



The Scientific Revolution

Until the mid-1500s, scientists agreed that the Earth was the unmoving center of the universe. The ancient Greek astronomer Ptolemy had come up with this theory in the second century A.D. His theory was accepted because it seemed like common sense and went along with the Church's views. The Church taught that God put Earth in the middle of the universe. However, scholars made discoveries in the 1500s and 1600s that changed the way people thought about science. This time in history is called the Scientific Revolution.



In 1543, Nicolaus Copernicus published a book that said Ptolemy's theory was wrong. Copernicus said that the Sun was the center of the universe, not the Earth. He also wrote that Earth was just one of several planets that revolved around the Sun. Most scholars did not believe Copernicus's theory. At that time, all scientific knowledge was based on ancient theories like Ptolemy's. If Ptolemy's theory was wrong, all scientific knowledge could be wrong!

Over the years, scientists looked for evidence of Copernicus's theory. In 1609, an Italian scientist named Galileo built a powerful telescope. It had a special lens that let him see things that had never been seen before. He saw mountains on the Moon, dark spots on the Sun, and four moons around Jupiter. The four moons revolved around Jupiter just like Copernicus said the Earth revolved around the Sun.

Galileo was not praised for his amazing discoveries. Instead, the Church was angry. Galileo's ideas clashed with the Church's belief that the heavens did not move. The Church did not want people to question its teachings. In 1633, Galileo was put on trial. Church officials told him to take back what he said or he would be put to death. Galileo agreed to say that he was wrong and that the Earth was the center of the universe. Legend says that Galileo muttered, "And yet Earth does move!" as he walked out of the court.

Scientists like Copernicus and Galileo started a new way of scientific thinking. Following their example, scholars like Sir Isaac Newton, Sir Francis Bacon, and René Descartes used a logical approach to solving problems. By the early 1600s, scientists used a process called the scientific method to study the natural world. Scientists collected and measured data and came up with a hypothesis, or possible explanation for the data. Then, they tested the hypothesis by observing or experimenting. Developed over many years, this step-by-step process is still used today.



The Scientific Revolution

Multiple Choice

Circle the best answer, and write the letter in the box.

1. Until the mid-1500s, scientists agreed that _____ was the unmoving center of the universe.

A. the Sun
B. the Earth
C. the Moon
D. heaven

2. In 1543, _____ published a book that said the Sun was the center of the universe.

A. Ptolemy
B. The Church
C. Copernicus
D. Galileo

3. Through his telescope, Galileo saw _____.

A. mountains on the Moon
B. dark spots on the Sun
C. four moons around Jupiter
D. all of the above

4. When the Church heard about Galileo's discoveries, it _____.

A. praised Galileo for his work
B. included Galileo's discoveries in its teachings
C. put Galileo on trial
D. agreed publicly with Galileo's findings

5. By the early 1600s, scientists used a process called the _____ to study the natural world.

A. scientific method
B. science fair
C. Scientific Revolution
D. international method

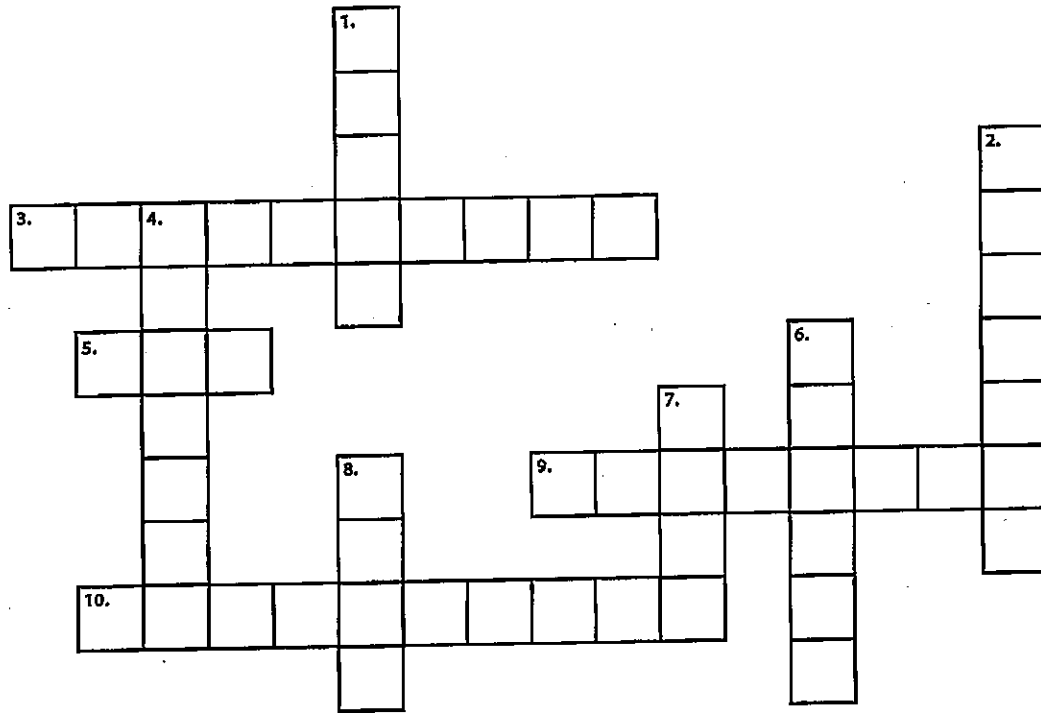
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The Scientific Revolution

Crossword Puzzle

Write the best answer in each blank, and complete the crossword puzzle.



