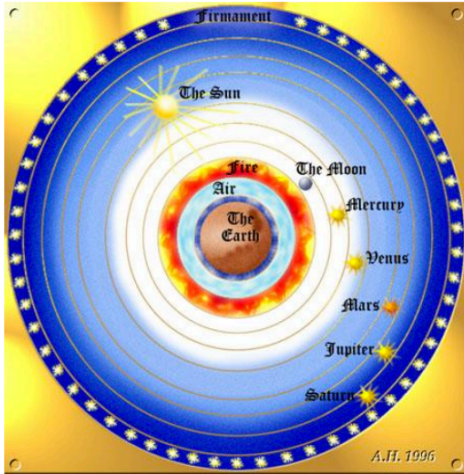


Galileo DBQ

Homework Due: _____



Graphic showing how Aristotle imagined the Universe.

The Greek philosopher Aristotle lived almost 2,000 years before Galileo's time, but people still believed his ideas, including the Catholic Church. One of Aristotle's accepted beliefs was that there were two kinds of matter, celestial and terrestrial. Celestial means "of the heavens," and terrestrial means "of the earth." This would mean that planets, stars, and moons—the celestial bodies—were different from Earth, the terrestrial body. These two kinds of matter each had their own particular kind of **motion**. This belief in different kinds of matter led over time to the belief that Earth is the center of the universe and that all celestial bodies **revolve** around Earth.

The view that Earth was the center of the universe was important to the Catholic Church because they believed that Jesus, the son of God, was human and lived on Earth. Such an important person could only live in the most important place—the center of the universe. It is important to note that these religious leaders did not know that the universe is made

up of billions of galaxies. They thought that the solar system we live in was the whole universe. So when they referred to the universe, they really meant only our solar system.

Galileo did not agree that our universe is geocentric, or that everything **revolves** around Earth. In 1609, Galileo began working on his own version of a very recent invention, the telescope. By 1610, he had not only developed his own telescope but had published a book about his observations using it. In *Starry Messenger*, he describes mountains on the moon as being like European mountains. He also notes his discovery that Jupiter has four moons revolving around it, just as Earth has one moon. In other words, he found that Earth is not different from other planets. Another book in 1613 brought him closer to his big discovery. First, he observed sun spots, which appeared to move. Galileo realized that the sun must **rotate**, which would explain the apparent movement of the spots. Second, he observed that Venus **rotates** around the sun.



Galileo and his telescope

Was the universe heliocentric, meaning that it **revolved** around the sun? If the heliocentric theory was true, it would mean that everything **revolves** around the sun, not Earth. It also would mean that Earth moves, too. If so, this would be a **tremendous** change in the way people view the world. Nicolaus Copernicus first proposed this idea in 1543. Copernicus's book was not very popular, and the Catholic Church was not very alarmed by this book. But Galileo believed he had made progress in proving that the theory was true. In 1611 he presented his **arguments** to Pope Paul V, who treated him respectfully. With this encouragement, Galileo was more convinced that Earth **revolves** around the sun. This led to his trial in 1616. Galileo obeyed the church order to end all discussion on the matter. But after 16 years, he published a book that the Catholic Church could not accept at the time.

You need to decide:

Was Galileo really a heretic?

Heretic: Someone who, in the opinion of others, believes contrary to the fundamental tenets of a religion he/she claims to belong to

For this homework assignment you will need to read the documents: annotating as you read, come to a conclusion, write a claim and outline your supporting evidence.

DOCUMENT A: Galileo's Letter

Galileo wrote the following letter to Duchess Christina of Tuscany in 1615. In this letter, he defends himself against the charges of heresy.

Some years ago I discovered in the heavens many things that had not been seen before our own age. The **novelty** of these things . . . stirred up several professors against me. They hurled various charges and published numerous writings filled with **vain** arguments, and they made the grave mistake of sprinkling these with passages taken from places in the Bible, which they failed to understand properly.

The reason given for attacking the opinion that the earth moves and the sun stands still is that in many places in the Bible one may read that the sun moves and the earth stands still. Since the Bible cannot **err**, it follows that anyone who claims that the sun is motionless and the earth movable takes an **erroneous** and heretical position.

With regard to this argument, I think in the first place that it is very **pious** to say and **prudent** to affirm that the holy Bible can never speak untruth—whenever its true meaning is understood. But I believe nobody will deny that the Bible is often very complex, and may say things which are quite different from what its bare words **signify**. . . .

