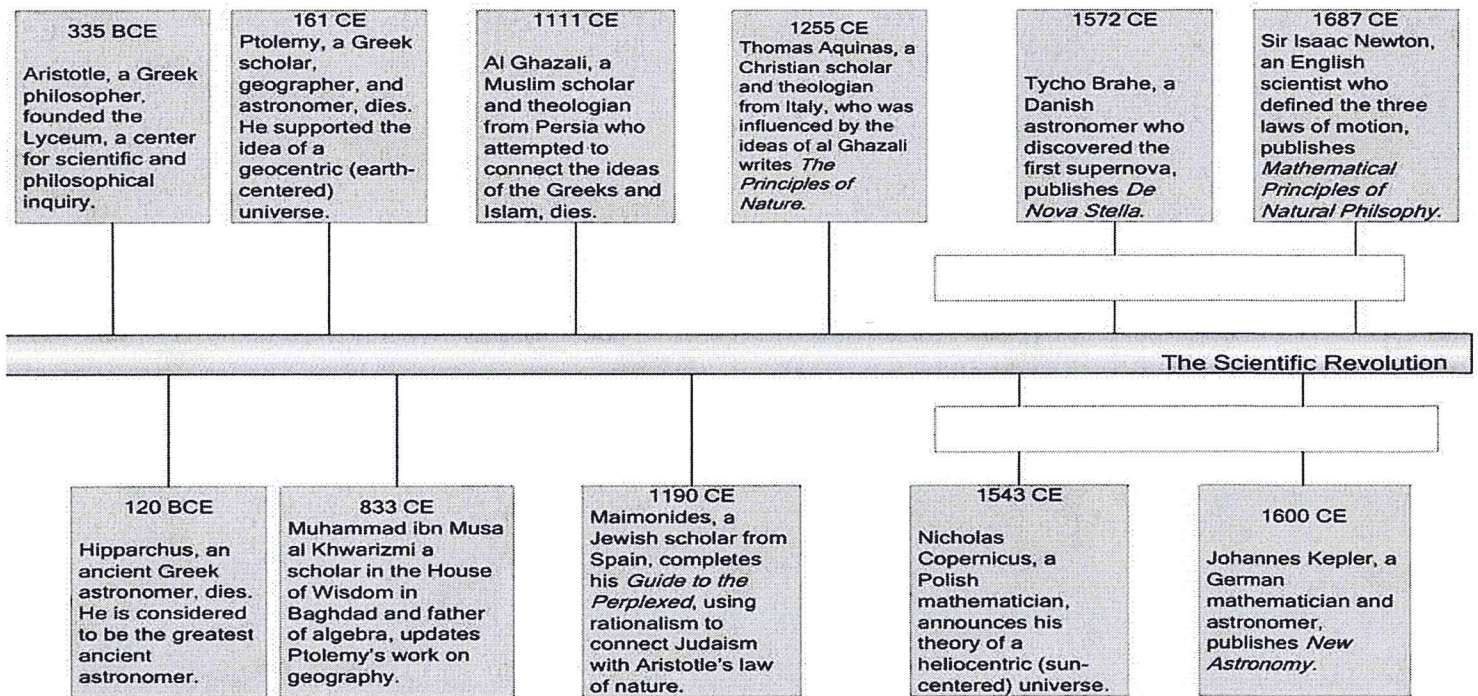


Roots of the Scientific Revolution



Answer the following questions.

1. What does the picture show?
2. The word root can mean many things. One of the meanings of root is "the source, beginning, or origin of a thing." What are some roots in your life? Explain how those things have helped to make you the person you are today.



1. What is the purpose of a timeline?
2. How many years does this timeline cover?
3. Circle the background of each person listed on the timeline (country, religion).
4. What is one major topic/event that you recently learned about this is not on the timeline? Insert it on the timeline.
5. Based on the information on the timeline, create a title and write it above the timeline.

6. Based on the information in the timeline, what do you think the term Scientific Revolution means?
7. What is the purpose of this specific timeline?

"If I have seen further, it is by standing on the shoulders of giants."

What does this mean?

What is the connection to the timeline?

Who do you think may have spoken the quote?

Roots of the Scientific Revolution

Directions: Read the following information and answer the questions.