ACROSS

3. _____ said that Earth was just one of several planets that revolved around the Sun.
5. The Church taught that _____ put Earth in the middle of the universe.
9. The Church did not want people to _____ its teachings.
10. A/an _____ is a possible explanation for measured data.

DOWN

1. If Ptolemy's theory was _____, all scientific knowledge could be wrong!
2. The Church taught that the _____ did not move.
4. Before Copernicus's theory, all scientific knowledge was based on ancient theories like _____'s.
6. The scientific _____ is still used today.
7. Galileo's telescope had a special _____ that let him see things that had never been seen before.
8. Scientists collected and measured _____.

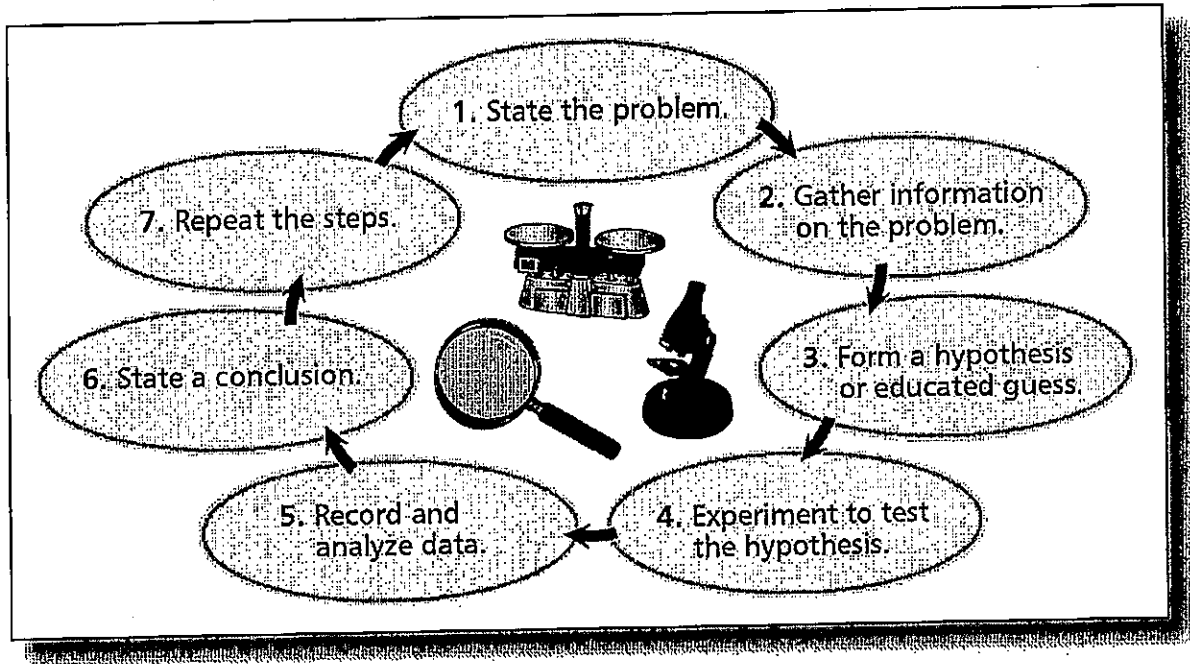
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The Scientific Revolution

Diagram – The Scientific Method

Use the diagram to answer the following questions. Write the answers in complete sentences.



1. What should a scientist do before he or she forms a hypothesis?

2. What should a scientist do after he or she experiments?

3. Why do you think step 7 is included in the scientific method?



Quiz: The Scientific Revolution

True/False

Decide if each statement is true or false, and write "true" or "false" in the blank.

- _____ 1. Copernicus published a book that said the Earth was the center of the universe.
- _____ 2. By the early 1600s, scientists used a process called the scientific method to study the natural world.
- _____ 3. The Church praised Galileo for his discoveries.
- _____ 4. Ptolemy was an ancient Greek astronomer.
- _____ 5. The scientific method is still used today.

Multiple Choice

Circle the best answer, and write the letter in the box.

