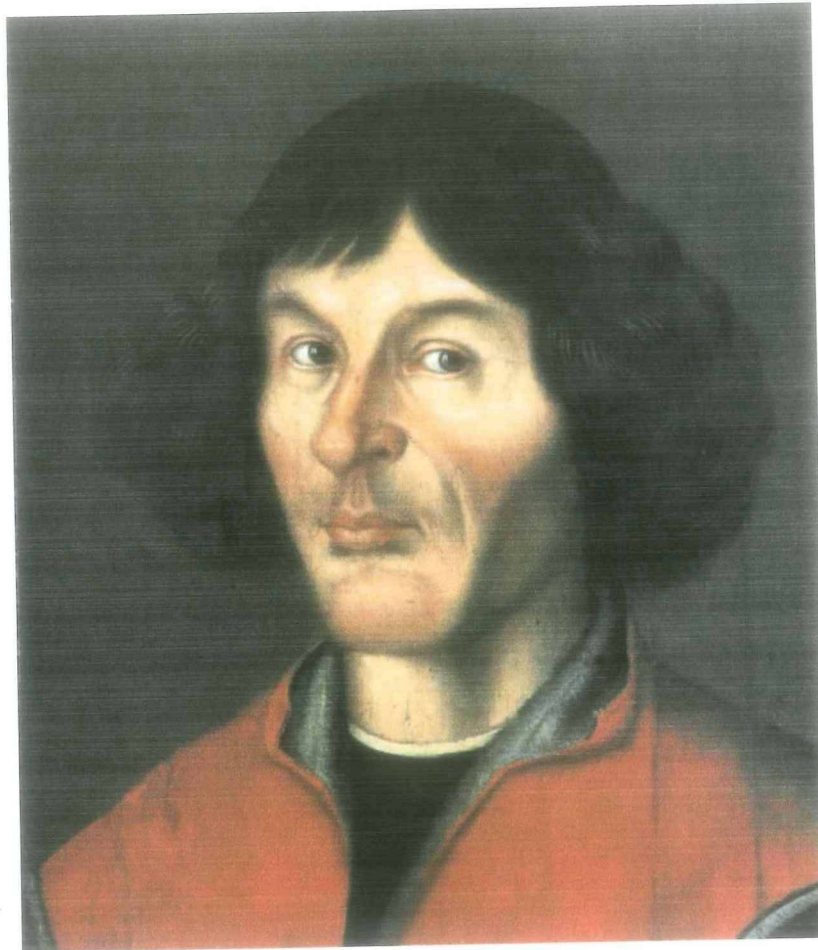


NICOLAUS COPERNICUS

The Father of Modern Astronomy



By: Skye Waterland

2/8/16

English 1 Pre-Ap

P6

Dear Reader,

In this collection of carefully crafted pieces, I hope to enlighten you on the life and accomplishments of Nicolaus Copernicus. Copernicus was a brilliant Polish astronomer and thinker who crafted the heliocentric theory and our model of the solar system today. During his life, many people believed that the earth was located at the center of the universe. Yet, Copernicus crafted a theory in which the sun was located at the center of the universe. This theory caused an accusation of heresy from the Catholic Church and brought a storm of controversy. Copernicus is known as the Father of Astronomy due to the basic knowledge of the field that he instilled into the world. After he died, he caused a revolution of scientific thought that took the course over hundreds of years and molded the cosmos today. Copernicus literally changed the way we see the world. I hope you enjoy the pieces I have written and learn more about Nicolaus Copernicus.