Introduction

You have taken science classes, read science books, and seen videos related to science, but do you know what the word "science" means? The word "science" comes from a Latin word which means knowledge, or understanding. For centuries people around the world have gained knowledge of the natural world. In the 16th and 17th centuries a new way of gaining knowledge of the natural world developed. This period is now known as the Scientific Revolution. The Scientific Revolution did not just fall out of the air; rather it was the result of scientific study made by scientists from numerous places over hundreds of years.

In your own words, what was the Scientific Revolution?

Where did the Scientific Revolution come from?

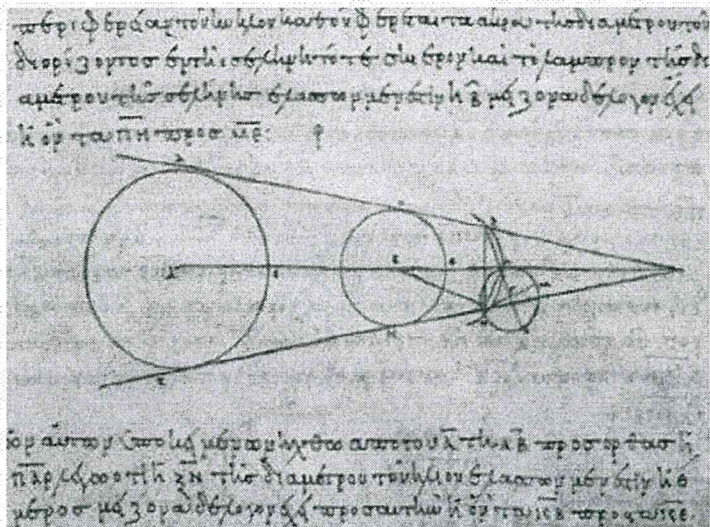
Conclusion

Through a long process and the efforts of hundreds of scientists in many places, a new way of understanding the natural world emerged. Superstition and tradition were replaced with an understanding of science that depended on data, or facts, and information that had been gained through observation and testing. In addition to this process, which is called the scientific method, scientists developed new understandings of things like gravity, and developed new tools like telescopes and thermometers. Science has never been the same.

In your opinion, what were the three most important items that led to the Scientific Revolution? List the item and one reason why that was an important root of the Scientific Revolution.

Placard 1

Ancient Greek Scientists



A copy of Aristarchus Samos' calculations of the sizes of the sun, moon and earth.

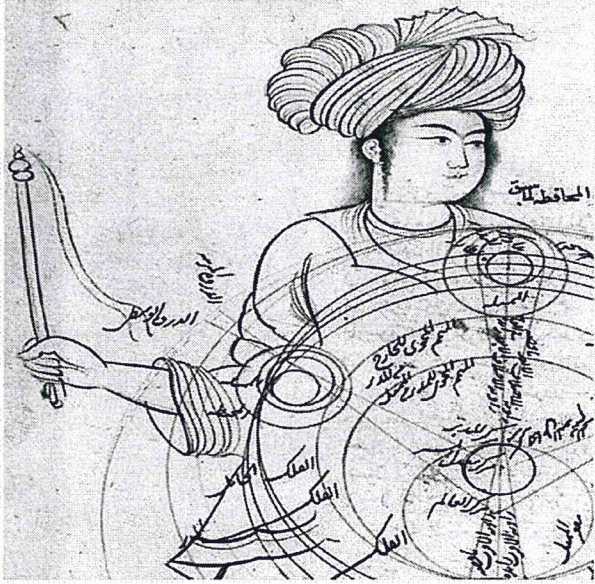
The ancient Greek scientists were known as rationalists. This means that they used observation, reason, and logic to gain knowledge. The Greeks tried to avoid using superstition to explain why things happened in nature. Instead, scientists like Aristotle and Aristarchus believed that by asking questions, and investigating and observing the natural world, people could come to a better understanding. The ancient Greeks were not always correct in their observations. For example, a scholar named Ptolemy thought the sun and the planets revolved around the earth, and Aristotle thought heavier objects fall faster than lighter objects. Nevertheless the Ancient Greeks and their scientific efforts provided the foundations for modern scientific knowledge especially in the fields of mathematics and astronomy.

