Name: _____

Skill Sheet 5.1**Isaac Newton**

Isaac Newton is one of the most brilliant figures in scientific history. His three laws of motion are probably the most important natural laws in all of science. He also made vital contributions to the fields of optics, calculus, and astronomy.



Isaac Newton was born in 1642 in Lincolnshire, England. His childhood years were difficult. His father died just before he was born, and when he was 3, his mother remarried and left her son to live with his grandparents. Newton bitterly resented his stepfather throughout his life.

An uncle helped Newton remain in school and in 1661, he entered Trinity College at Cambridge University. He earned his bachelor's degree in 1665.

Ironically, it was the closing of the university due to the bubonic plague in 1665 that ushered in the blossoming of Newton's genius. He returned to Lincolnshire and spent the next two years in solitary academic pursuit. During this period, he made significant advances in calculus, worked on a revolutionary theory of the nature of light and color,

developed early versions of his three laws of motion, and gained new insights into the nature of planetary motion.

When Cambridge reopened in 1667, Newton was given a minor position at Trinity and began his academic career. His studies in optics led to his invention of the reflecting telescope in the early 1670s. In 1672, his first public paper was presented, on the nature of light and color. Newton longed for public recognition of his work but dreaded criticism. When another bright young scientist, Robert Hooke, challenged some of his points, Newton was incensed. An angry exchange of words left Newton reluctant to make public more of his work.

In the 1680s, Newton turned his attention to forces and motion. He worked on applying his three laws of motion to orbiting bodies, projectiles, pendulums, and free-fall situations. This work led him to formulate his famous universal law of gravitation.

This concept was truly revolutionary. Less than 50 years earlier, it was commonly believed that some sort of invisible shield held the planets in orbit. Newton's law explained that it was the gravitational force between the sun and the planets that is responsible.

In 1687, Newton published his ideas in a famous work known as the *Principia*. He jealously guarded the work as entirely his. He bitterly resented the suggestion that he should acknowledge the exchange of ideas with other scientists (especially Hooke) as he worked on his treatise.

Newton left Cambridge to take a government position in London in 1696. His years of active scientific research were over. However, almost three centuries after his death in 1727, Newton remains one of the most important contributors to our understanding of how the universe works.

Questions

1. Research the legend of Newton's apple. Which of Newton's laws does it help explain?
2. Newton was outraged when, in 1684, German mathematician Wilhelm Leibniz published a calculus book. Find out why, and describe how the issue is generally resolved today.