Scientific Revolution?

What changes occurred in the way nature was studied?

Aristotle’s “method”
Aristotle’s “method”

While consistent with common human experience, Aristotle's principles were not based on controlled, quantitative experiments, so, while they account for many broad features of nature, they do not describe our universe in the precise, quantitative way now expected of science. … Aristotle's principles were difficult to disprove merely through casual everyday observation…. 
Aristotle’s “method”

Does the earth move?

What is necessary for an object to move?
New Tools

Tycho’s “Observatory”
Galileo’s Telescope
van Leeuwenhoek’s Microscope
Boyle’s Air Pump and Barometer
Scientific Practices

1. Asking Questions and Defining Problems
2. Developing and Using Models
3. Planning and Carrying Out Investigations
4. Analyzing and Interpreting Data
5. Using Mathematical and Computational Thinking
6. Constructing Explanations
7. Engaging in Argument from Evidence
8. Obtaining, Evaluating and Communicating Information
Galileo

“Philosophy [i.e., physics] is written in this grand book - I mean the universe - which stands continually open to our gaze, but it cannot be understood unless one first learns to comprehend the language and interpret the characters in which it is written. It is written in the language of mathematics ... without which it is humanly impossible to understand a single word of it; without [mathematics], one is wandering around in a dark labyrinth.”
Newton

Newton worked out a proof that the elliptical form of planetary orbits would result from a centripetal force inversely proportional to the square of the radius vector. Newton communicated his results to Edmond Halley and to the Royal Society in *De motu corporum in gyrum*, a tract written on about nine sheets which was copied into the Royal Society's Register Book in December 1684.

[Mathematics and Optics/Light]
Consider how in the period 1100-1648 European states began to create commerce and engage cultures beyond Northern Europe
Consider how in the period 1100-1648 European states began to create commerce and engage cultures beyond Northern Europe.
14th Century Trade Routes
Selective Readings in Western Civilization
1407 – Very first state bank, Banco di San Giorgio, was founded at Genoa. European gold and silver mines were exhausted, the lack of bullion led to the development of a complex banking system to manage the risks in trade

1453 - Fall of Constantinople closed the most accessible land-sea routes to sources of Asian goods

1492 – Columbus' first voyage to Caribbean area

1494 – Treaty of Tordesillas divided the newly discovered lands outside Europe between Portugal and Spain along a meridian 370 leagues west of the Cape Verde islands (off the west coast of Africa). This line of demarcation was about halfway between the Cape Verde Islands (already Portuguese) and the islands entered by Christopher Columbus on his first voyage (claimed for Spain), named in the treaty as Cipangu and Antilia (Cuba and Hispaniola). The lands to the east would belong to Portugal and the lands to the west to Spain.
1509 – Diogo Lopes de Sequeira (Portuguese) reaches Sumatra and Malacca.
Mercantilism

An economic “theory” said to...

- Cause frequent European wars

- Motivate colonial expansion
Mercantilist theory has various descriptions; most include:

- High tariffs, especially on manufactured goods
- Building a network of overseas colonies
- Forbidding colonies to trade with other nations
- Monopolizing markets with staple ports
- Banning the export of gold and silver, even for payments
- Forbidding trade to be carried in foreign ships
- Export subsidies
- Promoting manufacturing with research or direct subsidies
- Limiting wages
- Maximizing the use of domestic resources
Conflicts immediately connected with the Reformation of the 1520s to 1540s:

- The German Peasants' War (1524–1525)
- The battle of Kappel in Switzerland (1531)
- The Schmalkaldic War (1546–1547) in the Holy Roman Empire
- The Eighty Years' War (1568–1648) in the Low Countries
- The French Wars of Religion (1562–1598)
- The Thirty Years' War (1618–1648), affecting the Holy Roman Empire including Habsburg Austria and Bohemia, France, Denmark and Sweden
- The Wars of the Three Kingdoms (1639–1651), affecting England, Scotland and Ireland:
  - Scottish Reformation and Civil Wars
  - English Reformation and Civil War
  - Irish Confederate Wars, and the Cromwellian conquest of Ireland

*Selective Readings in Western Civilization*
Review the time period 1500-1648 and sketch a timeline showing significant political, economic, and religious changes in that time.