

The Scientific Revolution



The Renaissance inspired a spirit of curiosity in many fields. Scholars began to question ideas that had been accepted for hundreds of years. During the Reformation, religious leaders challenged accepted ways of thinking about God. Until the 16th century, people decided what was true or false by looking at Greek or Roman texts. During the mid 1500's, a revolution was taking place. It challenged how people viewed their place in the universe. These changes all brought about a Revolution in European thought called the Scientific Revolution. This was a new way of thinking about the natural world. Instead of basing their ideas on ancient Greek or Roman authors, or the Bible, people began to believe that answers should be discovered based upon careful observation and experimentation.

Francis Bacon explains the Scientific Method

I wish to unfold the principles of the experimental science, without experience nothing can be known... What are the steps in a scientific approach to solving problems? The scientist notices that certain things happen and gathers information. The second step is forming a hypothesis. The scientist makes one or more educated guesses as to the reason for the phenomenon. The scientist sets up new procedures to try to prove why the experiment happened. Finally, if the scientist can show that the results of an experiment are the same every time it is performed, a conclusion can be made about the cause of the phenomenon.

Discuss the **benefits** of using Bacon's Scientific Method.

STEPS OF THE SCIENTIFIC METHOD

Science as a sin

Christianity dominated Europe in the Middle Ages, and it actively discouraged the pursuit of science. It taught that the secrets of nature were God's domain and that probing them was an intrusion into areas where humans were not meant to go.

The good Christian should be aware of mathematics (astrologers)... The danger already exists that the mathematicians have a covenant (agreement) with the devil to darken the spirit and confine man to the bonds of hell".
St. Augustine (354-430)

"The highest duty of a Christian is to respect authority".
Leo X, Roman Catholic Pope (1513-1521)

How did religious leaders feel about new ideas?

Changing ideas about the universe

Closely view the presentation. Explain how theories about the cosmos changed throughout the ages. Be sure to identify: *Which thinker made the greatest change to ideas about the universe?*

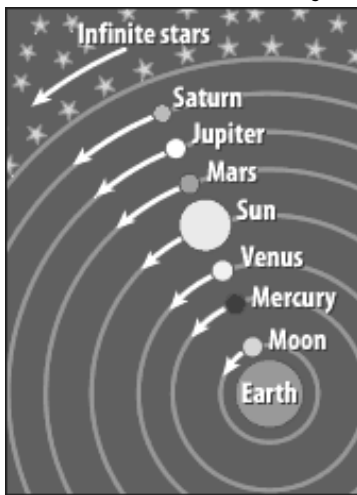
Nicolas Copernicus

The scientist Nicolas Copernicus (1473-1543) began to question old ideas about the nature of the universe. In his book "On Revolutions of the Heavenly Bodies", published in the year of his death, he changed the way people would view the universe. The following lines are from the preface of his book which he addressed to the Pope:

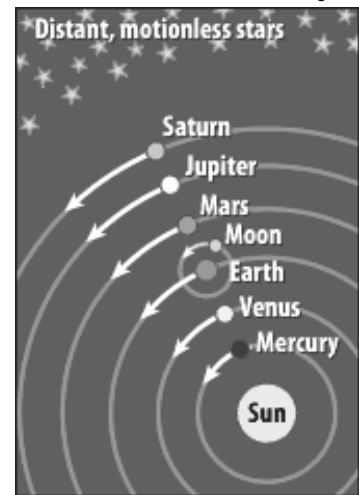
I hesitated long on whether, on the one hand, I should come forward with my Commentaries written to prove the Earth's motion, or whether on the other hand, it would be better to follow the example of others before me who shared their philosophic mysteries only with inmates and friends, and then not in writing but by word of mouth... In my judgment they did so out of fear that the noble discoveries of the learned would be despised by those who care not to study...

Two theories of the Solar System

Aristotle and Ptolemy's View (from 2nd century AD) Geocentric Theory



Copernican View (1543 AD) Heliocentric Theory



Why might Copernicus's view of the universe cause conflict between scientists and the Church?