Nicolaus Copernicus: the Father of Modern Astronomy

“To know that we know what we know, and to know that we do not know what we do not know, that is true knowledge.” – Nicolaus Copernicus

In the town of Torun, Poland on February 19, 1473 a boy by the name of Nicolaus Copernicus was born. Little did his parents know that he would revolutionize the field of astronomy and forever change the way we perceive the world. Throughout his life, Copernicus developed a heliocentric theory which stated how the sun is located at the center of the universe instead of the geocentric theory which stated how the earth was located at the center of the universe. Along with this theory came accusation of heresy from the Roman Catholic Church, since his theory was completely contrary to the geocentric belief. Before Copernicus, astronomy was simply a way for the church to communicate and perceive the heavens “including the sun, stars, and the planets” (Ryan 1.) After Copernicus, astronomy was no longer related to the beliefs of the Catholic Church, and the development of scientific thought was forever changed. Copernicus literally changed the way that we perceive the world and the cosmos surrounding the universe today. Copernicus started a revolution that began to sever the ties that held together science and religion.

When Copernicus was a young student, he studied canon law, liberal arts, and medicine but became interested in astronomy when he, “stayed with a mathematics professor, Domenico

Maria de Novara, who encouraged Copernicus' interest in astronomy." (BBC 1) Due to the encouragement to pursue this field of science, Copernicus began to study the planetary motions and other astronomers. Copernicus made observations by simply looking into the sky since the telescope hadn't been invented yet. Copernicus was also known as a brilliant thinker who gathered information and proposed theories. At the time, science was strongly influenced by the ideas of the Roman Catholic Church. Astronomy was mainly used to communicate and perceive the "heavens" such as the stars, the sun, and the planets. The Catholic Church only agreed to the geocentric model of the Solar System which showed how the earth stayed stationary while the stars and planets moved across the sky. This model was developed by Ptolemy of Alexandria a, "2nd – century Greek scientist whose geocentric (earth centered) interpretation of the structure of the solar system had become standard." (Ryan 1) But, Copernicus found fault in this popular theory, the geocentric theory stated how the heavenly bodies moved exactly how they were viewed from the earth. He soon began to develop his heliocentric theory.

In 1512, Copernicus wrote his first scientific text named "Commentariolus" which stated his negation to the Ptolemaic system. In his book he wrote, "All the spheres revolve about the sun... and therefore the sun is the center of the universe." He gave this book to a few of his friends and peers and within two years his idea began to spread throughout Europe.

Unfortunately, Copernicus became an object of ridicule and criticism amongst his peers and religious leaders even mocked him saying how preposterous his idea was. After this opposition to his idea, Copernicus decided not to publish his theory yet and stayed quiet, working diligently on the mathematic side of his heliocentric theory.

Over many years, Copernicus further developed his astronomical theory. In addition to the idea that the earth and all the other planets in the solar system revolve around the sun,

Copernicus also stated that the earth rotates on its own axis. Copernicus identified that each planet has its own center of gravity, contrary to the belief that the earth was the whole universe's center of gravity. Copernicus made huge advancements in the history of astronomy and physics. All of these ideas were published in Copernicus' second book called "De Revolutionibus Orbium Coelestium" (Latin for "On the Revolutions of the Heavenly Spheres). The book was published only a few days before his death on May 24, 1543 and legend says that he was shown a copy of his book on his deathbed. The book caused an explosion of controversy and in the preface of the book, Martin Luther (a minister of the Lutheran church) wrote that the ideas presented did not truly show the nature of the heavens, and the theory was not a fact. After only 1000 copies of the book was made, the Catholic Church banned the book and placed it on the Lutheran's list of forbidden books in 1616. The book remained on the list until 1835.

Nicolaus Copernicus may have died on May 24, 1543, but his ideas of the heliocentric model of the solar system were just beginning. "His great work... was the important first step to the more accurate picture of the solar system." (Hutchinson's 1) In the 17th century, astronomers such as Johannes Kepler, Galileo Galilei, and Tycho Brahe began expanding upon Copernicus' idea of the Solar System. Copernicus not only inspired astronomers to refine the model of the solar system, but he also inspired me. I hope to one day, to make a breakthrough in the field of astronomy just like Copernicus. Copernicus not only severed the ties that held together science and religion, he provided the foundation for the field of modern astronomy.