Answer the following questions on Student Handout 3

1. How might this image relate to the Scientific Revolution?
2. How did the Ancient Greeks contribute to the Scientific Revolution?
3. The contributions of the Ancient Greeks were important because...

Placard 2

Muslim Scholars



An image representing Qutb al-Din al-Shirazi, a Persian Muslim astronomer and mathematician.

Muslim scholars from Persia, Spain, and other places built upon the knowledge of the Greeks. By preserving ancient Greek books and translating them to Arabic, Persian and Spanish Muslims were able to gain a deeper understanding of science. During the Golden Age of Islam from the 8th thru 13th centuries CE, Muslim scholars made significant discoveries of their own in mathematics, medicine, and astronomy. Al-Khwarizimi made advances on Ptolemy's work and laid the foundations for algebra. Ibn Sina (known as Avicenna in Europe) wrote a medical book that became the basis of medical study in Europe for hundreds of years. Persian astronomers created advanced observatories for calculating planetary motion, and developed advanced astrolabes to help with navigation and in finding the direction to Mecca. Muslim scholars preserved and advanced the work of the Greeks.

Answer the following questions on Student Handout 3

1. How might this image relate to the Scientific Revolution?
2. How did Muslim scholars contribute to the Scientific Revolution?
3. The contributions of Muslim scholars were important because...

Placard 3

Jewish and Christian Scholars



Thomas Aquinas

Depiction of St. Thomas Aquinas from *The Demidoff Altarpiece* by Carlo Crivelli.

Jewish and Christian scholars also made investigations into the natural world. Maimonides, a Jewish scholar from Spain who eventually moved to Egypt, connected the ideas of Greeks like Aristotle with Jewish teachings. Thomas Aquinas, an Italian Catholic priest who was influenced by the ideas of the Muslim scholar al-Ghazali tried to connect scientific understandings with Christian teachings. Scholars like Maimonides and Aquinas caused some people to believe that there was not a conflict between religion and science. Eventually religious leaders of the Reformation such as Martin Luther further opened people to questioning traditional explanations of the natural world as they challenged the Catholic Church and its teachings.

Maimonides



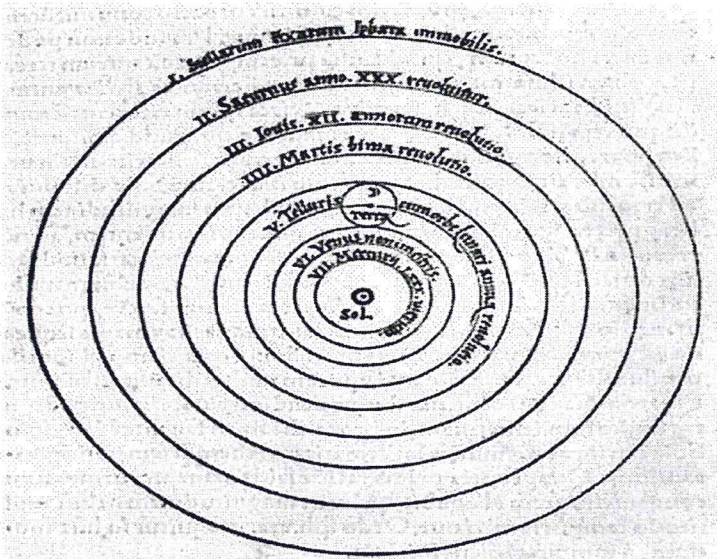
Commonly used image indicating one artist's conception of Maimonides.

Answer the following questions on Student Handout 3

1. How might this image relate to the Scientific Revolution?
2. How did Christian and Jewish scholars contribute to the Scientific Revolution?
3. The contributions of Christian and Jewish scholars were important because...