6. A/an _____ is a possible explanation for measured data.
- A. question
 - B. method
 - C. experiment
 - D. hypothesis

7. The Church taught that God put the _____ in the center of the universe.
- A. Sun
 - B. Moon
 - C. Earth
 - D. Ocean

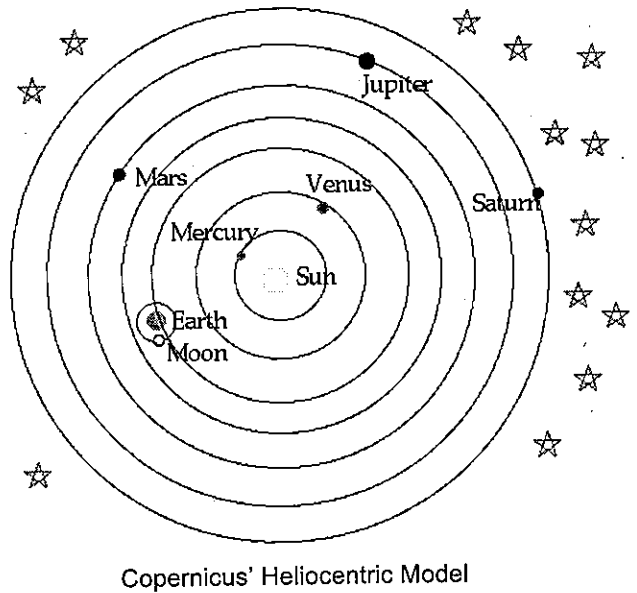
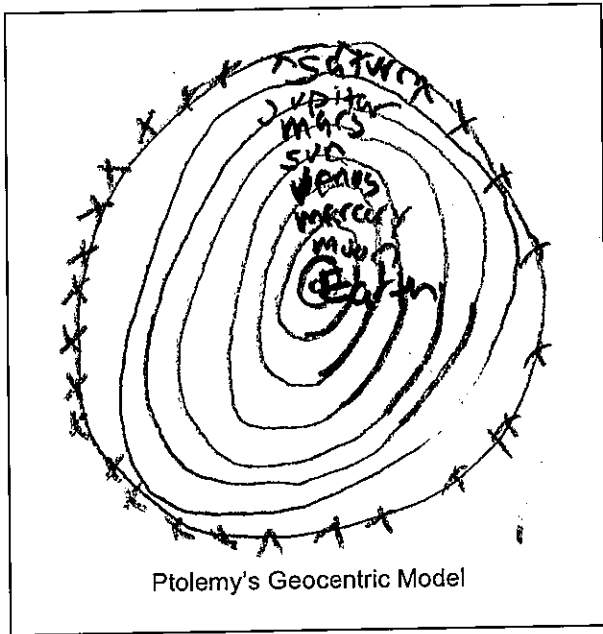
Short Answer

Answer the following question in complete sentences.

8. List four of the steps in the scientific method.

Document 1 (Math): Ancient Diagrams of the Universe

Note: The heliocentric model, which means sun centered, gradually replaced the geocentric model. This new system places the Sun at the center of the Solar System with the Earth and all the other planets orbiting it. This theory revolutionized everything because it reversed centuries of established opinion. Although the idea of a heliocentric model had been around as early as 200 B.C., it did not gain popularity until the 16th century. The Christian Church's doctrine was pretty much solidified 1500 years ago, but heavily influenced by Greek and Roman philosophers, especially in its views of science. Among those teachings lay the solid belief in a geocentric universe, very much advocated by Aristotle (384-322 B.C.) and expanded by Ptolemy (A.D. 85-165). "Geocentric" means Earth-centered - the Earth is the center of everything, and especially the center of the solar system.



1. What is the major difference between the heliocentric model and the geocentric model?

2. Why might the Church have fought accepting Copernicus' model?

3. What is wrong with the theory put forth by Copernicus based on what we know today?

Document 2 (Social Studies): Galileo; the Universe and the Church

Note: Galileo (1564-1642) supported Copernicus's Heliocentric Theory and argued against the Church, which supported the Geocentric (Earth centered) Theory of the universe based on theological ideas found in the Bible. This conflict ultimately led to Galileo being placed on house arrest until his death.

Source: "After 350 Years, Vatican Says Galileo Was Right: It Moves," The New York Times," By Alan Cowell. October 31, 1992

More than 350 years after the Roman Catholic Church condemned Galileo, Pope John Paul II is poised to rectify one of the Church's most infamous wrongs -- the persecution of the Italian astronomer and physicist for proving the Earth moves around the Sun.

With a formal statement at the Pontifical Academy of Sciences on Saturday, Vatican officials said the Pope will formally close a 13-year investigation into the Church's condemnation of Galileo in 1633. The condemnation, which forced the astronomer and physicist to recant his discoveries, led to Galileo's house arrest for eight years before his death in 1642 at the age of 77.

The dispute between the Church and Galileo has long stood as one of history's great emblems of conflict between reason and dogma, science and faith. The Vatican's formal acknowledgement of an error, moreover, is a rarity in an institution built over centuries on the belief that the Church is the final arbiter in matters of faith.

