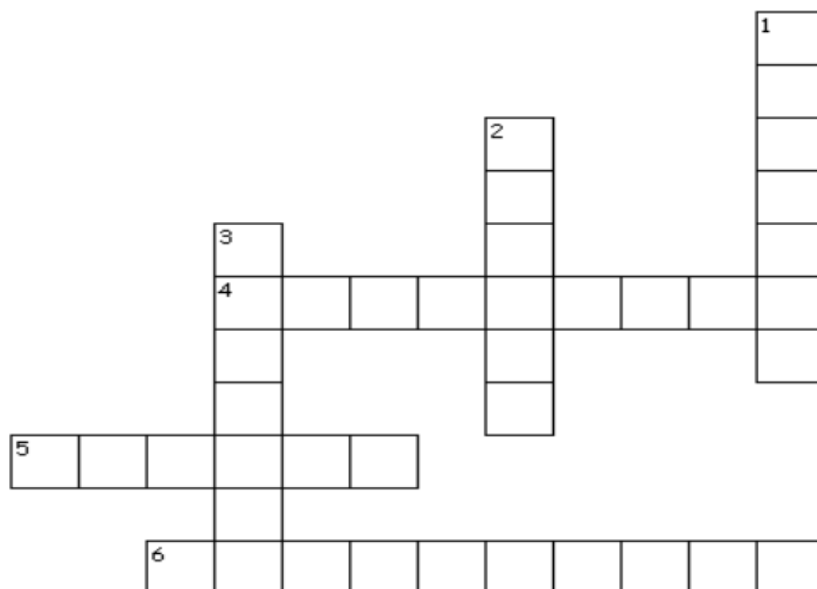


Name _____ Date _____ Class _____

The Scientific Revolution

Part 1: Crossword Puzzle: Instructions: Complete the crossword with the clues below. If you are writing with a pencil, fill in the squares. If you are in a Google Classroom or other format, just fill in the blanks.



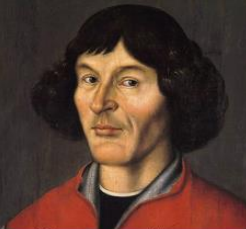

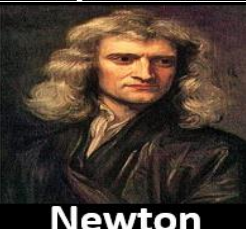
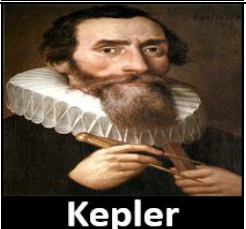


Across

4. Some of the greatest Greco-Roman thinkers, such as _____ and the Egyptian, Ptolemy, incorrectly taught the Earth was the center of the universe.
5. _____ was able to use Brahe's data and show how mathematical formulas could explain and predict patterns observed in space.
6. _____ felt that the past teaching of the geocentric theory contradicted his observations of the celestial bodies of space.

Down

1. _____ invented early forms of the microscope.
2. _____ developed the theory of gravity.
3. In 1610, _____ proved with his telescope that Jupiter had four moons revolving around it.

Part 2: Short Answer: Instructions: For each item below, you have two options. You do NOT have to do both! For each section, choose a scientist, either the one on the left or the right, and write one paragraph explaining the historical significance that their contribution to science left on the world.

 Copernicus	1. Write about the contribution of either Copernicus or Vesalius.	 Vesalius
 Newton	2. Write about the contribution of either Newton or Kepler.	 Kepler
 Fahrenheit	3. Write about the contribution of either Fahrenheit or Jenner.	 Jenner

The Scientific Revolution

In the 1500s, many respected the Greco-Roman philosophers of the past. They looked to these ancient thinkers to understand their world. Some of the greatest Greco-Roman thinkers, such as Aristotle (384-322 BCE) and the Egyptian, Ptolemy (100-170 CE), taught the Earth was the center of the universe. Yet, during the Scientific Revolution, many began to value observation of the natural world over the rhetoric of past philosophers.