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Nicolaus Copernicus

*"To know that we know what we know, and to know that we do not know what we do not know,
that is true knowledge." – Nicolaus Copernicus*

An idea.

Of a young man who often looked into the sky and pondered the movements of the heavens

A brave and brilliant thinker who questioned the position of humanity in the cosmos

A man who wondered what heavenly body was placed at the center of the universe

Who dared to object to the common thinking of the Roman Catholic Church

Nicolaus Copernicus.

A theory.

One that reinforced Nicolaus' objection not only to the Catholic Church's ideas

But to the thousands of years of muddled thought before him

Including the geocentric theory of Ptolemy

A Grecian who believed like many others that the earth was the center of the universe

Yet Copernicus found fault in this popular model

He instead stated how the earth revolved around the sun, which was the center of the universe

The heliocentric theory.

A revolution.

One that severed the ties that held astronomy and religion

One that started because of the heliocentric theory

One that took course over hundreds of years

One that inspired the later works of Johannes Kepler, Galileo Galilei, and Tycho Brahe

One that shaped the field of modern astronomy and forever changed the development of
scientific thought

One that all started with

An idea.

Copernicus: The Noble

Nicolaus Copernicus galloped on his fine Arabian horse into the deciduous forest in Poland. The air was crisp and the sun shone bright on the pine leaves that stretched far into the blue sky. The small pebbles of the path crunched as the hard hooves of the horse dashed across the ground. Copernicus was headed to his very first duel, and his mind was troubled. Martin Luther, a priest who called him weak for not continuing to promote his heliocentric theory had challenged Copernicus to a duel to restore his honor. Martin Luther was also known as one of the finest swordsmen in Europe, which instilled anxiety. Copernicus wore the best of his attire to present himself, a stylish coat and a buttoned vest. His long silver sword that tapped at his side as he rode through the forests sent a reminder of the conflict about to occur.

Copernicus arrived at the duel at exactly noon. The spot chosen was right next to a gentle river that sent a wave of calm through him. Copernicus alighted from his horse with such agility, surprising for a middle aged man. After meeting his second, Copernicus greeted his opponent Sir Martin Luther, a young man with a stature of about six feet and an impressive figure. He had also wore the best of his attire, a striking white coat and a silk sash.

“Shall we begin?” said Martin Luther in a slightly impatient and arrogant manner.

“I believe so Sir,” replied Nicolaus.

The two men walked out to the clearing next to the river and prepared their weapons. Martin Luther pulled a silver sword from his sheath. It was so thin that it wobbled in the wind. After inspecting his opponent’s weapon, Nicolaus proceeded to get out his sword. He grabbed the hilt, an intricately carved black handle, and pulled; the metal was so sharp that it made an “sssssss” sound as it snaked out of the sheath. The impressive curved blade that glimmered in

the sunlight was quite magnificent. Sir Martin Luther stood in awe, watching in admiration at the sword. Then, after the Seconds each approved of the weapons, they prompted the two men to begin the count.

The men both turned their backs quickly.

“One... two.... three... four, five, six, seven, eight, nine, ten!” said the two men in unison as with each count they took one step.