1. What did Galileo believe about the universe?

2. How did this conflict with the views of the Church at this time?

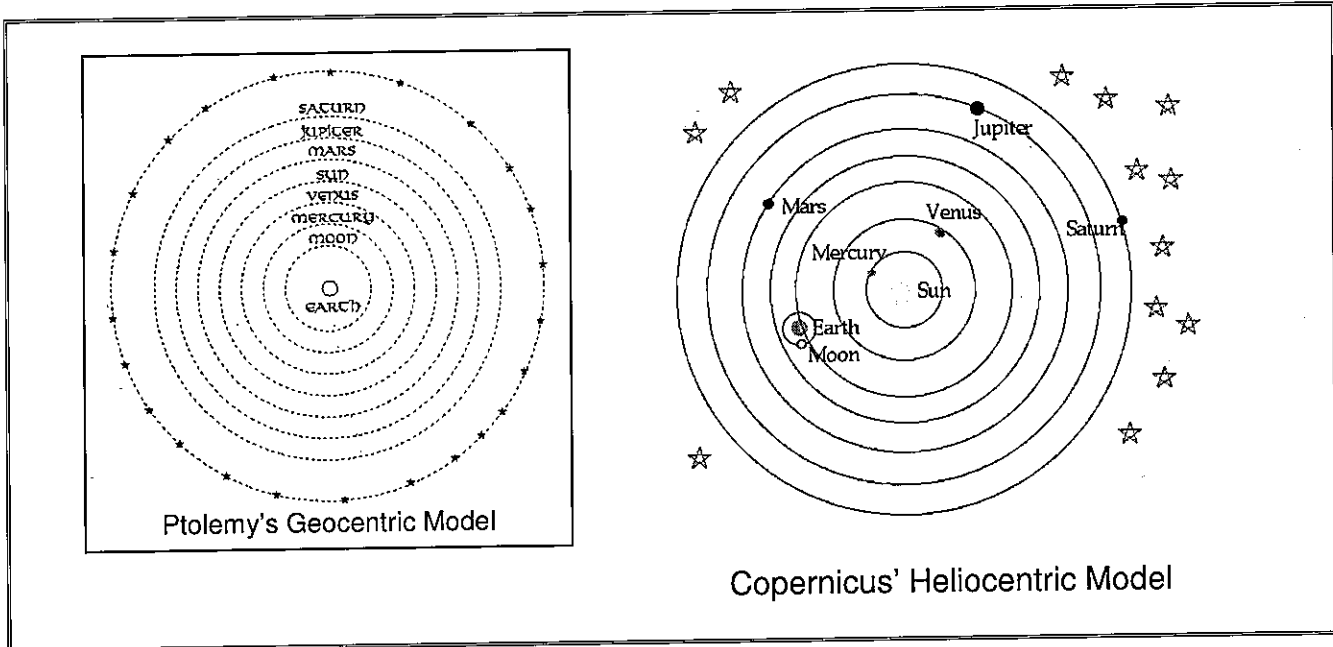
3. Regarding the universe, what is the Church's current view?

SCIENTIFIC REVOLUTION DBQ

On a separate sheet of paper answer the following questions based on the information supplied in the documents and your knowledge of world history.

Document 1

The following are ancient diagrams of the universe showing the relationship between the planets and the sun.



1. What is the major difference between the heliocentric model and the geocentric model? Why might people have problems accepting Copernicus' model?

Document 2

Although backed by authority and common sense, the geocentric theory did not accurately explain the movements of the sun, the moon, and planets. This problem troubled a Polish cleric and astronomer named Nicolaus Copernicus. In the early 1500s, Copernicus became interested in an old Greek idea that the sun stood at the center of the universe. After studying planetary movements for more than 25 years, Copernicus reasoned that indeed, stars, the earth, and other planets revolved around the sun.

Source: World History by McDougal Littell

2a) What ideas did Copernicus call into question?

2b) How does the excerpt portray Copernicus as a Renaissance humanist?

Document 3

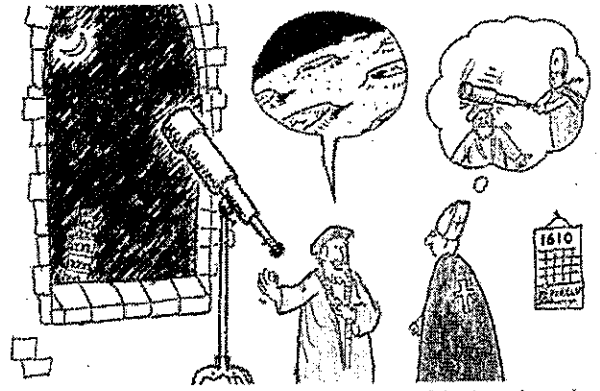
Use the following cartoon to answer the questions that follow.

3a. The Greek philosopher and astronomer Aristotle theorized that moon and stars were made of pure and perfect substance, and were perfect spheres.

Why would the Catholic Church have supported Aristotle's claim?

3b. According to the cartoon how does Galileo's observation of Aristotle's "perfect" moon differ?

