**CHAPTER 14-NEW DIRECTIONS IN THOUGHT AND CULTURE IN THE SIXTEENTH AND SEVENTEENTH CENTURIES**

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| **SUMMATIVE STATEMENT**: (pg 417-418) | |
| **Scientific Revolution (definition pg. 418)** | |
| **THE SCIENTIFIC REVOLUTION (pg 418)** | |
| Facts/Information | Consequences |
| The scientific revolution was not rapid. It was:  Leading figures weren’t isolated because they used (what kind of people to help):  Individuals who worked with natural philosophy could mostly be found where? | Revolution saw the establishment of:  Natural knowledge was what:  The studies/findings of those individuals were partially prejudiced by the person/university that was sponsoring their work (patron)  Eventually, (2nd half of 1600’s) were formal societies and academies created |
| **SUMMATIVE STATEMENT**  By the end of the seventeenth century through the end of the twentieth century, science achieved greater cultural authority in the Western world than any other form of intellectual activities and the authority and application of scientific knowledge became one of the defining characteristics of modern Western civilization.  Summative statement in my own words: | |
| **NICHOLAUS COPERNICUS (1473-1543)** | |
| Brief summation and description of ideals (pg. 418) | |
| Facts/information | Consequences/findings |
| He refuted and criticized the then-dominant view of the position of the Earth (the center of the universe)  This is relevant because: (inference) | He did this to help the papacy (Catholic church) to reform the calendar to best reflect the day of Easter as it relates to astronomy. |
| Background: **PTOLEMAIC SYSTEM** | |
| Five basic facts about the Ptolemaic System: (419)  1.  2.  3.  4.  5. | Problems discovered with the Ptolemaic system: (419)  1.  2.  Epicycle (definition)  3.  Other intellectual, difficulties:  1.  Conclusion: (bottom of 1st column, pg.419) |
| **DRAW THE PTOLEMAIC SYSTEM:** | |
| **COPERNICUS’S UNIVERSE** | |
| Transferred the ideals of a Ptolemaic model, geo-centrism, to heliocentric model, which is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | How were the retrograde motions of the planets now explained due to his theory? |
| Additional argument that challenged geo-centrism: | Conclusion: (regarding the length of the individual revolutions) |
| The repositioning of the Earth (geo-centrism) wasn’t his original goal. His appears to have set out to achieve: | |
| Major contribution(s): | |
| Draw Copernicus’ model | |
| **TYCHO BRAHE / JOHANNES KEPLER** | |
| **Tycho Brahe**: Brief description and summation of ideals: | How he differed from Copernicus: |
| Draw Brahe’s model (earth-centered system) | |
| **SUMMATIVE STATEMENT:**  Brahe constructed scientific instruments with which he made more extensive naked-eye observations of the plants than anyone else had ever done. He produced a vast body of astronomical data which his successors could work. | |
| **Johannes Kepler:** (who he was/ideals) | How he was similar to Copernicus:  How he utilized Brahe’s research:  What did he have to eventually abandon from Copernicus’ model?  Conclusive findings based upon the heliocentric model AND the Brahe’s mathemical relationships: |
| Draw Kepler’s model: | |
| New problem: (pg.420) | |
| **GALILEO GALILEI (1546-1642)** | |
| **Galileo** brief description/ideals: | How did his ideals differ from Brahe, Kepler and Copernicus? |
| What was the impact of the **telescope** in Galileo’s research? | Consequence of his discoveries: (420-421) |
| Galileo not only popularized the Copernical system, but he also articulated the concept of a universe subject to mathematical laws. More than any other writer of the century, he argued that nature displayed mathematic regularity in its most minute detail  In my own words and consequences as a result of his findings: (world of quantities replaced by world of qualities) | |
| How did this new natural philosophy portray nature and what was its effect?  **SIR ISAAC NEWTON** | |
| *The question that continued to perplex seventeenth-century scientists who accepted the theories of Copernicus, Kepler, and Galileo was how the planets and other heavenly bodies moved in an orderly fashion.* | |
| Isaac Newton: (description/ideals) | Newton reasoned: (pg 421) |
| Empiricism: (definition) | Why was this important to Newton? |
| **PHILOSOPHY RESPONDS TO CHANGING SCIENCE** | |
| **Nature as Mechanism** | |
| How did the proponents of the new science seek to explain the world? | Why was this effective and relevant to the people of the times? (422 second column)  Shift in thought from:  To:  Conclusion:  People would tend to see knowledge of nature as revealing nothing beyond itself—nothing about divine purposes for the life of humankind on earth. |
| **SUMMATIVE STATEMENT**:  Natural knowledge became the path toward physical improvement of human beings through their ability to command and manipulate the processes of nature. | |

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| **PHILOSOPHERS** | | |
| Francis Bacon  Description:  Most important contribution:  Bacon’s ***Advancement of Learning, Novum Organum, The New Atlantis*** attacked and established what?  What did Bacon believe about human knowledge?  Specifically:  How to achieve those goals:  Explain: *“The scholastic logic now in use serves more to fix and give stability to the errors which have their foundation in commonly received notions than to help the search after truth.”*  Bacon urged all philosophers to examine what?  How does this support his ideologies?  Why is his comparison of himself to Columbus relevant and significant?  Bacon’s main dissent from the people in his day is:  His belief that expanding natural knowledge had a practical purpose and its goal was human improvement. What was the long-term result of this idea? (424 end) | Rene Descartes  Description:  Most important contribution:  ***Discourse on Method*** rejected and advocated:  Why was the presence of God important to Descartes?  ***Conclusion was that human reason could fully comprehend the world.***  Two categories:   1. Thinking things 2. Things occupying space   His deductive methodology lost favor to **scientific induction (define)**  Why did that happen?  Most relevant information about Descartes I gathered from this: | Thomas Hobbes  Description:  Most important contribution:  ***Levithan*’s** purpose was to:  Summation of his writings in Levithan regarding humans:  *According to Hobbes, only a sovereign commonwealth established by a contract between the ruler and the ruled could enable human beings to meet those needs by limiting the free exercise of the natural human pursuit of self-interest with all its potential.*  What does he say will happen to human beings who do not have a sovereign commonwealth?  How does he reject the heretofore accepted philosophies of Aquinas and Aristotle?  Hobbes sees the original human state as a state of natural, inevitable conflict in which neither safety, security, nor any final authority existed.  THEREFORE:  How do humans then escape this terrible state of nature:  What is the golden rule?  Explain the opposition to his ideologies: (426) |

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| **JOHN LOCKE** | |
| John Locke  Description:  *First Treatise on Government:* main ideas  *Second Treatise on Government:* main ideas  What did Locke believe about people and religion?  Different from all others because:  *Letter Concerning Toleration* established:  *Essay Concerning Human Understanding* established: | Differs from Hobbes:  Regarding Humans:  Hobbes-  Locke-  Authority:  Hobbes-  Locke  Conflict in the state of nature:  Hobbes-  Locke  Relationship between rulers and the governed:  Hobbes-  Locke- |
| **SUMMATIVE STATEMENT**:  For Locke, reason and revelation were compatible and together could sustain a moderate religious faith that would avoid religious conflict.  **IN MY OWN WORDS**: |  |