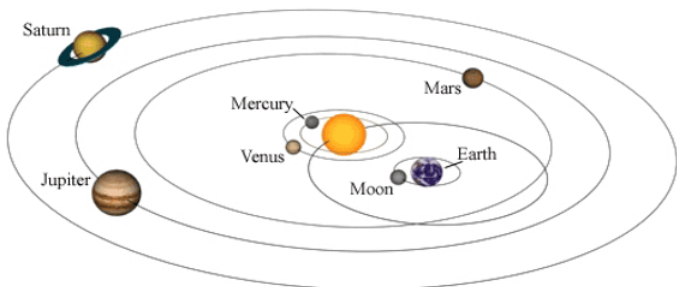
Prior to the middle of the 1500s CE, many people believed Earth was an immobile object and that the celestial bodies of space, such as the sun, stars, and planets, were moving around it. The Earth was considered to be the center of the known universe. This was called the geocentric theory. Though observational experience made those on Earth appear to be viewing a universe spinning around our planet, figuring out this was an incorrect view played a huge role in propelling humanity toward the scientific revolution.



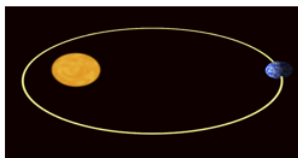
Copernicus helped humanity to start to understand the true nature of the solar system.

Nicolaus Copernicus (1473-1543 CE), felt that the past teaching of the geocentric theory contradicted his observations of the celestial bodies of space. In 1543, Copernicus published his defense that the Sun was the center of the known solar system, not the Earth, called *On the Revolutions of Heavenly Bodies*. He waited until he was very ill and facing death to allow his work to be published. During his life, he feared the Catholic Church would reject his teaching and maybe even persecute him.

Tycho Brahe (1546-1601) also studied the solar system and mapped out the observations of the movement of the planets and other celestial bodies. Brahe's protégé, Johannes Kepler (1571-1630), was able to use Brahe's data and show how mathematical formulas could explain and predict patterns observed in space. Kepler showed Copernicus was right about the sun being the object that all other objects in the solar system were going around. Yet, while Copernicus thought the planets moved in circular pattern, Kepler showed they were really moving in oval shaped patterns.



Kepler showed the revolutions of the planets were more of an elliptical, oval shape than perfect circles.



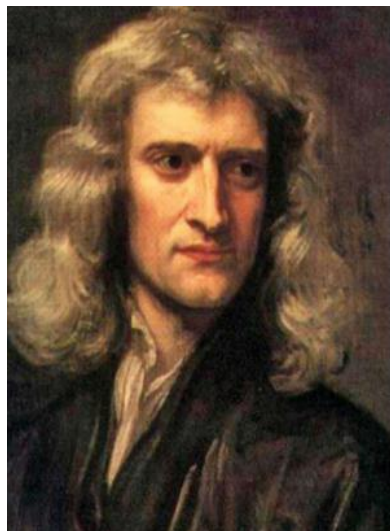
In Italy, Galileo (1564-1642) studied the findings of Copernicus and others. Using the telescope, he made observations concerning planets. In 1610, Galileo proved with his telescope that Jupiter had four moons revolving around it. The theory that all objects revolve around Earth was disproven, since four objects revolving around another planet were discovered. The Catholic Church threatened Galileo with torture, if he didn't recant and say Copernicus was wrong. They embraced the Geocentric Theory and felt teaching the Heliocentric

Theory undermined their authority. Under pressure, he agreed to their terms. He had to live under house arrest for the remainder of his days. Yet, his ideas could not be stopped.

As people began to rely more on observation than on the authority of past thinkers for understanding the world, the Scientific Method came about. These are the steps of the process: #1: Identify a problem. #2: Form a hypothesis for a

solution to the problem. #3: Test the hypothesis with an experiment. #4: Analyze and interpret your data from the test to see if your hypothesis was proven or disproven. Important thinkers contributed to this process that slowly emerged as a naturalistic way to understand the world.