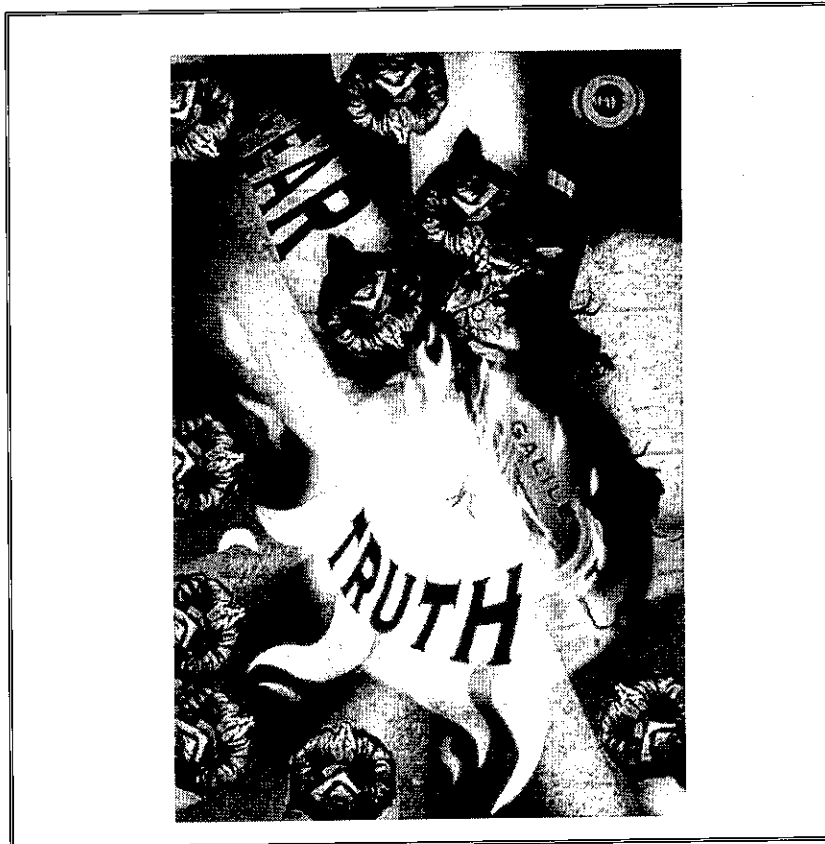
3c. According to this cartoon, what is the Catholic Church's view of Galileo's observations of the moon and laws of motion that supported Copernicus' heliocentric model?



Galileo discusses his discoveries with the church.

Document 4

Use the cartoon about the Church's treatment of Galileo below to answer the questions.



4a) What "truth" was discovered by Galileo that is depicted burning in the fire with him?

4b) Why is word "fear" shown in the background or shadows?

Document 5

“With sincere heart and unprecedented faith I (reject)...., and detest the aforesaid errors and heresies (of Copernicus) and also every other error...contrary to the Holy Church, and I swear that in the future I will never again say or assert...anything that might cause a similar suspicion toward me.” - Galileo

5. Why would Galileo have made this statement?

Part B:

Essay Question:

What conflicts developed in societies with the birth of modern science? How did these conflicts change societies? Who benefitted and who was harmed by these changes?

Scientific Revolution
Most Influential Scientific Revolution Thinker

Decide who is the most influential scientific revolution thinker (Ptolemy, Copernicus, Galileo) based on who has had the longest impact on the world.

You must defend why this person is the most influential thinker of the Scientific Revolution. Fill in the chart below with your answer and your facts to back up why your choice is most influential.

Scientific Thinker	
Reason #1 why your thinker is most influential	
Reason # 2 why your thinker is most influential	
What challenges did your thinker have to overcome during their findings?	
How would have you dealt with the challenges your thinker faced?	



The Protestant Reformation

The Protestant Reformation is the name of the religious reform movement that divided the Roman Catholic Church. Corruption was the main reason that people wanted reform of the Church. Often, Popes were more concerned with politics than with spiritual matters. Many church officials used their church offices to gain wealth. Some clergy sold indulgences. An indulgence was a reduction of all or part of the punishment of a sin. In the Middle Ages, indulgences were earned by doing good deeds, such as joining the Crusades. But by the late 1400s, the Church gave indulgences in exchange for money.



Many Christians thought paying for indulgences was wrong. Martin Luther was one of these people. He was a German monk and professor who prayed, fasted, and tried to lead a holy life. The Church's corruption and worldliness disappointed Luther.

An event in 1517 was the last straw for Martin Luther. A priest named Johann Tetzel set up a pulpit near Wittenberg, Germany. He offered indulgences to any Christian who gave money to rebuild the Cathedral in Rome. Tetzel made it sound like buying these indulgences would guarantee entry into Heaven.

Martin Luther was outraged. He wrote a list of 95 arguments against indulgences. The list, called the "Ninety-Five Theses," said the Church was wrong to sell indulgences. Luther wrote that Christians could be saved only by faith in God. He posted his list on the door of the Wittenberg Church, and copies were distributed all over Europe. Later, Luther told Christians to reject the authority of Rome. He said that because the Church would not reform itself, it must be reformed by others.

The Church told Luther to take back what he had said, but he refused. The Pope excommunicated Luther in 1521, which means he was thrown out of the Church. The Holy Roman emperor declared Luther an outlaw. It became a crime for anyone to give him food or shelter.

But Luther had many powerful supporters, and thousands of Germans said he was a hero. Many people liked Luther's ideas. By 1530, Luther's followers called themselves Protestants because they protested the Pope's authority. They set up Lutheran churches. The Western Church had split. The Roman Catholic Church was beginning to lose much of the political power it had held for centuries.



The Protestant Reformation

Multiple Choice

Circle the best answer, and write the letter in the box.

1. The religious reform movement that divided the Western Church is called the _____.

- A. Catholic Change
- B. Roman Reformation
- C. Protestant Reformation
- D. Lutheran Shift

2. People wanted reform in the Church because _____.

- A. Popes were more concerned with politics than spiritual matters
- B. many church officials used their offices to gain wealth
- C. some clergy sold indulgences
- D. all of the above

3. By the late 1400s, the Church gave indulgences in exchange for _____.

- A. good deeds
- B. money
- C. food
- D. prayers

4. _____ wrote the "Ninety-Five Theses."

