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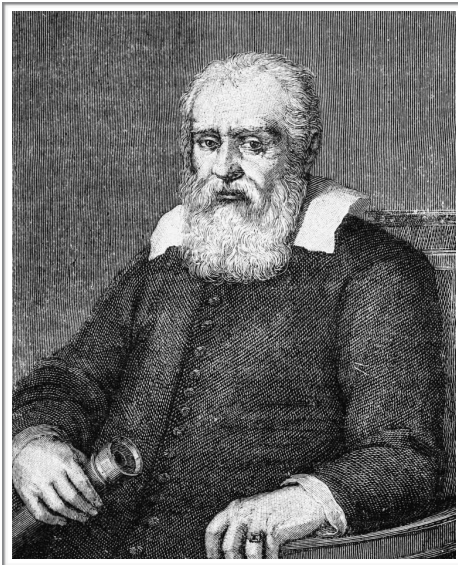
Date: _____ Period: _____

Supplemental: Galileo Galilei

Galileo Galilei Great Minds in Science

The Dark Ages happened after the fall of the Roman Empire between the 6th and 14th centuries. During this time, there was very little intellectual, scientific or cultural advancements. Luckily for me, I was born on February 15th, 1564, right in the middle of the European Renaissance period. The Renaissance occurred between the 14th and 17th centuries and was a period of great innovation in politics, art, science, mathematics and philosophy. This environment was ripe for profound changes in traditional thinking, however, my theories on the nature of the heavens were still too radical for the times. My ideas threatened the fundamental belief that the Earth was at the center of the known universe.

My story begins in Pisa, Italy, where I was born. I was the eldest of six children and growing up I had thought of becoming a priest, but my father really wanted me to become a doctor to bring in money for the family. Even then, parents pressured their children to become doctors! My father sensed that I had a passion for math and physics and



tried to keep me as far away from these subjects as possible for fear that my interest in them would take me away from medicine. His fears were well founded because that is exactly what happened. While attending medical school, I stepped into the wrong classroom one day and experienced a wonderful lecture on geometry. I was hooked and convinced my father that I should become a mathematician and physicist. By the age of 25, I was offered the position as the chair of mathematics at the University of Pisa. After teaching there for three years, I moved to Padua, Italy where most of my amazing discoveries took place.

Besides my intellectual pursuits, I was also a talented inventor and made interesting devices including a water pump powered by horses, a military compass and a thermoscope (primitive thermometer). These inventions were very important for bringing in extra income, especially after the death of my father. As the eldest son, I was responsible for all of his financial debts, of which he had many.

I met Marina Gamba in 1601 when I was 37 and we had a long-term relationship in which I fathered 3 children out of wedlock, even though I was a devote Roman Catholic. Since my two daughters were illegitimate, they were not considered marriageable so they entered the church to become nuns. Because of my difficult experience paying off my sisters' dowries after my father's death, I felt a huge relief that I did not have to pay dowries for my daughters, though I loved them dearly.

In 1604, a remarkable thing happened. A new star appeared in the night sky for many months. It shone very brightly and was unmistakable with the naked eye. It would later be known as Kepler's supernova. The supernova was a star that had exploded in the Milky Way. At that time, the prevailing idea of the heavens was that all the objects within it were unchanging, but this new star was proof they were not. Until that point, scientists thought that the near heavens contained only the Earth, Sun, Moon and the planets Mercury, Venus, Mars, Jupiter and Saturn.

In 1609, when I was 45, I heard of this marvelous invention, called the telescope, that had just been invented in the Netherlands. I was fascinated and built one within months. I improved on the Dutch telescope and it was good enough to point it to the sky to observe the heavens. In 1610, I noticed that Jupiter had 4 satellites which would later be known as the Galilean Moons in my honor. These moons are called Io, Europa, Ganymede and Callisto.

By this time, I was a big fan of the heliocentric model over the geocentric model proposed by Aristotle. The geocentric model placed Earth in the center of all the heavenly objects while the heliocentric model, proposed by Nicolaus

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Copernicus, placed the Sun in the center. With my telescope, I begin to gather data to support this Sun-centered model. I saw shadows on Saturn which proved that the planet was orbiting the Sun. I began to write letters in defense of my ideas and this is how my troubles began.

I began making some powerful enemies who opposed my ideas and brought them to the attention of the Inquisition of the Catholic Church. The Inquisition was a branch of the church dedicated to combating and punishing heresy. Heresy is a denial or doubt of any of the core beliefs of Christianity. As I continued to defend my beliefs over the next few decades, the church intensified its focus on me. In 1624, I was told by Pope Urban VIII that I could continue to study the heliocentric model as long as I stated that it was only a mathematical theory and not a scientific fact. The church wanted to look over all my writings before they were published. In 1632, one of my writings, *Dialogue Concerning the Two Chief World Systems*, came under intense scrutiny by the church and they deemed it heretical because it supported the heliocentric model. They threatened me with torture if I didn't promise to recant my beliefs. I reluctantly agreed and they reduced my sentence from torture to house arrest for the remainder of my life. However, by that time it was too late. The influence of my writings had extended beyond Italy and beyond the reach of the Catholic church. The heliocentric revolution had begun and couldn't be reversed.

Questions:

1. What was the Renaissance?
2. What was the significance of Kepler's supernova to the understanding of the heavens?
3. Why was the telescope essential in Galileo's discoveries?
4. What is the difference between the heliocentric model and the geocentric model?
5. Why did the Catholic Church oppose Galileo?