Name: Block:

Nicolaus Copernicus and the Heliocentric Universe

Imagine you discovered something important -- that nobody would believe.  Even worse, your discovery might get you into serious trouble.  That’s what happened in 1514.

Nicolaus Copernicus was a deeply religious man.  He worked for the church as a physician, caring for the poor people of Poland by day, but at night he studied the heavens.  Copernicus measured the relative angles of the sun, moon, and planets and concluded that the universe is heliocentric, or that it revolves around the sun.  Helios is a word used by the ancient Greeks for the sun.

In Copernicus’ time almost everyone believed that the earth was the center of the universe.  People believed that the sun and other heavenly bodies moved in circles around the earth.

 Copernicus feared that his ideas did not agree with how some people interpreted the Bible, so he circulated his opinions anonymously.  Martin Luther, a leading religious figure of the day, said of Copernicus, "Scripture tells us that Joshua commanded the sun to stand still, and not the earth.”

A legend about Copernicus tells of a book he wrote about the heliocentric universe.  The book was placed in his hands a few days after he lost consciousness from a stroke.  The story has it that Copernicus awoke to see that his work had been published, and then died peacefully.  We don’t know if that story is true, but it shows how fearful people at that time were of challenging long held beliefs, even if the beliefs are proven wrong.

**Fill in the Blanks**

        In 1514, a deeply \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ man named Nicholas \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measured the relative \_\_\_\_\_\_\_\_\_\_ of heavenly bodies and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that the universe was \_\_\_\_\_\_\_\_\_\_\_\_\_ because it traveled around the \_\_\_\_\_.  Copernicus circulated his \_\_\_\_\_\_\_\_\_\_\_\_\_ anonymously because he was afraid of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ long held \_\_\_\_\_\_\_\_\_\_\_\_.

**Answer in complete sentences**

1.  What does the term *heliocentric* refer to?

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2.  Why was Nicholas Copernicus afraid to publicly declare what he had discovered about the universe?

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Galileo Galilei and Heresy

Like Copernicus, Galileo Galilei learned from observing and measuring what he saw.  Galileo lived in Pisa, a city on the northwestern coast of the Italian peninsula.  In 1583, when Galileo was nineteen-years-old, he observed a priest swinging an altar lamp.  No matter how wide the swing of the lamp, it seemed the time it took to move from one end to the other was always the same.  Galileo had discovered what scientists today call isochronism, and his observations led to the development of the pendulum clock.

Galileo heard stories of a tool that used curved pieces of glass to magnify distant objects.  The Italian scientist was unable to purchase the instrument we now call a telescope, so he built a telescope on his own.  When Galileo observed the heavens, he made several discoveries that differed with Aristotle’s theory of an earth centered universe.

In Galileo’s time, many people believed in a geocentric universe where all heavenly objects revolved around the earth.  Galileo’s discovery of moons orbiting Jupiter disproved that theory.  While Galileo’s discovery did not prove the earth travels around the sun, it disagreed with the way many people interpreted the Christian Bible.  In 1616 Pope Paul V, the leader of Galileo’s Catholic Church, commanded that the scientist never again “defend or hold” the idea of a heliocentric universe.  Though he was a very religious man, Galileo continued to make new discoveries and continued to promote Copernicus’ theory of a universe that revolved around the sun.  Sixteen years later, Galileo went on trial for heresy.  Heresy is an opinion or belief that disagrees with the official position of the church.  Galileo was found guilty of teaching that the sun is the motionless center of the universe.  He was sentenced to house arrest for the remaining nine years of his life.  Galileo accepted his sentence, but he continued to write and study from his home.

**Answer in complete sentences**

1.  What is isochronism?

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2.  Why were Galileo’s discoveries unpopular with many people?

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3.  Why was Galileo sentenced to house arrest?

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