- A. John Calvin
- B. The Pope
- C. Martin Luther
- D. Johann Tetzel

5. Luther's followers called themselves _____.

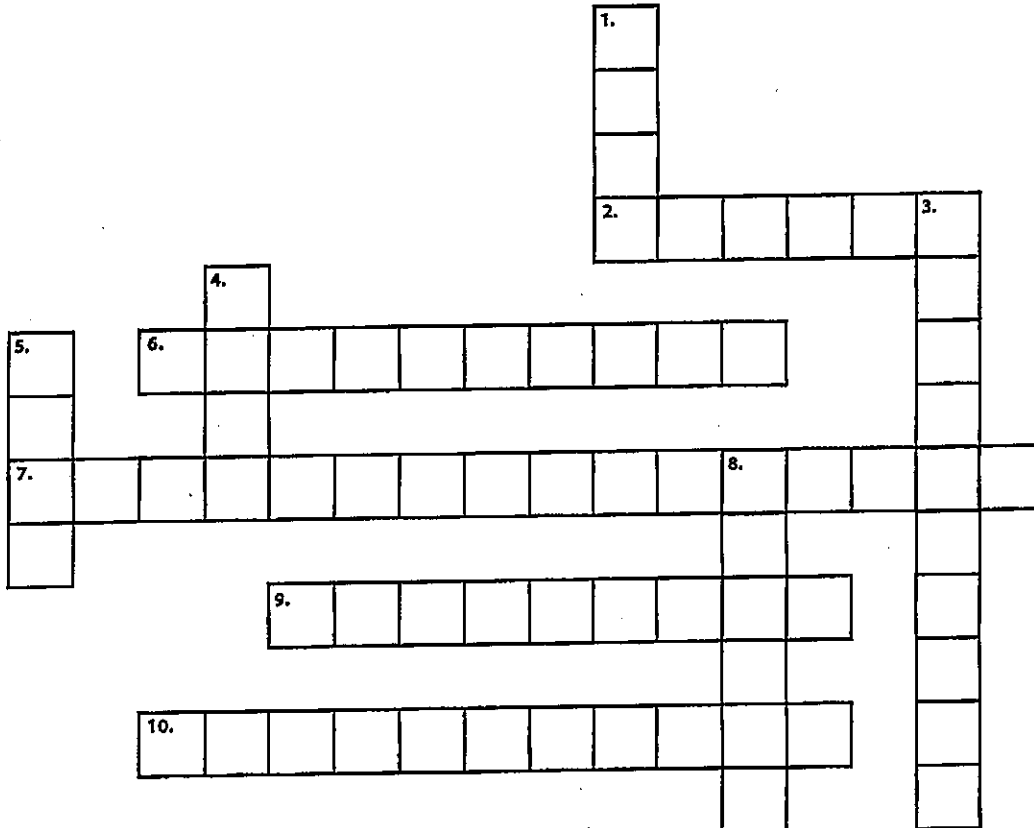
- A. Protestants
- B. Protestors
- C. Reformers
- D. Transformers



The Protestant Reformation

Crossword Puzzle

Write the best answer in each blank, and complete the crossword puzzle.



ACROSS

2. The Holy Roman emperor declared Martin Luther a/an _____.
6. _____ was the main reason that people wanted reform of the Church.
7. The _____ said it was wrong for the Church to sell indulgences.
9. Because of Martin Luther, the Roman Catholic Church began to lose much of its _____ power.
10. Many Christians thought paying for _____ was wrong.

DOWN

1. Martin Luther's supporters said he was a/an _____.
3. Luther posted the "Ninety-Five Theses" on the door of the _____ Church.
4. Luther told Christians to reject the authority of _____.
5. Martin Luther was a German _____ and professor.
8. A priest named Johann Tetzel made it sound like buying indulgences would guarantee entry into _____.

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The Protestant Reformation

Time Line – Henry VIII

England's King Henry VIII wanted a male heir. His first wife gave birth to a daughter, but after that she had no more children. Henry wanted to marry another woman who could give him a son. Church law did not allow divorce, and the Pope refused to end Henry's marriage. So Henry ended the Pope's power in England and began the Anglican Church. Use the time line to answer the following questions. Write the answers in complete sentences.

1509	• Henry VIII becomes king of England.
1516	• Henry's first wife, Catherine, gives birth to a baby girl, Mary. Catherine has no more children. Henry wants a son.
1527	• Henry asks the Pope to end his marriage, and the Pope refuses.
1529	• Henry ends the Pope's power in England and begins the Anglican Church.
1533	• Henry marries Anne Boleyn, who gives birth to a baby girl, Elizabeth.
1536	• Henry has Anne Boleyn beheaded.
1537	• Henry's third wife has a son, Edward. His wife dies.
1540–1544	• Henry divorces his fourth wife and beheads his fifth wife.
1547	• Henry dies. His sixth wife outlives him.

1. Why did Henry VIII want a divorce from Catherine?

2. In what year was Henry's son, Edward, born?

3. How many wives did Henry VIII have?



Quiz: The Protestant Reformation

True/False

Decide if each statement is true or false, and write "true" or "false" in the blank.

- _____ 1. People wanted to reform the Roman Catholic Church because of corruption.
- _____ 2. By the 1400s, the Church refused to give or sell indulgences to anyone.
- _____ 3. Johann Tetzel wrote the "Ninety-Five Theses."
- _____ 4. Martin Luther was a German monk.
- _____ 5. Luther told Christians to reject the authority of England.

