**Isaac Newton**

General

* Newton recorded many thoughts in notebooks in tiny script and was interested in a wide range of disciplines.
* The University of Cambridge’s curriculum had become stale and outdated by the time Newton entered, relying heavily on Aristotle and Greek thought. Still Newton found his way to new ideas through Descarte and Galileo and went beyond. In Newton’s second year, he bought a notebook and headed up forty five chapters that covered everything needed to form the basis of a new natural philosophy.
* To better understand light he slipped a bodkin into his eye socket and pressed against his eyeball. He also stared at the sun with one eye (in a looking glass) for as long as he could bear and had to retreat to a darkened room for three days before his vision returned to normal.
* Throughout Newton’s life he was a (secret) dedicated alchemist.
* Newton believed in God but rejected the doctrine of the Trinity.
* Book I of the *Principia* expounds definitions and was primarily about gravity (motions of bodies in orbits). Book II carried Newton’s three laws of motion, proofs of geometry and using these proved facts about the moon and the tides. He also revealed his calculus although he had to frame it in orthodox geometry so that people would understand (and believe) it. Newton finally banished Cartesian vortices by taking them seriously. He did the mathematics until he proved they couldn’t persist. Book III gave *The System of the World* explaining facts about the earth, other planets in the solar system and comets.
* It seems that Newton and Leibniz largely invented calculus independently but Newton discovered more earlier.

Timeline

1642 – Born on Christmas in Lincolnshire.

1645 – His mother, Hannah Ayscough married a nearby rector and Hannah abandoned Isaac to his grandmother

1653 – Barnabas Smith died and Hannah moved back. She sent Isaac to the Kings School in Grantham, where he boarded with the apothecary, William Clarke. He learned Latin, theology, a little Greek and Hebrew, and also a little arithmetic.

1661 – Newton was accepted into the Trinity College of the University of Cambridge as a subsizar. (The three ranks were noblemen, pensioners and sizars)

1662 – The Royal Society of London was founded with Robert Hooke (the wielder of the microscope) as the Curator of Experiments.

1665 – Cambridge closed because of the plague and Newton returned home. It was during this period that Newton developed a approach to infinite series and invented integral and differential calculus. During the plague years, Newton was inspired by the infamous falling apple. The apple falling to Earth served as an analogy of the moon also falling towards Earth.

1667 – Newton was back at Cambridge and became a fellow. Isaac Barrow encouraged Newton to share some of ideas.

1669 – Isaac Barrow resigned as Lucasian professor, yielding the position to Newton.

1669 – Newton invented the reflecting telescope. Barrow introduced it to the Royal Society.

1671 – Heinrich (later Henry) Oldenburg approached Newton about publishing an account of his reflecting telescope. Robert Hooke was already claiming to have invented it as early as 1664.

1671 – Newton was elected to the Royal Society. In the 1970’s Newton started frictional correspondence with Leibniz about their mathematics.

1672 – Newton sent a letter to the Royal Society which was one of the first examples of a true scientific paper expounding a theory. The theory was that white light was not actually white, but composed of all the colours of the rainbow and could be separated with a prism. At this time, Newton thought that light was composed of particles. This sparked a hostile reaction from Hooke and the two of them would be enemies for the rest of their lives.

1672 – Oldenburg discovered that he could pry knowledge from Newton but it was hard going and most of Newton’s mathematics remained hidden.

1673 – Fifteen months after being elected, Newton resigned from the Royal Society and terminated all correspondence with Oldenburg for two years.

1675 – Newton finally met the members of the Royal Society with a more detailed hypothesis on the nature of light but it reached far behind light to the substance of nature itself. Hooke took offense at Newton’s hypothesis and accused him of basically hijacking his theory.

1676 – Newton sent a dated letter to Leibniz expounding his binomial theorem, the use of infinite series, tangents and the finding of maxima and minima, but all in code.

1679 – Newton returned to Cambridge when his mother succumbed to a fever which she would die from.

1679 – Around this time, Oldenburg died and Hooke succeeded him as Secretary of the Royal Society.

1679 – Hooke sent an essay to Newton entitled, “System of the World.” Much of it Newton had already intuited in 1666 but had kept secret. It included the idea that all objects travel a straight line until deflected. However Hooke’s system lacked a mathematical foundation for calculus hadn’t been discovered. This sparked the debate between the two about the exact nature of the deflection. Hooke and Newton had both abandoned the Cartesian notion of vortices and were explaining the planet’s motion without reference to ethereal pressure or resistance.

1684 – Edmund Halley asked Newton directly what sort of curve a planet would make around the sun. Newton replied, an ellipse, but he wouldn’t give Halley the mathematical proof.

1684-7 – Spurred on by Halley, Newton dove into the problem and poured out his Book I of the *Principia*. He assailed Hooke and kept pouring forth his principles and ideas into Book II and III. Halley took on the task of getting the books published.

1684-6 – Gottfried Leibniz publishes his calculus. He stated boldly, without proof what Newton had disguised in geometry for his readers.

1687 – Newton was becoming famous now and regularly attended Royal Society meetings and social events.

1696 – Newton left Cambridge for London as Warden of the Mint; a position from which he brought the standardisation of England’s coins to new heights of exactness. It also made Newton very rich.

1700 – Newton became the Master of the Mint.

1703 – Hooke died and Newton became president. He published his second great work, *Opticks*. This explained everything Newton knew about light and colour and spanned from cosmology to metaphysics. He also included a couple of papers that expounded his mathematics (his method of fluxions) which was Leibniz’s differential calculus in completely different notation. This sparked a fierce feud which lasted long after both protagonists deaths and saw them anonymously reviewing their own work and anonymously criticising the other’s. Newton used his position to issue his manifesto; nature is simple and constant.

1716 – Leibniz died.

1727 – Newton died from a kidney stone.