I do not believe that the same God who has given senses, reason and intellect has intended us to not to use them. . . . He would not require us to deny sense and reason in physical matters of direct experience. . . . Can an opinion be heretical and yet have no concern with the salvation of souls?

Source: Galileo Galilei, "Letter to the Grand Duchess Christina of Tuscany," 1615.

Vocabulary

novelty: original or unusual

vain: conceited

err: to be wrong

erroneous: wrong

pious: devoutly religious

prudent: wise

signify: mean

The following are excerpts from the King James Version and Catholic Bibles

Note to the reader: Take under consideration that popular belief of the time was that “the heavens” were literally located beyond the stars. It was the church belief that earth was the center of the universe and that the stars (and sun) revolved around it. As you will see, this was difficult to defend with evidence from the Bible, since the Bible is a faith based, non-technical book. Church officials were forced to make broad interpretation of Scripture. While you are reading these excerpts from varying versions of Bible, evaluate whether the Bible presents strong evidence against the Copernican theory.

Joshua 10 (Verse 13)

And the sun stood still, and the moon stayed, until the people had avenged themselves upon their enemies. Is not this written in the book of Jasher: *So the sun stood still in the midst of heaven, and hasted not to go down about a whole day.* [King James]

13 And the sun and the moon stood still, till the people revenged themselves of their enemies. Is not this written in the book of the just? So the sun stood still in the midst of heaven, and hasted not to go down the space of one day. [Catholic]

Psalm 19 (Verses 1-5)

1 The heavens declare the glory of God; and the firmament sheweth his handywork.

2 Day unto day uttereth speech, and night unto night sheweth knowledge.

3 There is no speech nor language, where their voice is not heard.

4 Their line is gone out through all the earth, and their words to the end of the world. In them hath he set a tabernacle for the sun,

5 Which is as a bridegroom coming out of his chamber, and rejoiceth as a strong man to run a race.

[King James]

Psalm 104 (Verses 1-5)

1 Bless the LORD, O my soul. O LORD my God, thou art very great; thou art clothed with honour and majesty.

2 Who coverest thyself with light as with a garment: who stretchest out the heavens like a curtain:

3 Who layeth the beams of his chambers in the waters: who maketh the clouds his chariot: who walketh upon the wings of the wind:

4 Who maketh his angels spirits; his ministers a flaming fire:

5 *Who laid the foundations of the earth, that it should not be removed for ever.* [King James]

Isaiah 40 (Verse 22):

22 *It is he that sitteth upon the circle of the earth, and the inhabitants thereof are as grasshoppers; that stretcheth out the heavens as a curtain, and spreadeth them out as a tent to dwell in:* [King James]

22 It is he that sitteth upon the globe of the earth, and the inhabitants thereof are as locusts: *he that stretcheth out the heavens as nothing, and spreadeth them out as a tent to dwell in.* [Catholic]

Cardinal Robert Bellarmine was in charge of dealing with difficult issues connected to the Church's power and beliefs during the Galileo controversy. He wrote the following letter to Paolo Antonio Foscarini in response to Foscarini's book defending Galileo. Historians don't believe Bellarmine ever saw Galileo's 1615 letter (Document A).

As you know, the Council [of Trent] prohibits interpreting the Scriptures **contrary** to the common agreement of the holy Fathers. And if you would read not only the Fathers but also the commentaries of modern writers on **Genesis, Psalms, Ecclesiastes and Joshua**, you would find that all agree in explaining that the sun is in the heavens and moves swiftly around the earth, and that the earth is far from the heavens and stands immobile in the center of the universe. . . .

It would be just as heretical to deny that Abraham had two sons and Jacob twelve, as it would be to deny the virgin birth of Christ, for both are declared by the Holy Ghost through the mouths of the **prophets** and **apostles**. . . .

I say that if there were a true demonstration that the sun was in the center of the universe and the earth in the third sphere, and that the sun did not travel around the earth but the earth circled the sun, then it would be necessary to proceed with great caution in explaining the passages of **Scripture** which seemed contrary, and we would rather have to say that we did not understand the Scripture than to say that something was false which has been demonstrated. But I do not believe that there is any such demonstration; none has been shown to me. . . . [One] clearly experiences that the earth stands still and that his eye is not deceived when it judges that the moon and stars move.