Multiple Choice

Circle the best answer, and write the letter in the box.

6. The Holy Roman emperor declared Luther a/an _____.
- A. outlaw
 - B. hero
 - C. monk
 - D. saint
7. Johann Tetzel made it sound like buying indulgences would guarantee entry into _____.
- A. the Cathedral in Rome
 - B. the Wittenberg Church
 - C. Heaven
 - D. Purgatory

Short Answer

Answer the following question in complete sentences.

8. What did Martin Luther's followers call themselves?

Reformation Lesson
Primary Source Analysis

Name: _____
95 Theses Excerpts

The following are selected theses points from Luther's 95 Theses:

33. Men must be on their guard against those who say that the pope's pardons are that inestimable gift of God by which man is reconciled to Him;
36. Every truly repentant Christian has a right to full remission of penalty and guilt, even without letters of pardon.
43. Christians are to be taught that he who gives to the poor or lends to the needy does a better work than buying pardons;
47. Christians are to be taught that the buying of pardons is a matter of free will, and not of commandment.
62. The true treasure of the Church is the Most Holy Gospel of the glory and the grace of God.
66. The treasures of the indulgences are nets with which they now fish for the riches of men.
67. The indulgences which the preachers cry as the "greatest graces" are known to be truly such, in so far as they promote gain.
75. To think the papal pardons so great that they could absolve a man even if he had committed an impossible sin and violated the Mother of God -- this is madness.
76. We say, on the contrary, that the papal pardons are not able to remove the very least of venial sins, so far as its guilt is concerned.

Document Discussion Questions –

1. What does Luther say is the true treasure of the church?
2. What does Luther say about buying pardons (indulgences)?
3. Judging from all of these, what is Luther's opinion on the position of the pope?
4. Rather than buying pardons, people should spend their money on what?
5. Does Luther believe a Christian has to have a pardon to be forgiven? What DOES a Christian need?
6. What can papal pardons do (or not do) according to Martin Luther?
7. After reading all of these do you feel whether the pope had just cause to excommunicate Luther from the church?
8. What does Luther's motivation seem to be after reading excerpts from his controversial text?

World History One DBQ: The Printing Press



WOODCUT OF A PRINTING PRESS AND A COMPOSING ROOM FROM LA GRANDE DANSE MACABRE, PRINTED AT LYONS AND DATED 1568

The Following task is based on the accompanying documents 1-7. Some documents have been edited for this exercise. The task is designed to test your ability to work with historical documents. As you analyze the documents, take into account both the source and purpose of the documents and the author's point of view.

Directions:

1. Read the Historical Context & Answer the corresponding worksheet questions
2. Read the Documents & Answer the corresponding worksheet questions
3. Create a Thesis to answer the question presented in the "Task"
4. Write an Essay to answer the question (**The essay requires an outline, Introduction paragraph, 3 supporting body paragraphs and a Conclusion**)
-or- Create a project which will present an answer to the question – (**The Project must still integrate a thesis & three items supporting the thesis & a Conclusion**)



Task: Analyze the impact of the printing press.

Historical Context:

In the mid 1400's Johnannes Gutenberg "invented" the printing press. (The technology had existed in China for centuries by that time). Before the printing press books were written out by hand. As a result books took a long time to produce and were both expensive and rare. Because of these factors few people in Europe had books and could read.

The printing press changed all of this. Books became plentiful, and were now being written in local languages such as German and English, not just Latin, which few people could read. This caused a chain reaction. More books led to more people reading, reading translates to literacy, literacy leads to education and education leads to more independent thinking. These books were both for entertainment and for practical purposes, exposing people to different philosophies and ways of thinking about things. William Shakespeare and Machiavelli are good examples of Renaissance era authors.



Document #1. Description of Book Making before the Printing Press

During the Middle Ages, manuscript books were produced by monks who worked with pen and ink in a copying room known as a scriptorium. Even a small book could take months to complete, and a book the size of the Bible could take several years.

www.hrc.utexas.edu/exhibitions/permanent/gutenberg/2a.html

Document #2 Image of a monk in a Monastery copying a book



www.hrc.utexas.edu/exhibitions/permanent/gutenberg/2a.html

Document #3 Description of the importance of Gutenberg's Printing Press

Gutenberg's methods spread with stunning rapidity. By 1500 an estimated half million printed books were in circulation: religious works, Greek and Roman classics, scientific texts, Columbus' report from the New World. An acceleration of the Renaissance was only the first by-product of the Gutenberg press. Without it, the Protestant movement might have been failed, as well as the subsequent political and industrial revolutions.