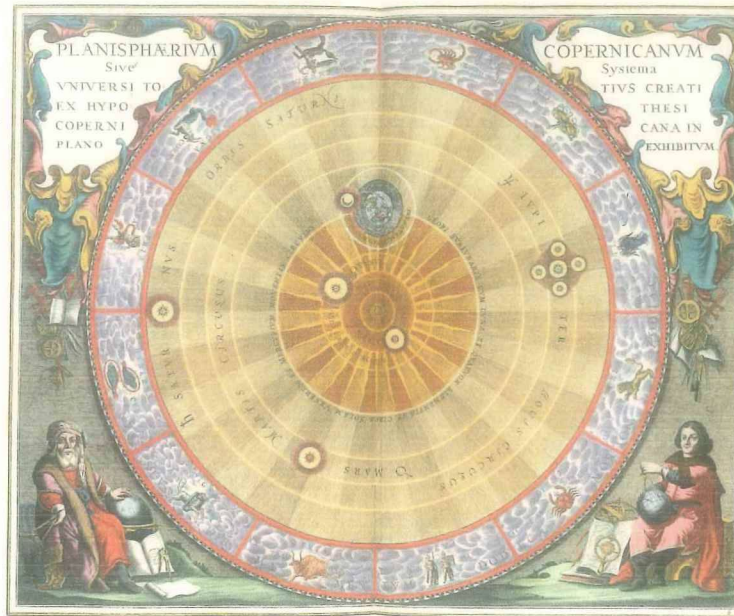
When they both said ten, each one turned around and held his sword steady. Sir Martin Luther had an impressive stance, his legs bent slightly, his sword held high, and his piercing evil eyes staring into the now fearful eyes of Copernicus. Nicolaus’ confidence drained from him and he felt weak. A flash of silver blazed through the air as Martin Luther’s sword pierced Copernicus’ left arm. Copernicus let out a cry, as his blood splashed onto the blanket of dried leaves coating the forest ground. Seeing his opponent’s weakness, Martin Luther let out a slight chuckle. Little did he know that Copernicus had a cunning idea.

Copernicus arose from the ground and noticed the angle of the sun shining down. He also noticed how the sword perfectly reflected the sunlight. Copernicus regained his stance, then quickly held his sword above his head. The midday sun reflected off of the dazzling sword and shone directly into Martin’s eyes, blinding him. He let out a sharp cry and dropped his sword as he covered his eyes. Seizing the opportunity, Copernicus advanced with his sword and slashed Martin’s arm so deeply that his blood flowed as quickly as the river. Copernicus had also kicked away Martin’s sword out of his reach.

“Mercy, Mercy!” cried Martin, a once courageous man who was now realizing his close death.

Copernicus stood above Martin who crouched on the ground so weakly. He was crying and screaming for help, yet the Seconds just stood in awe, having never seen this tactic used before. The Seconds also knew that only one person was to come out of this battle. Copernicus held the sword high above his head, ready to strike down on the back of Martin's delicately pampered neck, but then felt pity for the man. Copernicus dropped his sword and helped his trembling opponent up. The Seconds were shocked by this outcome but Copernicus said nothing. Copernicus then untied his fine Arabian horse and rode off into the shade of the trees, more confident than ever that he could now make the world understand the importance of the sun.

On the Revolutions of the Heavenly Spheres: De
Revolutionibus Orbium Coelestium



By [Skye Waterland](#) on January 5th, 2016

For the field of modern astronomy, *De Revolutionibus Orbium Coelestium* is the greatest book of all time. Even though the book was published in 1543 while Nicolaus Copernicus laid on his deathbed, it marked the beginning of a revolution of scientific thought. In the book, Nicolaus Copernicus states his heliocentric theory (in which the sun is the center of the universe) and draws out the model of the solar system as well as the paths of the planets. "In Copernicus' lifetime most believed that the earth held its place at the center of the universe. The sun, the stars, and all of the planets revolved around it." (Redd) Although there are a few faults in his model, the Copernican model of the solar



The Astronomy Articles



system remains as one of the key figures for future astronomers. Copernicus' model allowed scientists such as Galileo Galilei, Johannes Kepler, and Tycho Brahe to build upon this theory and further develop it. This novel laid down the basic foundation of scientific thought and established the field of modern astronomy.

