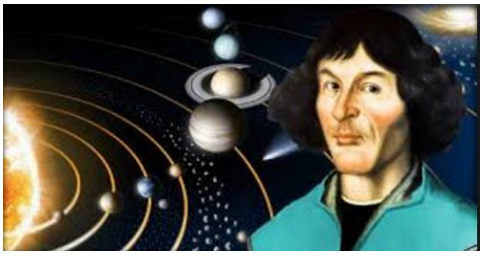
SS 8

Science to the Rescue



Nicolaus Copernicus
One of the fathers of the Scientific Revolution

The Scientific Revolution and the Age of Discovery owe their roots to the Renaissance and the Reformation. Both required an environment that both encouraged and allowed people to question and seek out new answers to the world around them. It is important to remember that the 16th Century is still a time where the Catholic Church has a lot of power and influence. The Protestant Reformation is well under way and fighting and killing over the two different views of Christianity is yet to reach its peak, but the spirit of the Renaissance has taken hold. This means that even though people are still very religious and are fighting to protect their views, the spirit of inquiry and the search for truthful knowledge has taken hold.

The Start of the Scientific Revolution

Although there are many, documented examples of people using science as a way to explain the world around them, it is a man by the name of Nicolaus Copernicus that is often credited with the start of the Scientific Revolution. Before Copernicus the world was often explained through religious terms. God created Earth and man, and this made the planet the center of the universe. Copernicus used the ideas of the Renaissance that encouraged rational thought and reason to make observations and calculations that differed from these religious beliefs.

At the time, religion was teaching that because God created the world, it was the centre of the universe and as it lay still, the Universe revolved around it. Copernicus was able to use the newfound idea of the Scientific Method to make observations and use mathematical equations to prove that the Earth was not the centre of the universe. Copernicus was also able to prove through science, that the Sun did not revolve around the Earth, but that the Earth in fact, rotated on its own and revolved around the Sun. This may seem self-evident by today's standards, but in the 16th Century, this was a radical and very **controversial** claim. To make such a statement went against everything the Church was saying and as a result, Copernicus was attacked by this powerful and influential institution

Revolution and the Scientific Method

A **revolution** is a radical departure from what is the norm and results in a new way of thinking. This means, that a revolution changes the way people think and interact with the world. The Scientific Revolution was built on the ideas fostered in the Renaissance and Reformation where people were taught to question, rather than accept what was being told to them about the world around them. Copernicus's calculations proved that the Earth was not the centre of the Universe or even the centre of our Solar System. Copernicus' calculations were based on observable data or information that anyone who looked, could see. This is what is at the heart of the Scientific

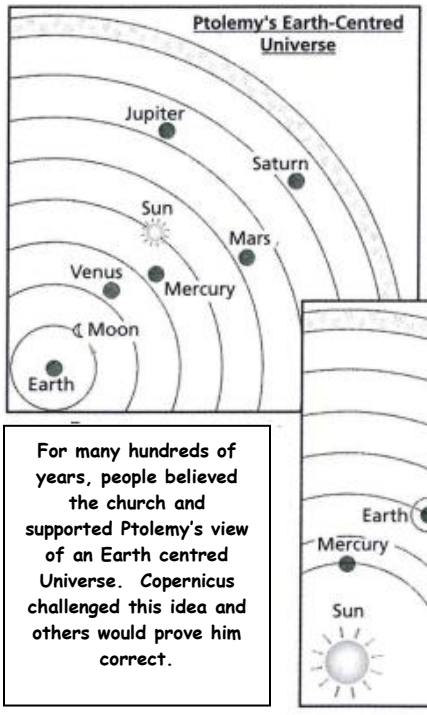
Controversial – an idea or action that is likely to bring about a public argument.

Revolution – an event or idea that is a radical departure from what is currently believed or practiced and results in a new way to think or act.

