

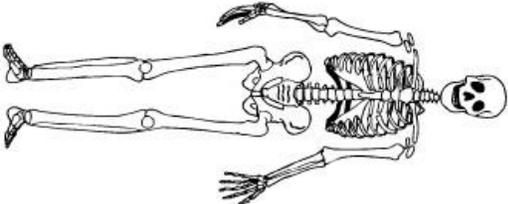
CROSSWORD PUZZLE: THE SCIENTIFIC REVOLUTION

The “Scientific Revolution” began in the 1500’s and continues even today. It is a movement that was brought about by man’s desire for new knowledge and a better way of doing things.

Before the Scientific Revolution, medieval man readily accepted as truth the teachings of the Catholic Church and writings of ancient scholars. People did not conduct scientific experiments or question traditional beliefs. Such thinking, however, changed in the 1500’s and the truth led to careful research, experimentation, and important new discoveries. These discoveries added to our understanding of the universe, nature, and man himself.

Pioneers of the Scientific Revolution studied the solar system, human anatomy, and the laws of nature. These people include some of the most famous names ever in the field of science. Their work is summarized on the chart which follows. Read the information carefully, then complete the crossword puzzle on page three.

Before the Scientific Revolution	After the Scientific Revolution
<p><u>Ptolemy</u>, an ancient Greek astronomer, said that the <u>earth</u> was the <u>center of the universe</u>. This belief was shared by <u>Aristotle</u>, a highly respected Greek philosopher and scientist. The views of Ptolemy and Aristotle were supported by the Church and by medieval man.</p> <p>It was thought that God put man on earth, and placed <u>earth</u> at the <u>center of the universe</u>. The sun, planets, and stars revolved around the earth. Man’s location in the center of the universe showed his close relationship with God. The sun, planets, and stars were God’s kingdom. They were made of shiny materials not found on earth. Heaven, located beyond the stars, was where man would be united with God after death.</p> 	<p>Nicolaus Copernicus published <u>Concerning the Revolution of the Celestial Spheres</u>. It said that the earth was not the center of the universe. Planets, including the earth, revolve around the sun. Years later, <u>Galileo</u> announced the same findings after observing the solar system through a <u>telescope</u>. He further noticed that materials which formed the moon and other heavenly bodies were similar to materials on earth. Galileo, the “<u>father of experimental science</u>,” urged that mathematics and experimentation be used to study the laws of nature.</p> <p>Both <u>Copernicus</u> and <u>Galileo</u> were criticized by the Church. The Church refused to accept their belief because it was against Church teachings and against what the Bible said. The Bible stated that once formed, the earth could not move. But Copernicus and Galileo said it moved around the sun.</p> <p><u>Johannes Kepler</u>, a famous German astronomer, eventually discovered the <u>Laws of Planetary Motion</u>. He used mathematics to show, among other things, that planets have an <u>oval-shaped</u> – rather than circular-shaped orbit around the sun.</p>

Before the Scientific Revolution	After the Scientific Revolution
<p>During the <u>Middle Ages</u>, laws of motion were thought to be different for objects on earth than objects in the heavens. This was because <u>heavenly objects</u> and <u>earthly objects</u> were believed to be made of <u>different substances</u>. Heavenly objects, such as the moon and the stars, were shiny, pure, and holy.</p> <p><u>Aristotle</u> thought there were “heavy elements” and “light elements.” Objects made of the elements <u>earth and water</u> fell to the ground because they were heavy. But the lighter elements <u>air and fire</u> rose upward into the sky.</p> <p>Some people were sure that objects moved because angels pushed them along. Aristotle thought air made things move. Aristotle’s beliefs about <u>laws of motion</u> were accepted by medieval man.</p>	<p><u>Sir Isaac Newton</u>, a mathematician and scientist, had some important ideas about motion:</p> <ol style="list-style-type: none"> 1. <u>Laws of motion</u> were the same for earth and all other parts of the universe. 2. The <u>law of gravity</u> causes objects to fall to the earth. Gravity also causes planets to revolve around the sun instead of flying off into space. 3. According to the <u>law of inertia</u>: <ol style="list-style-type: none"> a. An object will remain in the same place until a force causes it to move. b. A moving object will continue to move until a force causes it to stop.
<p><u>Doctors</u> and <u>university professors</u> knew little about the workings of the <u>human body</u>. They depended for most of their knowledge on the word of others, especially the writings of an ancient Greek doctor named <u>Galen</u>.</p> 	<p><u>Andreas Vesalius</u> studied <u>anatomy</u> – the structure of the body – by dissecting animals and human beings. His experiments showed that much of what Galen had written was incorrect. Vesalius made important discoveries about the function of muscles, joints, and internal organs. He is called the “<u>father of anatomy</u>.”</p> <p><u>William Harvey</u> studied the heart and “<u>circulation</u>” – the movement of blood through the body. His experiments showed that blood leaves the heart, is pumped to other parts of the body, and returns again to the heart.</p>
<p>Very little was known about the world of <u>microscopic life</u>.</p> 	<p>Anton van Leeuwenhoek became the “<u>father of microbiology</u>” as a result of his studies of life under a microscope. Using lenses which he made himself, Leeuwenhoek was able to magnify objects up to 270 times normal size. He examined such things as teeth scrapings, blood cells, and muscle fibers. He found that a single drop of water can contain hundreds of “<u>microorganisms</u>” – tiny animals swimming about that are not visible to the naked eye.</p>

Before the Scientific Revolution	After the Scientific Revolution
<p><u>Medieval Science</u> did not conduct studies or solve problems by using experiments and the scientific method.</p>	<p><u>Francis Bacon</u> wrote about <u>experimental science</u>. He urged scientists to regard old beliefs – especially beliefs of the Middle Ages – as false. He encouraged the use of carefully organized investigation to find the truth.</p>
<p>Across</p> <p>2. What Leeuwenhoek did to microorganisms.</p> <p>4. Encouraged experimental science.</p> <p>6. Revolution that began in the 1500's</p> <p>11. Johannes Kepler studied the orbits of planets and discovered laws relating to ____.</p> <p>13. "Father of anatomy."</p> <p>14. Place for "light elements."</p> <p>15. Vesalius proved that Galen was ____.</p> <p>17. "Father of microbiology."</p> <p>18. Experiments and the scientific method will help a person find it.</p> <p>19. Ancient Greek astronomer.</p> <p>20. Leeuwenhoek analyzed them with a microscope.</p> <p>21. The sun's gravity keep them in an oval-shaped orbit.</p> <p>22. Structure of the body.</p> <p>23. They were studied by Copernicus.</p>	<p>Down</p> <p>1. Earth and water, according to Aristotle, were ____ elements.</p> <p>3. Doctors once accepted his writings as fact.</p> <p>5. Believed air moved objects along.</p> <p>6. Copernicus and Galileo were criticized by the Church for saying that it was the center of the solar system.</p> <p>7. Sir Isaac Newton said gravity causes objects to do this.</p> <p>8. Supported the views of Ptolemy and Aristotle.</p> <p>9. First to say that the earth was not the center of the universe.</p> <p>10. William Harvey studied its circulation.</p> <p>12. Ptolemy said it was the center of the universe.</p> <p>15. The law of ____ said a force causes an object to move or stop.</p> <p>16. Discovered the law of gravity</p>

