Lecture Notes

**Change in the air: (Slide 1)**

Before scholars just accepted ancient Greek teaching, until such men as Copernicus, Galileo began to question these teachings. The church had major issues with those questioning the church. The church was supposed to have all the correct answers. Remember the word infallible?

**Geocentric Theory: (Slide 2)**

Earth centered view. Idea from great philosopher Aristotle and Greek astronomer Ptolemy. Christianity taught that God placed the earth at the center of the universe thus being a special place.

**Scientific Revolution: (Slide 3)**

New way to look at the world, questioning and finding answers disproving old beliefs, but as questions become answered new ones follow creating the Scientific Revolution. For example, Copernicus (earth not center) Kepler math to back it up. Galileo (book supporting Copernicus and telescope describing earth surface etc.) Development of the Scientific Method.

**Heliocentric Theory: (Slide 4)**

Stars, earth and other planet revolved around the sun. Did not completely explain why the planets orbited the way they did. Important statement. This is an example of the Scientific Revolution, the did not have all the answers but they opened the door for others.

**Copernicus: (Polish) (Slide 4)**

Discovered the Heliocentric Theory, wrote a book *On the Revolutions of the Heavenly Bodies,* he did not publish his findings until 1543 the last year of this life. Received copy of book on death bed. Why would he have done this?

**Read through slide 5**

**Kepler: (Danish) (Slide 6)**

Continued Copernicus’s work, showed that planets revolve around the sun in elliptical orbits instead of circles. Backed up Copernicus with math, came up with mathematical laws that govern planetary motion.

**Galileo: (Italian)(Slide 7)**

Built a telescope to study the heavens. Published a book called *Starry Messenger,* this book described his astonishing observations. Jupiter had four moons, sun had dark spots. Earth’s moon uneven surface. Shattered Aristotle’s theory that the moon and stars were made of a perfect and pure surface. Church warned him not to do this it was going against church teachings. Tried to be slick and published *Dialogue Concerning the Two Chief World Systems,*  Book presented both ideas of Copernicus and Ptolemy clearly showed his support of Copernicus’ theories. Had to sign a confession and never again was free man. Lived under house arrest.

**Scientific Method: (Slide 8)**

Logical procedure for gathering and testing ideas begins with a….

Problem or question from an observation

Form an assumption (hypothesis)

Test hypothesis on experiments or basis of data

Analyze and interpret the date to reach a new conclusion

Confirms or disproves the hypothesis.

**Bacon: (Slide 9)**

Credited with the development of the Scientific Method. He was an English statesman and writer, had a passion for science. Felt that scientists relied to heavily on the conclusions of Aristotle and other ancient thinkers. He urged that Scientists should experiment and then draw conclusions. Called experimental method. Important tool for scientific research.

**Descartes: (Slide 10)**

Like Bacon Descartes believed that one should reject old assumptions and teachings. Rather than just using experimenting, one should rely on mathematics and logic. Everything should be doubted until proven by reason “ I think therefore I am”

**Newton: (Slide 11)**

Created a single theory of motion. All physical objects were effected equally by the same forces (gravity). Same force ruled the planets. All objects are attracted together and the degree of attraction depends on the mass of the objects and the distance between them. Published his ideas in a book known as *The Mathematical Principles of Natural Philosophy.* Described universe as a big clock and God as the creator of this clock.

**Scientific instrument. (Slide 12)**

New tools were developed to make the precise observations that the scientific method demanded. Such as….

Microscope- Invented by Dutch maker of eyeglasses Janssen. Things like bacteria and red blood cells were observed for the first time eighty years later by Leeuwenhoek.

Mercury barometer- tool for measuring atmospheric pressure and predicting weather. Torricelli developed it.

Thermometer- showed water freezing at 32 degrees, Fahrenheit, Gabriel.

Angers Celsius created another scale for the mercury thermometer that showed freezing at 0 degrees.

**Medicine and Discoveries in Chemistry: (Slide 13)**

Vesalius dissected human corpses and published observations that stated that humans and other animals did not have the same anatomy like previously stated in Galen’s ancient writings. His book was the *Structure of the Human Body.*

Edward Jenner introduced a vaccine to prevent smallpox. It was dangerous he used cow pox, think of how he would use the Scientific Method to prove this.

Robert Boyle pioneered scientific method in chemistry. Wrote book, *Skeptical Chymist.* Challenged Aristotle’s idea that the physical world consisted of four elements earth air fire and water, he proposed these matters were made up of smaller primary particles that joined together in different ways. Boyle’s law- how volume, temperature and pressure of gas affect each other.

This thinking move to other fields of life which helped to usher in a movement that challenged the age old relationship between a government and it’s people….. DEMOCRACY…….