Placard 4

The Renaissance



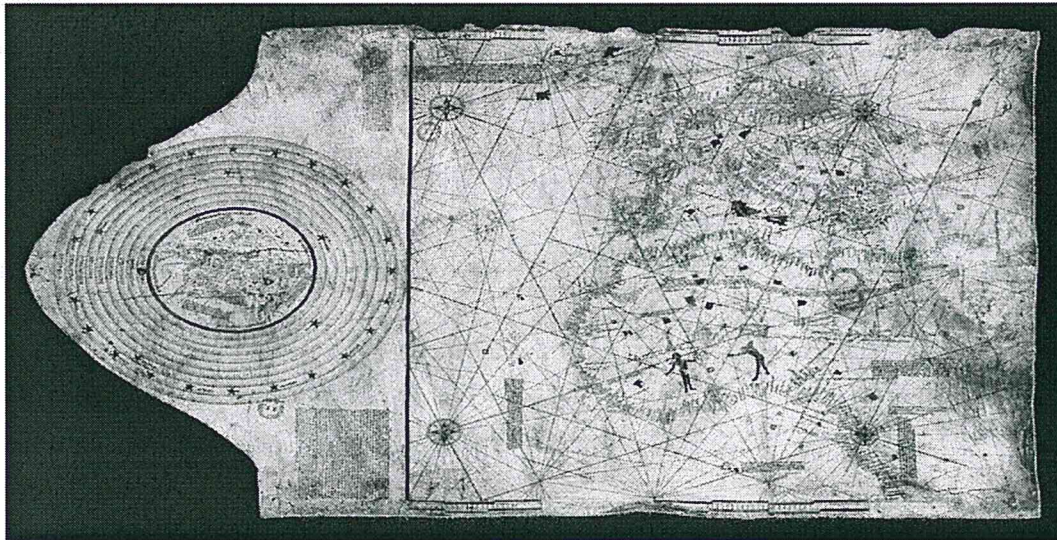
Nicolaus Copernicus (1473-1543) was the first astronomer to formulate a scientifically based theory of a heliocentric universe.

During the Renaissance of the 14th to 16th centuries, further advances were made. Humanist scholars studied the works of the ancient Greeks and Romans, and investigated the natural world in new ways. They also read the works of Muslim scholars like Ibn Sina (Avicenna). In addition, people like Leonardo da Vinci and Vesalius studied the human body (anatomy), while Copernicus made a major breakthrough in astronomy, concluding that the sun was the center of the universe (the heliocentric theory). Eventually a scientist in the 16th century named Kepler confirmed Copernicus's ideas through observation and study. Through scientific observation, experimentation, and the collection of data, the traditional ideas of Ptolemy and others were challenged and proven to be incorrect. A scientific revolution had begun.

- Answer the following questions on Student Handout 3:
1. How might this image relate to the Scientific Revolution?
 2. How did Renaissance scholars contribute to the Scientific Revolution?
 3. The contributions of Renaissance scholars were important because...

