The eternal contributions of isaac newton

At the peak of his scientific tenure, Sir Isaac Newton said, We build too many walls and not enough bridges. This quote was the basis for how he lived his life; building bridges of knowledge between the known and unknown. As a result of this philosophy, Newton became an acclaimed mathematician and physicist, known for contributions such as calculus, where he built upon the geometric and algebraic works of great mathematicians in the past to create a more complex way of manipulating variables in order to explain more advanced processes of nature.

Replacing obsolete methods of thinking was a common theme in Newton's research, as seen in his research on optics and even classical mechanics and gravitation. And when it seemed he had accomplished everything possible in the world of physics, Newton even delved into chemistry, helping form a basis of special religious studies in such ideas as dimensions and alchemy. As a result of these studies and seemingly infinite accomplishments, Newton has been credited as the father of modern science for almost 300 years.

Like most other great researchers, Newton's life started out difficult. He was born prematurely and barely survived his birth and first few months. Just to add to the struggle, Isaac Newton Sr. died, and Newton Jr's mother then abandoned him and left to live with his grandmother and begin to lead a new life. Eventually she was widowed again by her second husband (Reverend Barnabas Smith) who Newton despised, and according to Milo Keynes, Newton even threatened my father and mother Smith to burn them and the house over (Keynes 300). At about this time, Newton's mother also determined that Isaac's destiny was to become a farmer, based on familial traditions. Fortunately, he failed at it, and his mother had no other choice

than to send him to school. Thus, in June 1661, Newton was admitted to Trinity College in Cambridge. Although he was first admitted as a subsizar, where he paid for his education, Newton was quickly awarded a scholarship and could now fully concentrate on his studies. According to the biography in his famed text, Principia, In college, he learned extensively about the teachings of Aristotle, along with, the moderns by Kepler, Cavaleri, Roberval, Fermat and Wallis (Newton). He was absolutely fascinated with the former, becoming obsessed with mechanical philosophy and inspired to expand upon the current knowledge of the field. Thus, after graduating, Newton spent the next years at his home in Woolsthorpe developing his theories of optics, calculus, and gravitation.

After Newton graduated, in the mid 1660’s, the most distinguished scientists were directing all of their focus to studying light, or optics, and advancing the reflecting telescope. According to Darrigol’s, A History of Optics, Newton, having applied himself to the grinding of optic glasses of other figures than spherical, experienced the impracticability of these lenses and determined their defects, similarly to those of refracting telescopes, were because of a dispersion of light into colors. This research was the basis for Newton’s eventual formulation of the Theory of Color. His notes in Hydrostatics, Optics, Sound and Heat suggest that he used a prism and current research on the multicolor spectrum to show that color light does not change its properties by separating; thus, regardless if the light is transmitted, reflected, or scattered, the light will always remain the same color. Asked to prove this concept, Newton rode his current momentum and constructed a telescope using not lenses, but rather reflective mirrors. The design was the first

known functioning reflective telescope. Now using his Newtonian Telescope in his studies, Newton was able to conjecture that observed light was composed of particle, which were all refracted by accelerating into differing media (Newton). He published this observation in his book Optiks and, although unknowingly, set the stage for the development of quantum mechanics and photons some 250 years later.

After his study of optics, Newton devoted himself to advancing the world of mathematics, even described to, distinctly advance every branch of mathematics then studied (Ball). His greatest contribution to mathematics was, without any doubt, calculus. Even in college, Newton saw the current state of the mathematical world as obsolete and wanted to expand upon geometry and algebra. As a result, Newton formulated infinitesimal calculus as a way to express variables as fluxions or differentials as early as 1666. He also formulated an expression to find the area under a curve by factoring in a momentary increase at a point. As a result, the revolutionary fundamental theorem of calculus was formed. To give his newfound calculus a more complex framework, Newton further explored instantaneous motion and infinitesimals in his book Methodus Fluxionem et Serierum Infinitarum. However, according to James Stewart’s Calculus: Concepts and Contexts, Newton had been reluctant to publish his calculus because he feared controversy and criticism (Stewart). As a result, Newton often delayed his publication and eventually became involved in a dispute with Leibniz over credit in the development of calculus. Although it was proved that both Newton and Leibniz invented calculus independently, Newton accused Leibniz of plagiarizing his works, dismissing Leibniz’s works and sending him

into the depths of infamy. Newton was quickly establishing himself as one of the most distinguished scientists in recent times, with his findings showing prominence even today.

In 1679, Newton finally rekindled his interest on celestial mechanics and gravitation with the goal of fully incorporating the effects of gravity into Kepler's findings on planetary motion. To start his research, Richard Westfall's Never at Rest states that Newton called out to Robert Hooke and the Royal Society. His correspondence with the former inspired Newton to observe comets, and Newton was quickly able to prove that the elliptical form of planetary orbits would result from a centripetal force inversely proportional to the square of the radius vector (Newton). These relatively crude observations on planetary motion set the basis for Newton's most famous publication, Principia. Principia, published in 1687, stated the three universal laws of motion, together describing the relationship between the forces acting upon an object and the object's motion, which laid the entire basis for classical mechanics. Even further, these ideas of motion and gravitas (gravity) greatly inspired the classical technologies that were created during the Industrial Revolution. Now, all of Newton's previous discoveries of calculus and accelerating motion came together into one new law: the Universal Theory of Gravitation. Because Newton was able to conquer the mysterious, previously deemed supernatural, power known as gravity, he matched, even surpassed the likes of Copernicus, Brahe, Kepler, and Galileo.

After mastering the entire field of physics, Newton ventured into a less exact science; Biblical interpretation. Known to follow a Christian faith from the

very early stages of his life, much of Newton’s work later in his life were based on radical interpretations of theology, especially the occult studies of alchemy. Newton was known to be deeply fascinated with all forms of natural, physical, and material sciences, with this interest leading to some of the greatest contributions in science. However, Newton also had his fair share of controversial ideas, described perfectly by The Chymistry of Isaac Newton; Yet there is another, more mysterious side to Newton that is imperfectly known, a realm of activity that spanned some 30 years of his life, although he kept it largely hidden from his contemporaries and colleagues (Indiana University). Although there were several previous frameworks developed to understand the physical world, Chymistry was still very underdeveloped. Newton tried to contribute to use his expert experimentation skills to further explain the underwhelmed field of science, but according to the Strange, Secret History of Isaac Newton’s Papers, his experimental studies used esoteric language and vague terminology more typically associated with alchemy and occultism (Mann). In fact, an abundance of Newton’s notes indicated his great interest of the Philosopher’s Stone, a legendary substance with the supposed capability of turning crude metals into gold, dubbing it the elixir of life. Mann remarks that a surprising 1/10 of Newton’s works were devoted to finding this elixir. But it seems Newton wasted his time meddling in such matters, as it was not until several decades after Newton’s era that modern and analytical chemistry were even formulated, with the first experiments being conducted by Antoine Lavoisier in the mid 1770s.

Isaac Newton was an unbelievable polymath, transcending time with his seminal contributions to optics, mathematics, and gravity. Although his life proved to be difficult at first, the Englishman surpassed all expectations by going to college and eventually explaining the majority of the current problems faced in physical sciences, streamlining the way for one of the most important events in European history; the Industrial Revolution. Although not all of his research was the most ethical and realistic, he set the basis for the entirety of modern physics still used today, almost 300 years after his death. Publishing his studies in books like Principia, Newton was able to break down the workings of the vast solar system into simple equations, literally changing the way people saw and interacted with, not only objects around them, but the universe itself. By doing so, Newton surpassed all of the genius minds in history to become the one and only greatest scientist of all time.