Source: Cardinal Robert Bellarmine, "Letter on Galileo's Theories," 1615.

Vocabulary

contrary: against or the opposite of something

Genesis, Psalms, Ecclesiastes and Joshua: sections of the Bible

prophets: someone who speaks for God

apostles: religious messengers

scripture: text from the Bible

*In 1632, Galileo, who had been teaching and writing about the idea that the Earth moved around the sun, was summoned to Rome to stand trial. After questioning the relevant witnesses, the judges issued the following **condemnation** of Galileo.*

You, Galileo of Florence, were **denounced** in 1615, by this Holy Office, for holding as true a false **doctrine** taught by many, namely, that the sun is immovable in the center of the world, and that the earth moves . . . also, for explaining the **Scriptures** according to your own meaning. Therefore . . . by the desire of his Holiness and the Most **Eminent** Lords, Cardinals of this supreme and universal Inquisition, the two **propositions** of the stability of the sun, and the motion of the earth, were qualified as follows:

1. The proposition that the sun is in the center of the world and immovable from its place is absurd, philosophically false, and formally heretical; because it is expressly contrary to Holy Scriptures.
2. The proposition that the earth is not the center of the world, nor immovable, but that it moves is also absurd, philosophically false, and, theologically considered, at least erroneous in faith.

Therefore, in the most holy name of our Lord Jesus Christ and of His Most Glorious Mother Mary, We pronounce, judge, and declare, that you Galileo . . . have made yourself suspected by this Holy Office of heresy, that is, of having believed and held the doctrine (which is false and contrary to the Holy and Divine Scriptures) that the sun is the center of the world, and that it does not move from east to west, and that the earth does move, and is not the center of the world; also, that an opinion can be held and supported as probable, after it has been declared contrary to the Holy Scripture.

Source: *“The Crime of Galileo: Indictment and Abjuration of 1633.”*

Vocabulary

condemnation: a statement of very strong criticism

scripture: text from the Bible

denounce: to declare something is wrong or evil

doctrine: a set of beliefs

eminent: distinguished, high in station

proposition: a statement expressing a judgment or opinion

Questions to consider:

(I will not grade these, they are meant to help you think about the documents you have just read)

- If you didn't know about any of the scientific discoveries about the solar system and only knew what you could observe, would you think that the sun or the earth orbits the other?
- Why is it a problem that heliocentrism contradicts the Bible?
- Why would the Catholic Church ban Galileo from teaching what he saw in his telescope?
- Could the verses in the bible have been misinterpreted? Have different interpretations?
- Does Galileo believe in the teachings of the Bible? Is he saying the Bible is wrong?
- Is the Catholic church okay with people interpreting the Bible for themselves?
- What makes something true?

Pitch Forking:

Using the pitchfork model below, write a claim that answers the question: **Was Galileo really a heretic?**

(warning: you are not arguing whether he was right or wrong, you are creating a claim as to whether he was someone who holds a belief that is strongly at variance with established beliefs or customs, in particular the accepted beliefs of a church or religious organization.)



Quick check list for claims:


- My claim is a complete sentence (does not start with: "it" or "he/she" or "they")
- My claim takes a position: It is clear to the reader that I have come to a conclusion about why Galileo is or is not a heretic
- My claim explains my position/opinion in an academic argument with at least 3 key points
- My claim is arguable it can be backed up with evidence, quotations, argumentation, expert opinion, statistics, and telling details from the sources I have to work with

Now use your claim to complete the outline below:

My first key point:
Evidence (quote from the text) I will use from sources to make my point: (Document _____)
Argument: my conclusion and analysis as to why this shows evidence that Galileo was/was not a heretic

My second key point:
Evidence (quote from the text) I will use from sources to make my point: (Document _____)
Argument: my conclusion and analysis as to why this shows evidence that Galileo was/was not a heretic
My third key point:
Evidence (quote from the text) I will use from sources to make my point: (Document _____)
Argument: my conclusion and analysis as to why this shows evidence that Galileo was/was not a heretic

Annotations score

0	1	2	3	4
Please complete and turn in as soon as possible	Some major errors. Claim is incomplete, evidence does not match key points. Lacking analysis	Needs to undergo revisions. Claim is good, may have incomplete evidence, lack analysis	You mostly have it! Your claim and evidence support one another. Your argument is sound.	

Your total score will be multiplies by 5