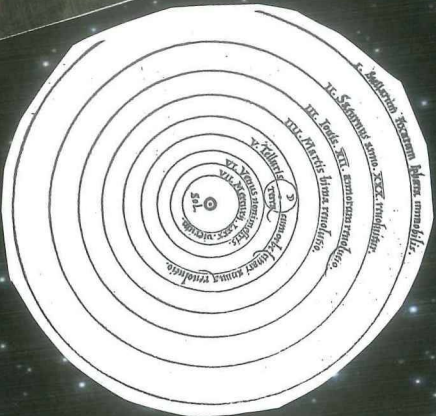
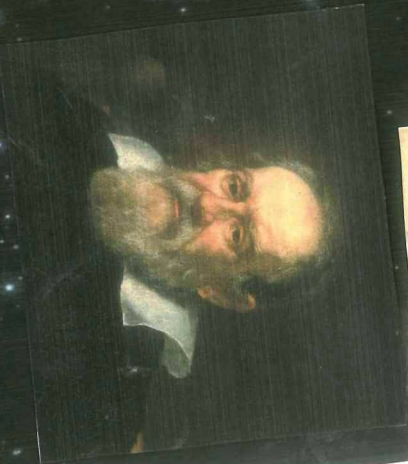
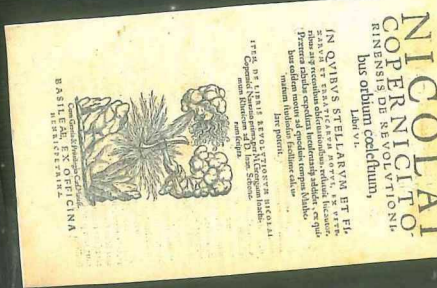
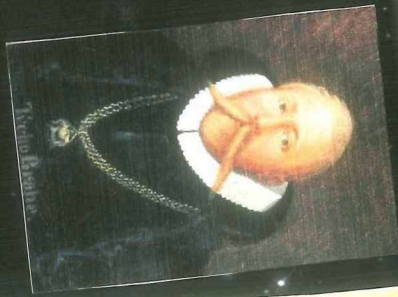
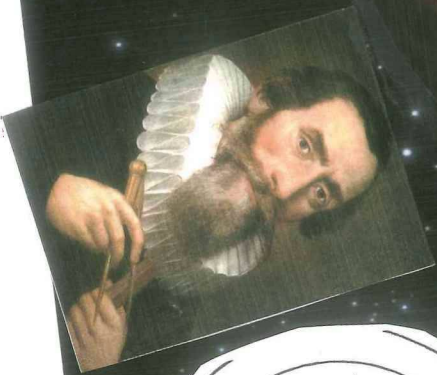
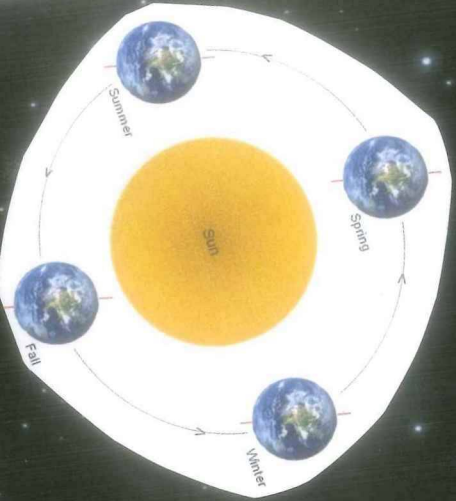
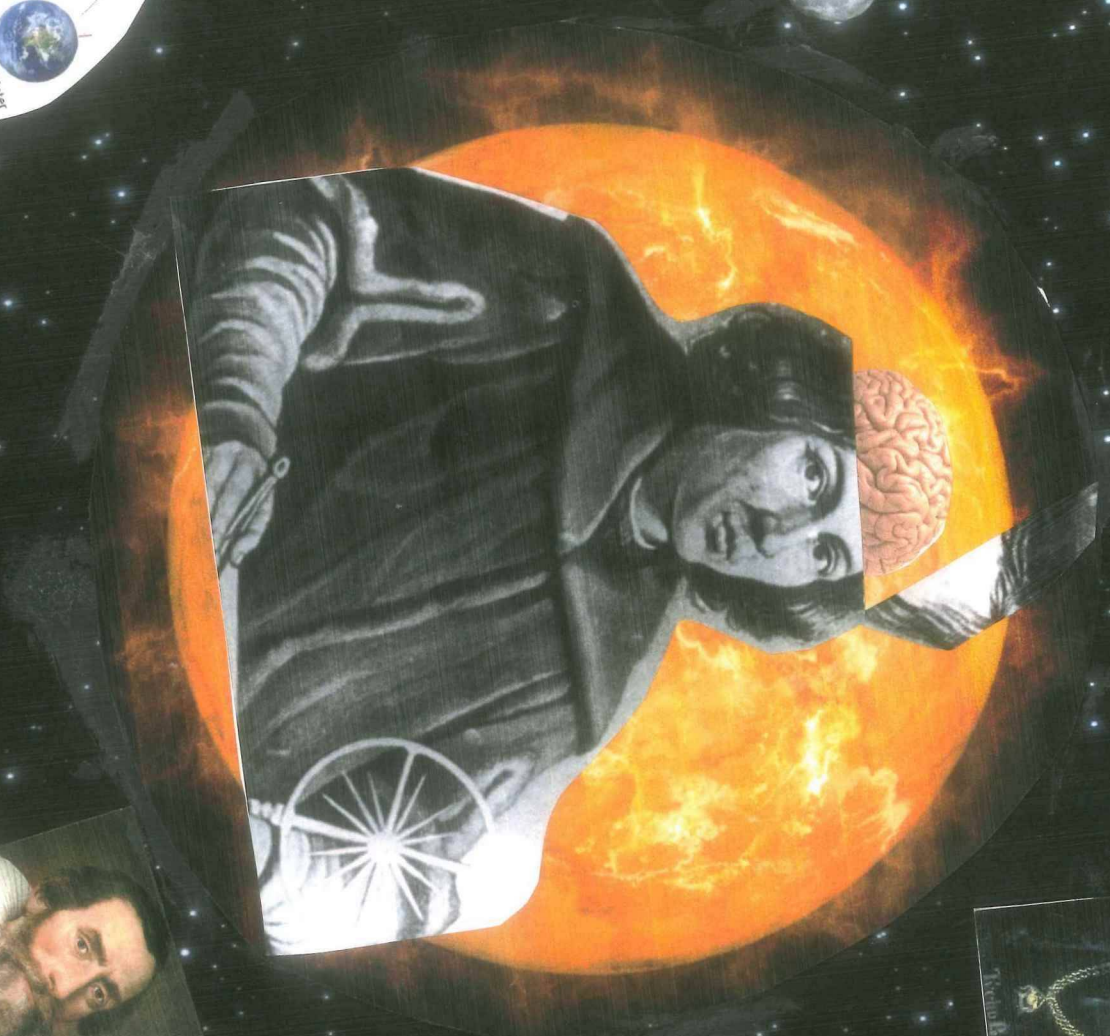
Since Copernicus lived in a time period where the telescope had not been invented yet, many of his observations were made by simply looking into the sky. Copernicus spent his whole lifetime developing not only the heliocentric theory, but explaining the occasional backwards motion of the planets and stars known as retrograde motion. Copernicus described that the earth's motion through space allowed the retrograde motion of the heavens. This idea rebutted the common geocentric theory, in which the earth was motionless at the center of the universe.