Placard 5

The Age of Exploration

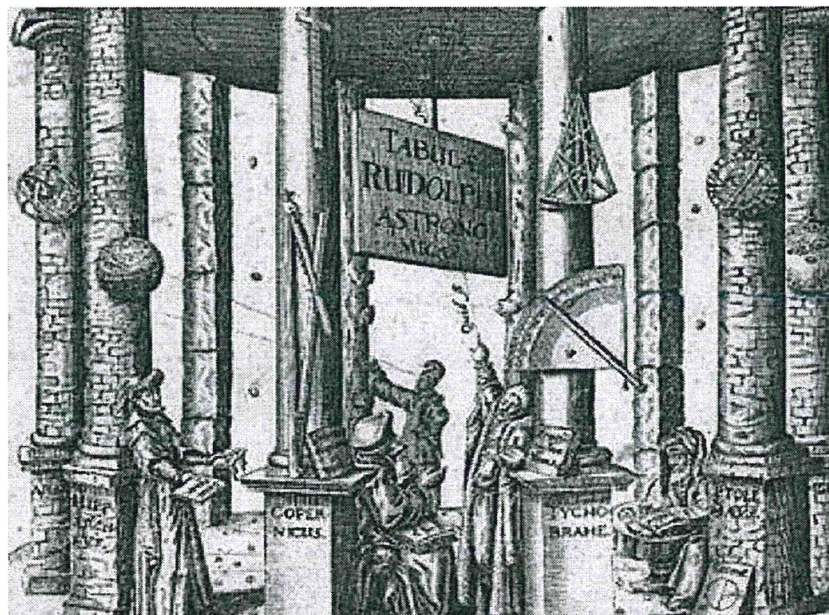
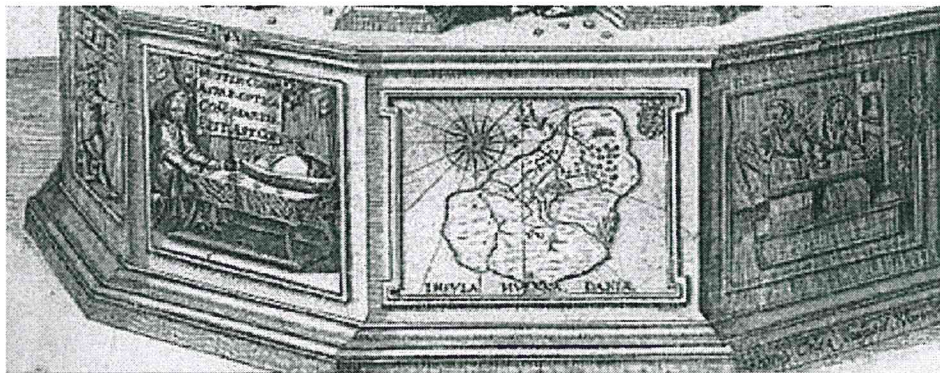
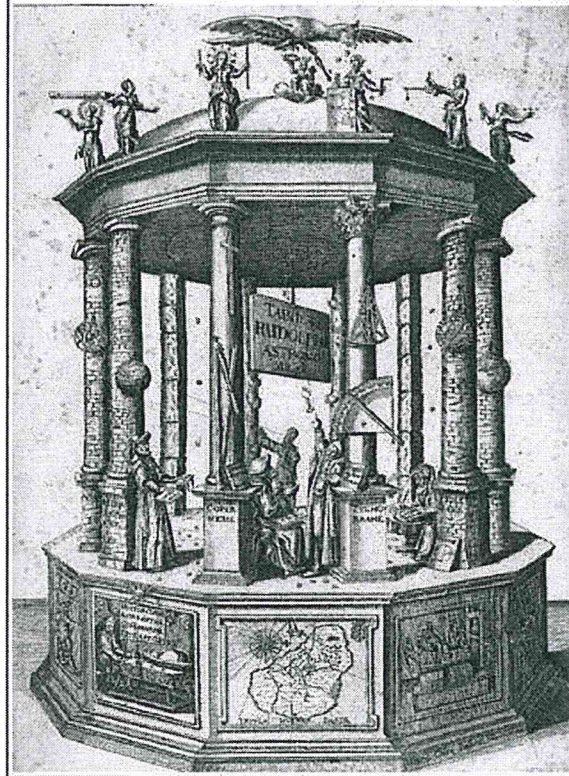


This map is said to have been drawn circa 1490 in the workshop of Bartolomeo and Christopher Columbus in Lisbon.

- Answer the following questions on Student Handout 3:
1. How might this image relate to the Scientific Revolution?
 2. How did the Age of Exploration scholars contribute to the Scientific Revolution?
 3. The contributions of the Age of Exploration were important because...

One final contributor to the Scientific Revolution was the Age of Exploration. As individuals like Columbus, and Magellan journeyed across the oceans in the 15th and 16th century, and encountered places previously unknown to Europeans, more people began to question traditionally held ideas of the natural world. If there were places that people did not know about surely there were other ideas and things to learn about. Mapmakers and others sought to gain more accurate understandings of the natural world and geography. By doing so, they helped to increase scientific understanding.

A Vision of the New Science 1627



Topic: What is the title of the placard?	Question 1: How might this image relate to the Scientific Revolution?	Question 2: How did this group contribute to the Scientific Revolution?	Question 3: Why were the contributions of this group important?
Placard 1			
Placard 2			

Topic: What is the title of the placard? Placard 3		Question 1: How might this image relate to the Scientific Revolution?		Question 2: How did this group contribute to the Scientific Revolution?		Question 3: Why were the contributions of this group important?	
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Placard 4

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Topic: What is the title of the placard?	Question 1: How might this image relate to the Scientific Revolution?	Question 2: How did this group contribute to the Scientific Revolution?	Question 3: Why were the contributions of this group important?
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Placard 5