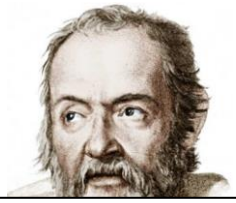
Revolution and what makes the **scientific method** such a powerful tool for finding the truth. The scientific method allows people from anywhere in the world, to replicate or observe the same data and come to the same conclusion. Soon, other scientists who followed him were able to observe and calculate the same information and receive the same results that Copernicus did. In this example, the scientific method would prove that Copernicus' ideas were "truthful knowledge" and would set forth a whole new way in which to look and operate in the world. It was by definition, a revolutionary new way of thinking.

Resistance to Science

For many people in power during the 16th Century, absolute truths or facts sometimes threatened what they believed or threatened the institutions that kept them in power. If people were able to prove that what you were telling them was false, then people may question everything else you were telling them. When Copernicus' ideas of a Sun-Centred Universe was proven correct by another **astronomer** called Galileo Galilei, the Catholic Church summoned him before an **Inquisition** or a Church Court. Galileo was using the scientific method to prove Copernicus' ideas that questioned the Church's view that because God created Earth, that everything, including the sun revolved around it. Galileo resisted, but when he was threatened to be tortured, he finally agreed to the Church's belief of an Earth-Centred Universe. Although, as he was being led away to house arrest, legend has it that he muttered the sentence "…but still it moves", meaning that the Earth was not stationary like the Church believed, but rotating and spinning like Copernicus had suggested. This was a simple sentence, but it represents the feeling of many during this time. No matter what people believed or what people were being taught to believe, the truth was still worth proving and in fact required proof. This sense of determination and adventure would fuel more scientific discoveries and would fuel the Age of Exploration.



For many hundreds of years, people believed the church and supported Ptolemy's view of an Earth centred Universe. Copernicus challenged this idea and others would prove him correct.



Galileo would replicate Copernicus' calculations to prove his Sun-Centred Solar System

Scientific Method – a defined process of investigation, experimentation and reflection designed to find truthful knowledge.
Astronomer – a scientist who uses math and observations to study the planets and stars.

Inquisition – a Catholic Church court designed to put people on trial for offering beliefs or ideas that differed from what the church believed.

SS 8

Science to the Rescue

Directions: READ the handout entitled; "Science to the Rescue" and then answer the following questions:

1. Use your handout, to provide definitions for the following terms: (1 mark each)

Controversial	
Revolution	
Scientific Method	
Astronomer	

Inquisition	

2. On a separate piece of paper, answer the following questions using **COMPLETE SENTENCES:**

a. In your own words, describe who used science and math to prove that the Earth is not the centre of the universe. Why would this be a controversial discovery? (2 marks for quality of response and inclusion of details)

A great mathematician and astronomer by the name of _____ was able to prove through science that the Earth is NOT the centre of the universe and instead the Sun is the centre of our solar system. This would be controversial because it went against what the _____ believed.

b. In your own words describe why the Scientific Revolution needed the Renaissance to happen first. What makes the Scientific Method is a perfect tool for finding truthful knowledge? (2 marks for the quality of your response and evidence of thought and effort)

The Scientific Revolution needed the Renaissance to happen first because the Renaissance inspired people to seek out truthful _____ rather than simply accept what the Church was telling people. The Scientific Method is the perfect tool for finding truthful knowledge because it has to be based on _____ and the results have to be _____ by others.

c. In your own words, describe why you think the Church would not agree with Copernicus' Sun-Centred Solar system. Who would support Copernicus' ideas and what happened to him? (2 marks for quality of response and evidence of insight)

The Church did not agree with Copernicus' ideas because they believed that because God created the Earth then the Earth must be the _____ of the Universe. An astronomer by the name of _____ would support Copernicus' Sun-Centred Solar system and when he did, he was _____ by the Church and was threatened to say that the Sun was not the centre of the Solar System.

3. Word Search – Scientific Revolution

<u>You will be marked out of 5 for completing the following Word Search</u>

Total: ____ /16

The Scientific Revolution

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C	N	E	R	I	E	U	O	C	E	U	O	A	E
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GALILEO
REVOLUTION
MISCROSCOPE
COPERNICUS
INVENTIONS
LIGHT
GEOCENTRIC
TECHNOLOGY
LENS
TELESCOPE
SCIENTIFIC