In England, Francis Bacon (1591-1621) argued observation, what he called empiricism, was how to understand the world, not just by appealing to ancient authorities. In 1620, he published *Novum Organum Scientiarum* (New Method of Science)



Isaac Newton was a devout Christian and scientific thinker. He had a profound impact on humanity's understanding of gravity and found science and religion to be compatible

advocating for others to use tactics that would later evolve into the scientific method. In France, Rene Descartes (1596-1650) developed analytical geometry and also endorsed notions of the scientific method.

While studying at Cambridge University in England, Isaac Newton (1642-1726) developed his theory of gravity. Newton claimed all objects attract one another. This explains why objects fall toward Earth and why planets revolve around the Sun. Newton believed the Christian God designed the law of gravity and that the universe worked perfectly in sync with mathematical principals. While religious proponents and scientific thinkers did have some tension in history, Newton was an example of those who saw religion and observational science as compatible.

The advancements in astronomy led to scientific thinkers to examine other aspects of nature on Earth. In the late 1500s, Zacharias Janssen (1585-1632) invented early forms of the microscope. Antonie Philips van Leeuwenhoek (1632-1723) used the microscope to observe bacteria in the late 1600s. This was the first time humanity became aware of the microscopic world. In 1714, Gabriel Fahrenheit invented the thermometer using mercury to measure the temperature. Humanity's understanding of the world was changing due to scientific observations.

Through dissection of cadavers, Andreas Vesalius (1514-1564) produced accurate drawings and depictions of the human anatomy. This helped doctors to better understand the human body. Edward Jenner (1749-1823) discovered the process of vaccination by exposing individuals to cowpox to prevent people from getting small pox, caused by germs closely related to cowpox. Robert Boyle (1627-1691) discovered that matter consisted of various compounds and invented Boyle's Law, which explains the relationship between gas pressure and other objects.

Answers:**Part 1: Crossword Puzzle:**

(Aristotle) Some of the greatest Greco-Roman thinkers, such as _____ and the Egyptian, Ptolemy, taught the Earth was the center of the universe.

(Copernicus) _____ felt that the past teaching of the geocentric theory contradicted his observations of the celestial bodies of space.

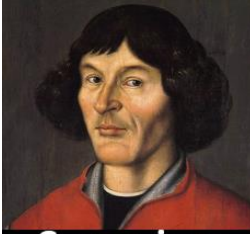
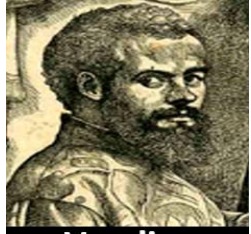

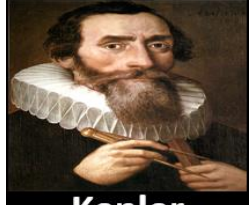
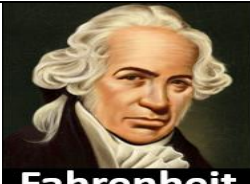

(Kepler) _____ was able to use Brahe's data and show how mathematical formulas could explain and predict patterns observed in space.

(Galileo) In 1610, _____ proved with his telescope that Jupiter had four moons revolving around it.

(Newton) _____ developed the theory of gravity

(Janssen) _____ invented early forms of the microscope.

Part 2: Short Answer: Instructions: For each item below, you have two options. You do NOT have to do both! For each section, choose a scientist, either the one on the left or the right, and write one paragraph explaining the historical significance that their contribution to science left on the world.

 <p>Copernicus</p>	<p>Write about the contribution of either Copernicus or Vesalius. Answers will vary based on which person was chosen. Copernicus developed notions on the heliocentric theory. Vesalius produced accurate drawings on the human anatomy.</p>	 <p>Vesalius</p>
 <p>Newton</p>	<p>Write about the contribution of either Newton or Kepler. Answers will vary based on which person was chosen. Newton developed the theory of gravity. Kepler was able to use Brahe's data and show how mathematical formulas could explain and predict patterns observed in space.</p>	 <p>Kepler</p>
 <p>Fahrenheit</p>	<p>Write about the contribution of either Fahrenheit or Jenner. Answers will vary based on which person was chosen. Fahrenheit developed a means to measure temperature. Jenner developed the process of vaccination.</p>	 <p>Jenner</p>