Copernicus' novel showed that not only did the earth and all of the other planets in the solar system revolve around the sun, but the earth rotates on its own axis. Copernicus also stated that the rotations on earth's axis caused night and day while the earth's revolutions around the sun caused the changing of the seasons. In addition, he identified that each planet has its own center of gravity, contrary to the belief that the earth was the whole universe's center of gravity. Copernicus' novel was putting years of brilliant thought into writing.

Even though Copernicus' heliocentric theory put down the most basic foundation of modern astronomy, there were still a few faults. In his book, he stuck to the classical belief that the planets traveled around the sun in perfect circles. In the 1600's a man named Johannes Kepler proved that the planets orbit the sun in epicycles instead of circles. Later, Galileo Galilei also noted that the sun was the center of the universe, but was put in house

arrest for an accusation of heresy from the Roman Catholic Church. It took hundreds of years for the Copernican model of the universe to finally take hold.

De Revolutionibus Orbium Coelestium: On the Revolutions of the Heavenly Spheres is an important book for the history of scientific thought. This book not only shares Copernicus' heliocentric theory, yet it also represents the life of a brave man who dedicated his life to the study of astronomy. "His great work... was the important first step to the more accurate picture of the solar system." (Hutchinson) Nicolaus Copernicus literally changed how we see the world today.



Notes Page

*"To know that we know what we know, and to know that we do not know what we do not know,
that is true knowledge." – Nicolaus Copernicus*

In my multigenre project, I used the quote above as my main unifying element.

Poem- Nicolaus Copernicus

In my poem, I used the quote above as connective tissue. I incorporated the quote's repetitious style too, especially in the last stanza of my poem. The phrase at the beginning of each stanza shows how Nicolaus' idea transformed over time and represents how he was mainly a brilliant thinker. When I mentioned at the end of the poem how the revolution started as an idea, this shows the cycle and development of thought. The alignment of the poem in the center represents Copernicus' heliocentric theory in which the sun was the center of the universe.

Myth- Copernicus: The Noble

In my myth, I craft a clear problem and resolution. The problem is when Copernicus must fight his first duel against a skilled swordsman named Martin Luther. The resolution is that Copernicus lets the man live, but teaches the world about the importance of the position of the sun. I used a lot of hyperbole and alliteration throughout my piece. Martin Luther represents how religion was so closely tied to science, and when Copernicus slashed him, but did not kill him it shows how Copernicus had only begun to sever the ties that held together science and religion. The trick in which Copernicus uses the sun to reflect the light into Martin's eyes shows how he is a brilliant thinker who produces ideas that have never been thought of before.

Newspaper Article- *On the Revolutions of the Heavenly Spheres: De Revolutionibus Orbium Coelestium*

In my newspaper article, I discuss the importance of the publishing of Nicolaus' book, *On the Revolutions of the Heavenly Spheres: De Revolutionibus Orbium Coelestium*. This event is important because it truly marked the beginning of the Copernican revolution. The book contained Copernicus' heliocentric theory, along with a model of the solar system, and the planet's paths. Even though the novel was published only a few days before he died, it inspired the works of future astronomers including Galileo Galilei, Tycho Brahe, and Johannes Kepler. The book embodied Copernicus' brilliant thought that was put into words.

Collage

In my collage, I incorporated many elements. The sun is placed in the center of the paper, which represents Copernicus' heliocentric theory. The picture of Copernicus has his head cut open to symbolize how he was a brilliant thinker and how powerful his knowledge was. Around him I also placed the earth on its axis and the moon revolving around the earth which was another one of Copernicus' ideas. I also placed a picture of the earth revolving around the sun which shows another one of Copernicus' ideas that explained the changing of the seasons. I placed a picture of Johannes Kepler next to a picture of Copernicus' model because instead of circles, Kepler changed the orbits of the planets to ellipses. In the upper right hand corner, I put a picture of Copernicus' book along with Tycho Brahe and Galileo Galilei who built upon his ideas.

Revised Essay- *Nicolaus Copernicus*

In my essay I crafted a clear paper on Nicolaus Copernicus. I incorporated many facts and details about his discoveries along with quotes to support these facts. My essay contains key unifying elements including how Copernicus was mainly a brilliant thinker and he severed the ties that held together science and religion with his knowledge. I also have my quote that is my unifying element at the top of my essay. My revised essay is a polished version of my research.