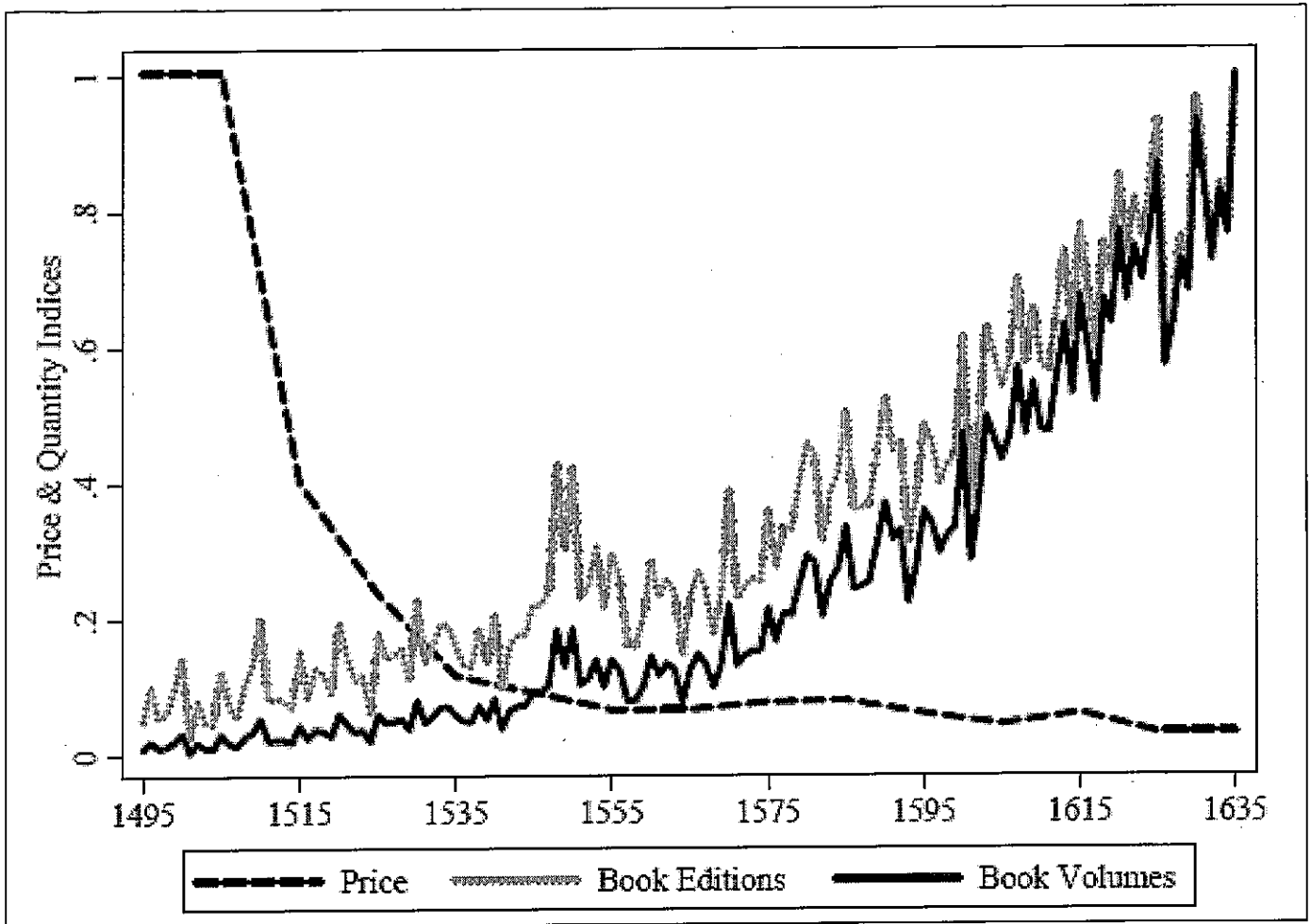
Text - Robert Friedman, ed., *The Life Millennium: The 100 Most Important Events & People of The Past 1,000 Years*, Time

Document #4 A Wood Engraving of a printer's workshop



<http://gds.parkland.edu>

Document #5 Prices and Quantities of Printed Books in England 1495-1639



The Welfare Impact of a New Good: The Printed Book. Jeremiah Dittmar 2011

Document #6 Thomas Carlyle, *Sartor Resartus*, 1833

He who first shortened the labor of copyists by device of movable types was disbanding hired armies, and cashiering most kings and senates, and creating a whole new democratic world: he had invented the art of printing.

Document # 7 The Printing Press and its Effects on Book Production – Revolution or Evolution?

The most important consequence of Gutenberg's invention, was the spread of printed books in medieval and early modern Europe. Classical, religious and scientific literature was printed in the vernacular and spread across Europe, increasing the level of literacy by providing readable texts to a growing reading public. These printed texts were sources of information for people of all political, social and economic strata [groups].

More and more, print became associated with the freedom of speech, religion, learning and the fight against old superstitions... One consequence of the printing press is that it allowed for the quick reproduction and widespread dissemination of religious and classical texts and ideas across Europe. By making book-production increasingly cheaper, the printed word spread far and wide to laymen across Europe, creating a larger reading public... Would the literature of the Renaissance, the Reformation and the Scientific Revolution have been spread as far and wide without the duplicative powers of print? Probably not. Similarly, would these movements have been as significant without their large audience? No.

The Printing Press and its Effects on Book Production – Revolution or Evolution by Eirik Jakobsen May 2005 University of Stavanger, Faculty of Arts and Education



Printing Press Documents

Task:

- Read through each of the following documents about the Printing Press
- For Each Document Answer "How did the Printing Press Impact The World?"

Document	How Did the Printing Press Impact the World?
1	
2	
3	
4	
5	
6	
7	